

# Earth Science Newsletter

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## Emerita Profile

Very few geologists have had as much influence on the earth sciences in the last century as Professor Emerita Tanya Atwater. In the Sept 4, 2013 issue of Nature, science historian Naomi Oreskes writes: "More than two dozen scientists, including women such as Tanya Atwater..., did the key work that created the theory of plate tectonics as we know it — explaining continental drift, volcanism, seismicity and heat flow around the globe." More specifically, Tanya Atwater provided the first quantitative assessment of the role of plate tectonics on the geology of continents, focusing on her now famous work on the geology of western North America. What distinguished her work from a number of other leading geologists at the time was her precise analysis of seafloor magnetic anomalies.



Seafloor spreading was just being discovered, and she wondered how tectonics in the ocean could connect with that on the continents. Deciphering plate motions from marine magnetic data allowed her to make accurate calculations of the timing of key tectonic events as the mid-ocean ridge offshore of western North America collided with the continent and was subducted, leading in a very interesting way to the birth of the San Andreas fault system and a host of other geologic events. Remarkably, she was a young graduate student at the Scripps Institution of Oceanography (UCSD) when she did this landmark work, taking time off from her primary dissertation topic at the time. She and her colleagues returned to this subject two decades later, armed with better magnetic anomaly data and statistical tools, and provided precise calculations of the uncertainties for the timing of geologic events in western North America and elsewhere in the world. She provided geologists throughout the west with a long list of predictions to test in the field and explained many geologic conundrums. Her initial paper on this subject and the follow-up work are amongst the most widely cited papers in all of the earth sciences.

These benchmark discoveries overshadowed the fundamental contributions she made to our understanding of the tectonics of mid-ocean ridges and oceanic transform faults. She defined block-faulting on the Gorda Ridge, explained "leaky" transform faults, and analyzed magnetic anomaly polarity transitions to decipher the processes of crustal accretion at spreading centers. These contributions helped to lay the foundation of much of our current understanding of divergent plate boundaries. Beyond this, she also did important work on "hotspots" and global plate circuit closure, too much to write about here!

Reflecting on this age of discovery in which she played such a key role, Tanya recently remarked: *"The best part of the plate business is that it has made us all start communicating. People who squeeze rocks and people who identify deep ocean nanofossils and people who map faults in Montana suddenly all care about each*

*...cont'd on p.2*

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## EMERITA PROFILE: TANYA ATWATER, *cont'd from p.1...*



*others' work. I think I spend half my time just talking and listening to people from many fields, searching together for how it might all fit together. And when something does fall into place, there is that mental explosion and the wondrous excitement. I think the human brain must love order."*

She was a pioneer as one of the first women oceanographers to go to sea. In the late 60's at Scripps and elsewhere, women were not allowed on the research ships, and were considered to be bad luck (really). She insisted that her research required her to go to sea, and her advisor agreed, insisting that adjustments be made aboard the ships to include her. In those early years she found herself sometimes sleeping in a sleeping bag on the floor or under a table in the main lab, other times occupying the best crew stateroom on the ship. She proved herself to be a great seagoing oceanographer and opened the door for the seagoing women who followed. Later in her career she became the first woman Chief Scientist of an ALVIN (three person research sub) expedition. Again, there was a major kerfuffle over bathroom facilities, both on board the cramped mother ship (R/V LULU), only one head for 24 people) and on board the submersible. She should write a book about these adventures someday!

In our department at UCSB, Professor Atwater was a passionate teacher of Introduction to Oceanography (GS 4), Physical Geology (GS 2), Plate Tectonics (GS 157) and Marine Geology (GS 105), in addition to "Geology for Artists" through the College of Creative Studies and various graduate student seminars. She was also very active in the field course GS 18, which introduced non-majors and majors alike to the very exciting geology in our own backyard. She provided "the big picture" while others painted in the fascinating details told by the rocks.

Another of her passions is communicating how the Earth works to a broad public audience. She poured enormous energy into public "outreach" before it was even a commonly used word. Her 1985 movie on plate tectonics is one of the finest instructional videos ever made, and was produced in the difficult old-school way with hand-drawn illustrations on plastic cells converted to animations one frame at a time. From the 1990's to the present, she has employed computer animations to greatly expand on her original plate tectonics movie. Her animations show the precise history of the Pacific Ocean basin and North America, the Atlantic ocean basins, and the continental collision that formed the Himalayan mountains. Others illustrate glacial cycles and local complexities in the geographic and geologic history of southern California and the Santa Barbara Channel Islands. She was honored with one of the first National Science Foundation Distinguished Teaching Awards for this work, providing her with a \$300,000 grant to invite and instruct teachers and researchers from around the world in the use of geologic animations for research, communication and outreach. In so doing, she established the Educational Multimedia Visualization Center in the UCSB Department of Earth Science, and served as its Director. What is so exceptional about her plate tectonic animations is that they are not imprecise cartoons. Rather, they are step-by-step quantitative determinations of plate kinematics and their implications based primarily on analysis of marine magnetic anomalies and precise measurements of deformations onshore.

To leverage her educational impact on society, Professor Atwater focuses on teaching teachers. As Professor Emerita, she also continues her outreach efforts through the Channel Islands Restoration organization, and she gives frequent talks around the country, including at our own Santa Barbara Museum of Natural History, Channel Islands Naturalists Corps, Santa Barbara Botanical Gardens, and other local venues.

She has been widely recognized for her pioneering work, as follows: elected a Fellow of the American Geophysical Union; named a co-recipient of the 1980 annual AAAS Newcomb Cleveland Prize for the top research paper in the journal *Science* (along with three other UCSB emeritus professors); awarded the Gold Medal from Society of Women Geographers; elected a Fellow of the Geological Society of America; selected for an NSF Distinguished Teaching Award; awarded the Leopold von Buch Medal, German Geosciences Society, DGG; and elected to the U.S. National Academy of Sciences (NAS), which is the premier scientific body in our nation.

As an active member of NAS, she was instrumental just last year in establishing the "Next Generation Science Standards" for K-12 schools across the country, including the elevation of the Earth and Space sciences to be one of the three branches of science to be taught at all levels (the others being Life sciences and Physical sciences).

It has been a privilege, a pleasure and an honor for the UCSB faculty, students and university to have such an exceptional person in our midst!



# Letter from the Chair

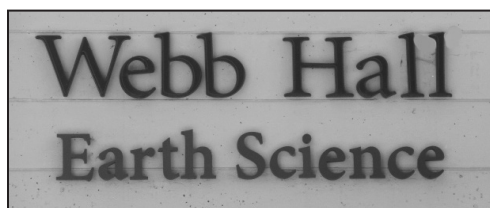


We begin the new academic year on many positive notes. This past year we made our first new faculty hire in several years. With a specialty in the field of geochemistry-petrology, Matt Jackson joined us this fall from Boston University where he had been an assistant professor for five years. Key parts of Matt's research will be conducted in a soon-to-be-constructed metal-free, clean lab. We are now in the initial stages of another faculty search: this one in Geodynamics. This search is part of multi-year effort to strengthen Geophysics following a series of retirements over the past decade. Such new hiring is, in part, made possible in part by the statewide vote last fall to increase support for higher education, rather than to cut another \$250M from UC's budget, as in previous years. As a result, we anticipate a gradual replenishing of our faculty and improvements in our teaching and research facilities. If you voted for this measure in California, we thank you!

During this past year, two of our assistant professors (John Cottle and Alex Simms) were awarded tenure - we look forward to years of their striking intellectual and instructional contributions. Speaking of awards for faculty, Toshiro Tanimoto was inducted as a Fellow of the AGU this past fall, and David Lea was elected as a 2013 AGU Fellow. They join 6 other AGU Fellows among our faculty. David was also inducted this past winter as the Fellow of the Amer.

Assoc. for the Advancement of Science, as was I. Ken Macdonald was elected as a fellow of the other AAAS (Arts & Sciences). Susannah Porter received UCSB's Distinguished Teaching Award, in part for her success in teaching *Dinosaurs* to GE classes of up to 700 students! Stan Awramik was elected a Fellow of the Geological Society of America, and Dave Valentine received a Leopold Leadership award. We are, of course, very pleased with the diverse accolades that our faculty garner, and we take obvious pride in their successes.

A walk around Webb Hall would show some changes since last year. Passersby can now see that "Earth Science" is what happens in Webb Hall. With support and encouragement from Tanya Atwater and the department, local artist and geologic aficionado John Iwerks created a 23-foot-long depiction of the south-north cross section from the Channel Islands to the Santa Ynez Fault. This gorgeous section now adorns a similarly oriented (S-N) hallway and is already a valued (and attractive!) teaching aid. With some cost-sharing from our dean, we bought a half dozen new petrographic microscopes this year (which students now tussle over...). One 'scope with an excellent integrated camera is hooked up to a 60" high-definition LCD display that has transformed the teaching (and learning) of petrology for our students. Some are equipped with reflected light to use in our Ore Deposits and Mineral Resources course. We hope to gradually upgrade all of our 'scopes. For \$5500, we can put your name on a new one 😊!



Speaking of contributions, Alex and Claudia Webster, who were students here in the '70s, gave us \$100,000 to underwrite a fund designed support field activities. This gift is perhaps the largest of this sort that we have ever received - and we are tremendously grateful! This year we plan to inaugurate the Crowell Lectureship, named, of course, for John Crowell, our emeritus professor who is famous for his pioneering work both on tectonics and sedimentation along the San Andreas Fault and on pre-Pleistocene glaciations. With this lectureship, we will bring in eminent researchers to meet with our faculty and students over multi-day visits. This past April, we held our second Graduate Alumni Career Panel in which four alums in different fields returned to campus for a day to share their career experiences and advice with our graduate and undergraduate students. We hold this panel on the same day that we hold our Graduate Research Review during which all of our graduate students present posters about their research during a fest on the Webb Hall roof. It's timed to coincide with the All-Gaucha Reunion. So, this coming year it will be on Friday afternoon, 25 April. We invite you to put that date on your calendar, come join us, see the department, partake in the BBQ, see old friends and acquaintances, and see the dynamic range of research that our students are pursuing.

Summer field camp was a big success this year, but it required some nimbleness of planning. Shortly prior to a long-planned departure for Santa Cruz Island, E. coli turned up in a key water supply. Quickly, Alex Simms made new arrangements to take the camp to Ghost Ranch, New Mexico, for a fortnight that preceded a month that the students spent in the Sierra near Tahoe with Art Sylvester. Yes, Art is still coming back to teach another generation of mappers - and we feel fortunate to have his experience and continued engagement. Luckily, the large Yosemite fire didn't start until after the camp was over.

This fall, the department recently welcomed 17 new graduate students; many of whom joined a group of continuing grad students for a field trip to Santa Cruz Island prior to the start of Fall classes. During this same pre-term interval, an 18-person General Education class spent 10 days being introduced to geology through intensive daily field exercises in the Sierra near Mammoth. For the first four weeks of the fall quarter, Dave Valentine, his grad students, and postdocs are leading a 4-week, NSF-supported research/teaching cruise from San Francisco to San Diego. They are focused on biodiversity, the fate of natural gas in the seawater, and natural hydrocarbon seeps. A half dozen UCSB undergrads are running geochemistry experiments that they helped conceptualize as part of this cruise.

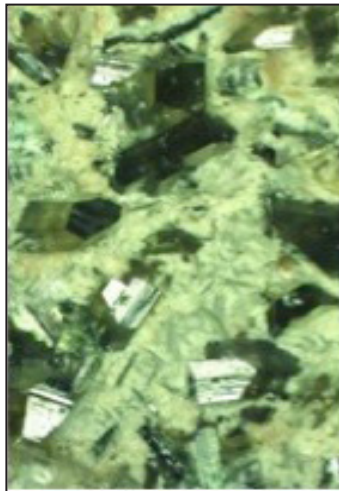
I hope you get a sense from this description that things are hoppin' here, as they are. Part of that activity is made possible through the generous donations to the department from our alums and friends. These help us learn, teach, mentor, and create each year, and we sincerely thank you! Please stop by if you are passing through. The door is open...

# Department Highlights

## Billwiseite ( $Sb^{3+}_5(Nb,Ta)_3WO_{18}$ ):

*A newly discovered mineral named for emeritus professor*

Recently Brendan Laurs (BS '91) discovered and described for the first time a new mineral in a pegmatite from Nanga Parbat in Pakistan. Brendan named the mineral after Emeritus Professor Bill Wise in honor of his contributions to research and teaching in mineralogy. Although this new mineral has only been found on one specimen in tiny crystals growing on mica flakes, its naming recognizes the profound influence that Bill Wise had on his students and fellow geologists. Many alumni will remember Bill Wise for teaching them about minerals, and some will recall him guiding them over Pisgah Crater during 104A trips, or working with them during summer field camp in the Tahoe/Donner Pass area, or co-leading three study excursions to Hawaii.



Billwiseite



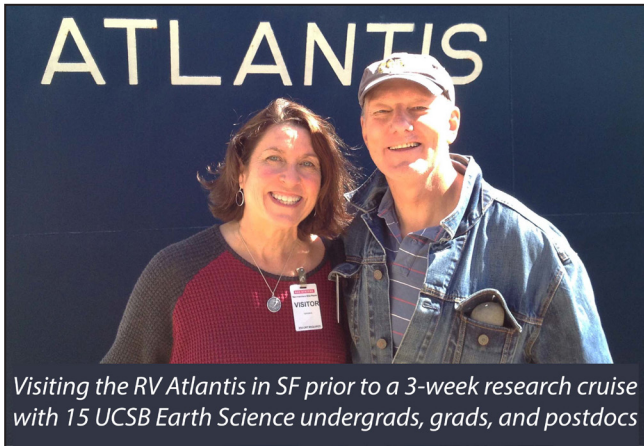
Bill Wise

Sometimes regarded as the geologist who never ages, Bill was born and raised in Carson City, Nevada, where his father was an engineer for the fabled Virginia & Truckee Railway. He took his bachelor's degree at Stanford University, and then at John Hopkins University he did his 1961 doctoral research on the zeolitic alteration of the Eocene volcanoclastic underpinnings of the Cascade Range of Washington state. Many mineralogists consider Bill to be the world's expert on the occurrences and crystal chemistry of zeolite minerals. Among his many notable papers are his descriptions of the first known occurrence of clinoptilolite crystals and of two new zeolite minerals. He is an expert on vanadium minerals, skarn, and industrial minerals at New Idria and Boron, California. His work also includes extensive geologic mapping and volcanologic studies of Mt. Hood, Oregon, Mauna Kea, Hawaii, and Pisgah Crater in the Mojave Desert. What an honor reflective of his noteworthy and influential career to have a mineral named for him!

## Alec and Claudia Webster Fund for Field Studies:

*A New Earth Science Fund and Endowment*

This new fund has been established through a generous gift from Alec and Claudia ('75) Webster to honor their strong relationship with UCSB, their connection to the Earth Science department, and the mentorship of faculty who taught them in the field in the 1970s. This fund's purpose is to promote the engagement of Earth Science students in field work and the associated development of strong intellectual and communication skills. The Webster's goal is to foster new leaders with people-oriented critical thinking skills, an environmental consciousness, and interest in teaching, policy, advocacy, and field studies that foster human understanding and responsible development.



Visiting the RV Atlantis in SF prior to a 3-week research cruise with 15 UCSB Earth Science undergrads, grads, and postdocs

This new endowment is now open for contributions from alumni, friends, and faculty.

Claudia (née Tighe) and Alec's story is both unusual and appealing. They met during their freshman year when coming to their first midterm in Robert Norris's Physical Geology. By coincidence or fate, they discovered that their birthdays fell on that same midterm date. They became friends and, even after graduating and getting married (to other partners), they continued to send birthday cards to each other... until one year, they learned they had both been recently separated from their spouses. After a couple decades apart, they got back together, and "the rest is history!"

Alec and Claudia would like to see this fund grow (as would we!) to support more and more field studies by our students. Hence, the fund is open for contributions that will augment theirs and help the fund provide more support for the next generation's leaders.



Viewing the submersible onboard the RV Atlantis

## News from the Field...

### Volcanology Class Field Trip to Hawaii (Spring 2013)

This spring Cathy Busby led 20 students on a 5-day Physical Volcanology field trip to the Big Island of Hawaii over the Memorial Day weekend, where they stayed at Distinguished Alumnus Jason Saleeby's Island Outpost Field Station in Volcano. At Hawaii Volcanoes National Park, the group was treated to a half-day update on the geologic history of Kilauea volcano by Don Swanson, former Scientist-In-Charge of the Hawaii Volcano Observatory. As the class learned first-hand by looking at the stratigraphy of



Kilauea with him, Don has completely revised models for how Kilauea and shield volcanoes in general behave, by demonstrating that Kilauea has been dominated by explosive activity for 60% of the past 4,000 years.

Peléé was also extremely generous with the group. Halema'uma'u pit crater had a lava lake inside it, which gave off a beautiful red glow at night under a full moon. A thrilling boat ride to see lava entering the sea (a site where buckets lowered overboard came up with water warm enough for a jacuzzi) was followed by a trek across black basaltic glass to watch pahoehoe lava flows form. This sight really brought home the concepts of lava crusts, lava toes, and inflation processes. Other highlights included a trip to the southernmost point in the United States (South Point) to study a thick ashfall deposit of unknown origin.....and a hike in to the spectacular Green Sand Beach, which is full of olivine eroded from a tuff ring. The trip concluded with a swim and a visit with giant sea turtles on a black sand beach. The students had one word for the experience: AWESOME!!!!

### Summer Field (2013) Eastern San Juan and Chama Basins & Sierra Nevada



At the end of June, 2013, as summer field camp began, Alex Simms took 11 UCSB undergraduates and two other students from Brazil and UC San Diego to northwestern New Mexico where they studied the rocks of the eastern San Juan and Chama Basins. This two-week segment was originally planned to go to Santa Cruz Island but a last-minute detection of E. coli in the well at Christy Ranch necessitated finding another location on short notice. Despite this improvisation, the change in venue worked well because these students had the opportunity to study some classic units, including the Chinle Group, Entrada Sandstone, and Morrison and Dakota Formations. Far from the complex tectonic mess that is California geology, they were able to observe the world-class sedimentary structures and stratigraphic relationships preserved within the strata of the Colorado Plateau (complete with limestone). Of course, by design, they also had the opportunity to scratch their heads on some of the local structures created along the Nacimiento Uplift near the Jemez (Valles) Caldera that make mapping such

such an educational experience. They enjoyed a nice stay amongst the picturesque cliffs of "Georgia O' Keeffe country" at Ghost Ranch, New Mexico (also important to dinosaur lovers) and another geologic field excursion to nearby Bandelier National Monument. Despite fire closure of the surrounding Santa Fe National Forest, the students did well in mapping over 11 square miles of BLM lands in their 14 days in New Mexico.

Under Art Sylvester's guidance, the second part of the 2013 summer field camp convened for a week at UC Berkeley's Cal Lodge in Norden in the northern Sierra Nevada. Once the students proved their ability to map independently, we moved to UC's Sagehen Creek Field Station for three weeks of research mapping.

Six fellows mapped the entire, previously unmapped 7.5' Hobart Mills quadrangle in just the three weeks. One of the discoveries was just how extensive the Pleistocene glaciations were in the area. It was a unique pedagogical experience to work out a story from remnant moraines, drift, variably weathered volcanic and plutonic boulders, and the distribution of outsized boulders.

Three students worked out the geology of fluvial terraces in Sagehen basin and their relations with late Miocene lava flows. Two sets of terraces are older than 5.5 million-year-old flows, and two are younger, implying that Sagehen basin was extant already in Miocene time and thus is one of the oldest basins in the northern Sierra Nevada.



...cont'd on p.6



## Alumni Corner

# What the Alumni are Doing

Dylan Rood (PhD, Spring '10) continues to work at SUERC (Scottish Universities Environmental Research Centre) in Glasgow, Scotland, where he and Daisy Pataki (MS, Winter '07) have just welcomed their first child.

Jason Schmidt (BS, Summer '13) is pursuing his MS degree at UCSB, under Frank Spera.

Beau Gentry (BS, Fall '12) and Brenna Quigley (BS, Summer '12) will begin the MS graduate program at UCSB, with Phil Gans as their faculty advisor.

Molly Redmond (PhD, Winter '10) has started as an Assistant Professor at The University of North Carolina - Charlotte.

Beth Pratt-Sitaula (PhD, Fall '05) has moved with her family to the Denver area where she is working for UNAVCO- the geodesy consortium. She is also the Academic Director for Nepal Geoscience program for the School of International Training.

Kevin Chantrapomlert (BS, Spring '13) is expecting to start graduate work at Cal Poly Pomona in Geophysics.

Jessica Thompson (PhD, Summer '13) will begin work with Conoco-Phillips in the new year.

Ken Davis (MS, Summer '03) was an EPA delegate to the international mercury treaty convention in Geneva.

Qiming Liu (PhD, Fall '13) is working for CGG in Houston, Texas as a Seismic Imager.

Hanna Alexander (BS, Summer '08/ MS, Winter '13) works for the Texas Commission on Environmental Quality in Austin, Texas.

Christy Till (BS, Spring '04/ MS, Fall '05) and husband Duane Devecchio (PhD, Winter '09) moved to Arizona State University where she is now an Assistant Professor and he is a Research Professor.

Julian Stahl (BS, Spring '13) is in the MS program at Montana State University.

Blair Paul (PhD, Spring '13) and Burch Fisher (PhD, Fall '13) are now Postdocs at UCSB, working with Dave Valentine and Doug Burbank, respectively.

Jacob Poletti (BS, Summer '12) will be working with John Cottle as an MS graduate student at UCSB.

Bryan Juarez (BS, Spring '13) is pursuing a Master's degree in Evolutionary Biology at University of Michigan, Ann Arbor.

Jesse Mosolf (PhD, Fall '13) is a Geologist at the Montana Bureau of Mines and Geology.

## Graduate Alumni Career Panel

For the second consecutive spring, the department hosted a Graduate Alumni Career Panel. Back by popular student demand, this panel built on the success of last year's panel in its efforts to illustrate some diverse career pathways and to engage graduate and undergraduate students in discussions about where they may take their Earth Science education when they finish at UCSB. This year's panelists included Jill Wertheim (2007) from National Geographic Research where she directs the assessment, research, and synthesis arm of their Roadmap Project; Mark Grivetti (1979) who works for Geosyntec as an expert on an array of environmental problems; Peter Morris who is a geologist at Veneco and was previously with Chevron; and Mary Stallard (1986) who is president and lead consultant of Montclair Environmental Management in northern California.

Most of our graduate students and many undergraduates participated in the 2-hour, open-ended discussions in which we were treated to anecdote-laced, post-graduation histories of each of these alumni. Several of the career pathways were convoluted, most were opportunistic, and all showed persistence, resilience, and the way in which individual aspirations tend to drive careers forward. Of particular interest were the initial steps following graduation (some of which might seem mundane), how each person discovered the geological and intellectual passion that motivate them, and how they figured out the best way to pursue those passions.

The panel and lunch were followed by a mass migration to the infamous Webb rooftop, where each of our current graduate students presented a poster on his or her research as part of our annual Graduate Research Review. Looking ahead, please remember that alums are very welcome to join us in this celebration of the creative output of our graduate students. This year it will be held on April 25, 2014.

### SUMMER FIELD, cont'd from p.5

The significance and conclusion of the student will be presented as a poster paper at the annual Geological Society of America convention in Denver.

The remaining students refined and corrected previous geology mapping in the Independence Lake quadrangle, so that both it and the Hobart Mills quadrangle have now been compiled, digitized, and are close to being ready for publication as complements to the recently published 1:48,000 scale geologic map of the North Lake Tahoe/Donner Pass area. That map represents the summer field mapping since 1987 under the supervision of Bill Wise and Art Sylvester.

The students enjoyed a field trip to study the recently discovered, active, strike-slip Polaris fault, led by Jim Howle (USGS) and his documentation of the Tahoe area fault by means of LiDAR.

Lastly, UCSB alumnus Art Darrow treated the students to an afternoon of waterskiing on Fallen Leaf Lake.

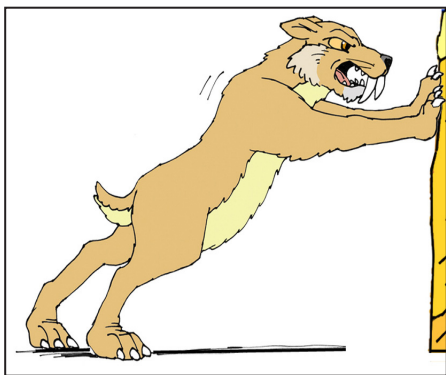
## Mark Grivetti



Mark Grivetti graduated from UCSB Department of Geology in 1982. Two years later, he earned a Masters Degree in 1984 under the direction of Professor Don Weaver. Mark's MSc thesis described and analyzed deformation in the hydrocarbon-rich Monterey Formation. This thesis addressed some key unknowns: what caused the extensive deformation of the Monterey Formation, and what was the balance between structural deformation versus soft-sediment deformation due to loading or seismic shaking? Mark's meticulous field observations and creative thinking made this thesis a classic that is still being sought by oil explorationists today (seriously). Since that time, Mark has developed a diverse background in development of water resources, geologic assessment, and seismicity studies, and he has worked in environmental remediation and risk assessment on many large-scale projects. Two of the more prominent companies for which he has worked are Dames and Moore and most recently GeoSyntec. Over the years, Mark has been especially helpful to our Department in terms of giving talks to classes on working in industry, as well as giving advice and helping students find jobs.

Mark's success and appeal seems attributable to his ability to think creatively, ask important question relevant to the problem being addressed, and being approachable. As was aptly demonstrated on the panel, Mark has an engaging personality. He is a credit to our Department.

## John Iwerks

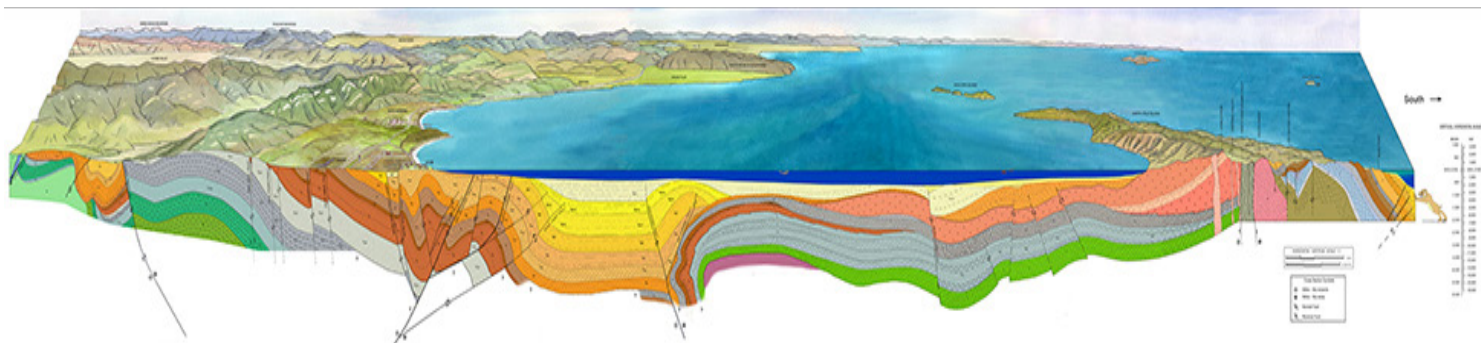


2013 Department Fellow John Iwerks has merged his skill as an artist with his love of geology to produce educational and entertaining animations and artwork that inspire our imaginations and convey the essence of key geologic ideas. John's childhood was spent in the San Fernando Valley, where his father Don Iwerks, was Head of the Machine and Camera Shop at Walt Disney Studios. Don was instrumental in the development of Disneyland and the early camera systems of the True Life Adventures nature films in the 1950s. His grandfather, Ub Iwerks, was a close associate and friend of Walt Disney and was the sole animator and creator of the character Mickey Mouse, in the early films Plane Crazy, Gallopin' Gaucho, and Steamboat Willie. John's interest in geology sprang from a common interest in landscape painting that was nurtured by his mentor Ray Strong, in Santa Barbara. Ray emphasized an understanding of geology as integral with landscape painting, giving a sense of the underlying forces exposed on the surface of the landscape.

A 5-day field trip to Death Valley with SBCC Geology cemented John's love of the landscape. He was hooked and remained with the SBCC Geology department for many years as student, teaching assistant, field trip organizer/participant, and tutor. At SBCC, John also used his artistic talents to make graphics for T-shirts, create department logos, and design and paint two outside murals that provide cross-sectional views of the local geology and of the USA.

Along the way, John's interest in animation and the Earth Science led him into some experimental films regarding geologic time and events. A mutual friend introduced John to Tanya Atwater, and they realized a common goal: merging of geology and animation for educational purposes. Soon they collaborated on several projects, including a video of the geologic history of Western North America; the re-do of the topographic relief map of California in the 1st floor of Webb Hall; artistic services on several projects with visiting geologic educators in Tanya's Educational Multimedia Visualization Center (EMVC). These projects included work for Hawaii lava lake flows, rise and erosion of Sierra Nevada Granites, Pleistocene glaciation of the Northern Hemisphere, pygmy mammoths on the Channel Islands, sea-floor spreading of the Atlantic Ocean, and several more subjects (visit <http://emvc.geol.ucsb.edu/index.htm> to see these movies).

John's cross-section across SB Channel at SBCC was noticed by Andy Wyss and Tanya Atwater, who were intrigued by the possibility having a similar mural in Webb Hall. Working with UCSB geologists, John created the most accurate cross-section to date transecting the UCSB campus and spanning from the Channel Islands to the Santa Ynez Fault. This digital image is now on display on the 2nd floor of the Earth Sciences department.



# Distinguished Alumni 2012/13

Every year, the department honors one or two of its alumni whose accomplishments provide our current students with exemplary role models.

## Karin Boyd



Karin came to UCSB in 1978 as a marine biology major. That lasted until spring of her sophomore year, when she went on a geology department field trip to the Panamint Valley, led by Drs. Webb and Norris. Hook, line, and sinker: she found her love of the earth sciences, completely immersing herself in the undergraduate curriculum provided by the UCSB geology department. Her time at UCSB was capped off by receiving the Outstanding Graduating Senior award in 1982, winning an indestructible field vest she proudly uses to this day. She then headed to graduate school at the University of Wyoming, where she studied the diagenetic evolution of the Santa Margarita sandstone in the southern San Joaquin Valley. Upon finishing her MS, Karin travelled overseas for a year with long-term beau and fellow UCSB geology/geophysics graduate Ritchie Boyd. She spent part of that time exploring for epithermal gold deposits in Queensland, Australia. In 1988 she took a job in Fort Collins, Colorado with a small water-resource consulting firm that was pioneering the field of applied geomorphology. She was mentored there for six years by Drs. Stan Schumm and Mike Harvey, while doing field work all over the country, and evaluating

years by Drs. Stan Schumm and Mike Harvey, while doing field work all over the country, and evaluating destabilized river systems for the Corps of Engineers. In the process, she published several papers with Stan Schumm and ensconced herself in the field of applied fluvial geomorphology. In 1997, Karin took a job at Inter-Fluve, a stream restoration firm in Bozeman Montana that was one of the first firms in the country to approach river-system evaluation and rehabilitation as a collaborative integration of the sciences. From 1997 to 2002, Karin worked with a team of civil engineers, hydrologists, riparian ecologists, and fisheries biologists on stream restoration projects all over the country. In 2002, Karin went out on her own, incorporating as Applied Geomorphology Inc. She is currently the lead geomorphologist for several large engineering firms working on remediation/restoration of river systems listed as superfund sites in Montana, including Silver Bow Creek and the Clark Fork River below Butte, and at the Asarco Smelter site in East Helena. She recently returned from a 2-week trip to Mongolia, where she traveled with a plant ecologist and mine reclamation specialist from Montana State University, working with Buddhist Monks to develop ecological restoration demonstration projects at monasteries. When she's not working, Karin can be found continuing to explore Montana by foot, bike, boat, or ski, spending time at her family ranch on the Rocky Mountain Front, or hanging out with the Canadian in-laws on an island off of the coast of British Columbia. Her oldest daughter Maggie is a Platinum Presidential Scholar at the University of Montana, and her younger daughter Cayley, a junior at Bozeman High School, is currently on exchange in northern Argentina. Ritchie remains an instructional technology gadfly at Montana State University, and they have been married for 25 years.

## Tom Sisson

After graduating from Stanford in 1978, Tom Sisson came to UCSB in the fall of 1980 as one of several new graduate students who were working on the May 1980 eruption of Mount St Helens. Harry Glicken, later killed in the Unzen eruption, studied the St Helens landslide and debris avalanche, while Karen Gilkey worked on lahars, and Tom investigated the deposits and effects of the "directed blast." They ended up at UCSB mainly because Cliff Hopson had determined the Holocene geology of St Helens, and because at that time R.V. Fisher was preeminent in the study of pyroclastic rocks. Together, Cliff and RV made UCSB the place to conduct field-related St Helens research.

In 1982, Tom finished his MSc at UCSB, returned to mapping quadrangles in the Sierra Nevada seasonally for the USGS, and spent winters rock-climbing and mountaineering while living out of a VW bus. He then returned to graduate school at MIT where he combined field studies on igneous rocks in the Sierra with experiments on basaltic magmas. During a subsequent post-doc at University of Texas, Dallas, Tom made the first quantitative measurements of dissolved H<sub>2</sub>O in arc basalt melt inclusions.

In 1993, the USGS invited Tom to lead a project studying the geology of Mount Rainier, Washington and to establish an experimental petrology/geochemistry lab. Through his work with the USGS since that time, Tom has become well known both for his astute field studies on igneous rocks in Hawaii, Japan, Alaska, the Cascades, the Sierra, and Saudi Arabia and for his innovative

...cont'd on the next page





# Faculty News

Meet the newest member of our faculty!!!

Matt Jackson grew up in rural Montana, where, for several years, he was the only student in his class in a two-room schoolhouse. He got a “lucky break” and left for Yale University, where he received in B.S. in Geology and Geophysics in 2001, earning the Yale Geology and Geophysics Department’s Belknap and Hammer prizes for his senior thesis work on lamprophyres at Mount Ascutney, Vermont. After college, Jackson lived and worked in Iceland as a Fulbright Scholar. While in Iceland, he studied the Holocene eruptive history of Katla volcano and, more importantly, he met his future wife in Reykjavik (after a long day of fieldwork at Katla)! After the yearlong stint in Iceland, Jackson enrolled in the MIT-Woods Hole Oceanographic Institution (WHOI) Joint Program and earned a PhD in Marine Geology and Geophysics in 2007, where Jackson studied hotspot volcanism at the Samoan archipelago. For his thesis entitled, “Dismantling the deep Earth: Geochemical constraints from hotspot lavas for the origin and length scales of mantle heterogeneity”, he was awarded the Ruth and Paul Fyre award for Excellence in Oceanographic Research from the MIT-WHOI Join Program. Jackson then left for the Carnegie Institution of Washington, where he worked with post-doctoral mentors Rick Carlson, Steve Shirey and Erik Hauri to understand early-Earth evolution, sediment recycling from subduction zones to hotspot volcanoes, and volatile budgets in the Earth’s mantle.



*Matt Jackson*

Matt joins UCSB after three-and-a-half-years of teaching at Boston University. Jackson’s current research explores early-Earth formation and the bulk composition of the modern Earth, which are not well understood. Jackson and his students examine the compositions of hotspots lavas, like those erupted at Hawaii, Iceland, Galapagos and Samoa,



to better understand the composition and evolution of the Earth’s deep interior. In August, Jackson spend 35 days at sea aboard the oceanographic research vessel R/V Roger Revelle, to better understand early Cenozoic hotspot volcanism in the western Pacific. The cruise was a huge success, and Jackson’s group will be busy sorting through and geochemically characterizing the ca. 10,000 pounds of rocks that they recovered from more than 40 deep submarine volcanoes.

Matt was born in Fairfield, California. After 18 years in Montana and 17 years on the East Coast, Jackson is excited to return to his native state with his wife, Anna Maria Skuladottir, and their daughter, Katla. A lifetime of Montana and New England winters made Santa Barbara’s 288 days of annual sunshine a huge selling point!”

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**TOM SISSON... cont'd**

and incisive experimental studies on petrogenesis and volcanic processes. Currently, Tom is the Scientist-in-Charge for the Menlo Park office of the USGS Volcano Science Center.

Tom writes, “What I found at UCSB was an exceptional group of graduate students and inspiring faculty, with a strong emphasis on bridging between field observations and quantitative lab studies. Other notable graduate students then were Jim Mortensen, Dick Tosdal, Dave Kimbrough, Mary Lou Bevier, Sam Mukasa, Dave Sherrod, Bill Hirt, Dan May, Eric James, Barbara (Bobbie) John, John Shervais, and Scott Hornafius, among others. I routinely see Jim, Sam, Dave S., and Barbara at scientific meetings, and I see papers by Dave Kimbrough, John Shervais, and Scott Hornafius. This is a high professional success rate for any department. Most of us had worked in the earth sciences before arriving at UCSB, so we thought we knew a lot. The first thing the Department had us do, however, was take a field seminar that consisted of weekend van convoys across southern California to visit sites where UCSB faculty were conducting research, or where faculty thought important research problems might develop. John Crowell was the driver behind this field seminar, but many other faculty members pitched in. The Tertiary stratigraphy and structure of southern California were well known by then, thanks particularly to Tom Dibblee (who attended some of the weekend trips), but it was early days for thermobarometry of metamorphic rocks, widespread application of zircon geochronology, and quantitative neotectonics. We discovered how little we actually knew, but that there were important problems nearby to figure out, and that we could do it. Certain faculty manifested particular traits: Cliff was charismatic and could inspire anyone into the earth sciences, Art Sylvester emphasized the scientific and professional discipline necessary to succeed, and George Tilton showed that a scientific giant could be humble and patient with graduate students who knew comparatively nothing. What I got from UCSB was deep instruction across the earth sciences, with special emphasis on the value and interpretation of field observations.”

It is gratifying to think that the instruction and experience that Tom gained here at UCSB has underpinned such a diverse, productive, and noteworthy career!

# More Faculty News...

*Congratulations to our newly tenured faculty...*

*Professors John Cottle and Alex Simms!*



## *John Cottle*

John Cottle is originally from New Zealand where he completed a B.Sc. and M.Sc. in geology at the University of Otago in Dunedin. For his M.Sc. thesis, John tried to unravel the structure, petrology, and geochronology of NeoProterozoic-Ordovician granitoids in the Trans-Antarctic Mountains. In 2004, John moved to the University of Oxford where he worked with Prof. Mike Searle on the Mt. Everest region in the South Tibetan Himalaya. His dissertation focused on understanding the kinematics and history of a large-scale detachment fault system (the South Tibetan Detachment System), as well as the timing of metamorphism and melting in the Greater Himalayan crust. After completing his D.Phil in 2008, John took a post-doctoral fellowship at the NERC Isotope Geoscience Laboratories of the British Geological Survey in Nottingham U.K., where he became an expert in laser-ablation, inductively coupled plasma mass spectrometry.

On joining the UCSB faculty in 2009, John along with Prof. Brad Hacker and Dr. Andrew Kylander-Clark, set up a state-of-the-art laser-ablation mass spectrometry facility capable of measuring elements and isotopes in a wide variety of geologic materials at the micron-scale. John's current research focuses on collisional orogenic systems and understanding the timescales over which they evolve. He has current National Science Foundation funded projects in Tibet, Nepal, and Antarctica, and USGS funding to study Rare Earth Element mineralization in southeastern California. John currently supervises seven graduate students working on a range of topics from Himalayan tectonics to petrology of Antarctic granitoids to rare earth element mineralization. John teaches a variety of courses at UCSB including plate tectonics, analytical methods, ore deposits, geochronology, introductory petrology and summer field camp. He has also taught graduate level courses in mass spectrometry and tectonics. John and his wife, Anna (also a New Zealand native) became parents for the first time in February of this year and are enjoying introducing their son to the great outdoors surrounding Santa Barbara.



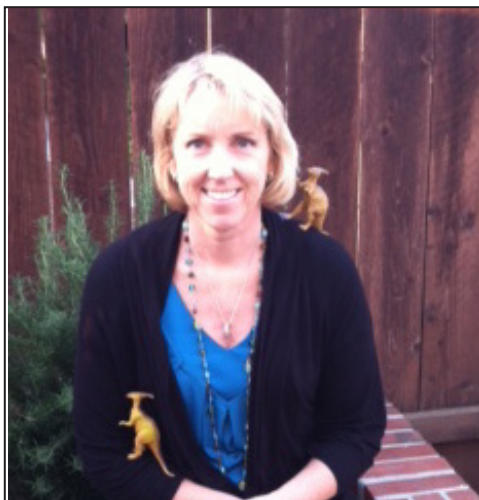
## *Alex Simms*



Alex Simms grew up in Oklahoma where he completed his B.S. in Geology at Oklahoma State University in 2001. Following a couple internships for what is now ConocoPhillips in Bartlesville, Oklahoma, he pursued a PhD under the direction of Prof. John Anderson at Rice University in Houston, Texas, where he studied the Late Quaternary history of Corpus Christi Bay, Texas. His research focused on the stratigraphic architecture of incised valleys and the roles that sea level and climate play in governing coastal evolution. In 2005, he started as an Assistant Professor at Oklahoma State University. After the 15-hour drives to study the "nearby" Texas coast became cumbersome, he left his beloved home state in 2010 to make it easier to study coastal geology and enjoy his love of the mountains (hard to find places that satisfy both, but Santa Barbara is one of those). Through NSF funding, he has continued to pursue scientific questions along the Texas Coast, but has recently started tackling intriguing new problems along the closer California Coast, where Alex is now employing a combination of shallow geophysics, coring, mapping, and geomorphic observations to study the role of tsunamis, wildfires, and hyperpycnal flows in controlling coastal architecture along the Santa Barbara Channel. His other main NSF-supported research focus has been on the geologic record of Antarctic glaciation, where he has been implementing innovative approaches to dating raised beaches in order to test models of post-glacial rebound following Holocene deglaciation of the Antarctic Peninsula. Alex teaches a variety of courses at UCSB including principles of sedimentology and stratigraphy, field methods, GIS, summer field camp, depositional systems, and sequence stratigraphy. He also serves as primary advisor for four current PhD students and one current and two past MS students at UCSB. When not looking at rocks and dirt, Alex and his wife of 13 years, Annie (also an "Okie"), are kept busy by their five children. After four boys, the Simms family welcomed in December of 2012: the first Simms baby girl born in the line since 1948!

# Staff News

*We are excited to have new staff members Kate Lima, Patricia Machuca & Loren Fentroy join our department!*



*Kate Lima*

## *Department Manager*

In October, 2013, Kate began her job as the new department manager. Her autobiography states, "I began working at UCSB after I received my bachelor's degree in English and then a teaching credential. I really love kids, but I found I really didn't like teaching them. And I missed the intellectual conversations I had at the university. So, I switched gears and began working here at UCSB, first in Classics and Art History before moving to Economics, where I served as their manager for the past 12 years. During this time I went back to school - just for the fun of it - and received a masters degree in literature/philosophy. I'm thrilled to move to the Earth Science department where the excitement of both the students and the faculty is palpable. Cheers to new beginnings!"

*Patricia Machuca*  
*Financial Manager*

Patricia writes, "I was born, raised, and educated in Sinaloa, in the West Coast of Mexico. I came to the US in 1996 after graduating from the Universidad Autonoma de Sinaloa with a degree in Public Accounting. I have lived in beautiful Santa Barbara for the last 17 years and have worked at UCSB for 13 years. I worked at the MultiCultural Center for eight years, at the Faculty Club for a year, and in Residential Dining Services for almost five years. I am now here in Earth Science, and I am very excited to be part of this fascinating and welcoming department.

I am married and have three children, all boys, who keep my earth shaking! Besides watching my boys, I love hiking, dancing, sewing, and meeting with friends."



*Loren Fentroy*  
*Undergraduate Advisor*



In July, 2013, Loren began her job as our new Undergraduate Program Assistant. She writes, "I graduated from UCSB in 2011 with a BA in Global Studies (Minor in Spanish). I recently moved back to Santa Barbara after having lived in New York for close to two years while working towards my MA in Higher Education & Student Affairs at New York University. Attending college and graduate school in two polar opposite cities has given me the opportunity to experience a wide variety of cultures and has peaked my interest in traveling more! I particularly would like to travel to England, Brazil, and Australia. I am happy to be back on campus amongst my fellow Gauchos and excited about working with undergraduate students again! The daily interactions I have with students are my favorite aspect of my position! Outside of work, I enjoy running and have recently taken an interest in cooking."

# Graduate Student Spotlight



As the fifth year of my PhD at UCSB begins, so does my seventh research cruise. The work I perform aboard each seagoing vessel is the focus of my thesis: to further constrain the interaction between marine microbes and natural gas.

I entered graduate school with a bachelor's degree in chemistry and a passion for geology. I found my home in Dr. Valentine's research group where I was encouraged to pursue Earth system questions from a chemical approach. Studying marine biogeochemistry has provided me with the opportunity to travel, live out at sea for weeks at a time, and utilize my chemical skillset in unexpected ways.

Reflecting on the last four years, two memorable experiences come to mind: my very first cruise off the coast of California and the Deepwater Horizon Oil Spill. The first cruise was eye-opening to the world of oceanography. Our ship, the R/V Atlantis, became a mobile but fully-functioning laboratory. Samples were collected and analyzed directly on board, often as dolphins swam laps around us. The oil spill was less serene. When my advisor received word that we had ship time available to investigate the spill, all else stopped and I was out in the Gulf within 10 days. The science we did was interesting and unlike any other work our lab had done previously. Natural gas concentrations as a result of the spill were the highest ever reported in the water column. There were a lot of uncertainties as to how the microbial community would respond. Much to our surprise, within three months of the initial spill, all the natural gas that was released had been oxidized by marine microbes.

In addition to research, the graduate program at UCSB has afforded me many professional opportunities. I am heavily involved with mentoring and outreach for undergraduates. I also recently served as an instructor of record for an entry-level geology course on campus. I am happy to call the Earth Science Department at UCSB my home.

*Stephanie Mendes,*  
PhD candidate



*Nicole Neira,* MS candidate

"I sit in a chair and I think." Those were the first words I uttered to myself in an empty cold laboratory. After meeting my advisor, Jordan Clark, and having had a quick tour of what was to be my second home, I was given a copper wire filled with water, a metal filer, a glass syringe, pliers, and clamps. He told me, "Your goal is to extract the water inside this copper wire into this glass vial without it touching air. I'll let you get to it." He left me there, and I sat on an old, dirty blue chair and thought of how I was going to impress my advisor on my first day here.

As an undergraduate, I worked in a hydrology lab at Florida International University (yes, I am a long way from home) and was privileged to have field days in our beautiful Everglades National Park, tracking sources of water in the major fresh sloughs there. I was used to looking at water flow from the clouds to the marsh to

the limestone and ocean. If you remember anything about your high school Earth Science class, you remember that oh-so-simple Water Cycle diagram. They don't put ocean crust hydrothermal flow lines in those!

My research is rather unique because, for the first time, sulfur hexafluoride (SF<sub>6</sub>) gas is being used inside the ocean crust to track the flow of water through it. Because this synthetic gas tracer has been released since the 1950s, it is found in the atmosphere in trace amounts: hence, all the thinking on that old blue chair.... My study site lies 2600 meters below sea level on the Juan de Fuca plate, well removed from its actively spreading ridge. The site sits among outcrops that look like seamounts, and water appears to be recharging and discharging through them. My goal is to quantify the flow rates of water through the shallow ocean crust. Using a km-long, linear array of boreholes, we have injected SF<sub>6</sub> in a central site (along with stained bacteria, fluorescent dyes, and trace metal salts), and I am timing SF<sub>6</sub>'s arrival and concentration at other holes.

Because of the nature of my project, I split my time between working with hardware tools and running the water samples in our ever-faithful gas chromatograph. When the data are plotted, the fun begins: formulating interpretations based on location, timing, and distance from the injection source. Initial results suggest rather asymmetric flow with rates as high as 1.5 m/day. Soon other researchers will use those flow rates with the bacteria, dyes, and salts to assess how and why the seawater geochemistry changes along its flow path. Whenever I feel tired or discouraged, I remind myself of how lucky I am to be working with pioneer oceanographers and to be contributing to the scientific community by helping scientists understand crustal hydrothermal flow better. Being the only college graduate of my family (born in Chile, but raised in Miami, FL.) and soon to be the only one with a Master's Degree, I'd say this is exactly where I want to be. After this adventure, my next one will be to bring the passion and importance of science to children by being a public school teacher.

# List of Theses/Dissertations

Winter 2013 - Fall 2013

*Congratulations to the Class of...*



Hannah Alexander, MS Winter '13

Advisor: Alex Simms

"The Stratigraphic and Geomorphic Evolution of the Bull Creek Valley, Oklahoma: Implications for Paleoclimate Studies and Nanodiamond Occurrence"

Michele Conrad, MS Winter '13

Advisor: Andy Wyss

"Oligocene Rodents (Caviomorpha), the First Report of Fossil Mammals from El Volcan, Chile"

Scott Herman, MS Winter '13

Advisor: Phil Gans

"A paleomagnetic investigation of vertical-axis rotations in coast Sonora, Mexico: Evidence for distributed transtensional deformation during the Proto-Gulf shift from a subduction-dominated to transform-dominated plate boundary in the Gulf of California"

Jaron Lucero, MS Winter '13

Advisor: Frank Spera

"Evaluation of Seismic Methods for Inferring Fluid Migration in Volcanic Regions"

Maura Quady, MS Winter '13

Advisor: Jordan Clark

"Improving the Hydro-stratigraphic Model of the Oxnard Forebay, Ventura County, California, using Transient Electromagnetic Surveying"

Dane Tikunoff, MS Winter '13

Advisor: Frank Spera

"Composition, Temperature and Pressure Dependence of the Phonon (Thermal) Conductivity of Silicate Geoliquids"

Andrew Rich, PhD Spring '13

Advisor: Ed Keller

"The Form and Function of Bar-Built Coastal Lagoons"

Eva Von Thury, MS Spring '13

Advisor: Alex Simms

"Using Laser Scanning Technology to Monitor Coastal Erosion and Sea-Cliff Retreat in Southern Santa Barbara County, California"

Burch Fisher, PhD Summer '13

Advisor: Doug Burbank

"Deciphering Landscape Drivers and Signatures in Tectonically Active Landscapes using Google Earth, Remote Sensing, and Cosmogenic Radionuclides"

Michael Sommers, MS Summer '13

Advisor: Stan Awramik

"Primary carbonate mineralogy of Lower Algal Chert Member ooids and stromatolites, Paleoproterozoic Gunflint Formation, Ontario, Canada"

Jessica Thompson, PhD Summer '13

Advisor: Doug Burbank

"Neogene Tectonic Evolution of the NE Pamir margin, NW China"

Jesse Mosolf, PhD Fall '13

Advisor: Phil Gans

"Stratigraphy, structure, and geochronology of the Abanico Formation in the Principal Cordillera, central Chile: Evidence of protracted volcanism and implications for Andean tectonics"

# Fall 2013 Incoming Grads

We proudly welcome 17 new students to our graduate program this year!



Abby Wyant, MS  
Advisor: Stan Awramik



Alexander (Al) Neely, MS  
Advisor: Doug Burbank

Allison (Ellie) Price, PhD  
Advisor: Matt Jackson



Anne (Annie) Lamontagne, PhD  
Advisor: Toshiro Tanimoto



Beau Gentry, MS  
Advisor: Phil Gans

Brenna Quigley, MS  
Advisor: Phil Gans

Demian Nelson, PhD  
Advisor: John Cottle

Eric Schoettle, MS  
Advisor: Doug Burbank

Jacob (Jake) Poletti, MS  
Advisor: John Cottle

Jason Schmidt, MS  
Advisor: Frank Spera

Johnathan (John) Rice, MS  
Advisor: Alex Simms

Mareike (Reike) Adams, PhD  
Advisors: Ralph Archuleta & Chen Ji

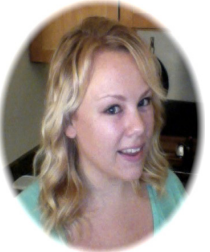
Miranda Stripe, MS  
Advisor: Susannah Porter

Rachel Spratt, PhD, IGPM  
Advisor: Lorraine Lisiecki

Samantha (Sam) Gwizd, MS  
Advisor: David Lea

Vanessa Brillo, MS, IGPM  
Advisor: Syee Weldeab

Veronika Kivenson, PhD, IGPM  
Advisor: Dave Valentine



# 2012-2013 Annual Department Awards Ceremony

## Departmental Graduate Awards

G.K. Gilbert Award  
Timothy Becker  
Burch Fisher

Harry Glicken Memorial Award  
Mary Kate Fidler

Richard and Eleanor Migues  
Graduate Field Research Award  
Forrest Horton

George Tunell Endowed  
Fellowship  
Jonathan Harvey

Wendell Woodring  
Memorial Award  
Joseph Stern

Preston Cloud Memorial Award  
Timothy Becker, Michael Stearns,  
Joseph Stern, Stephanie Tsang

Lloyd and Mary Edwards Field  
Studies Fellowship  
Aaron Bufe, Michael Stearns

RV Fisher Award  
Graham Hagen-Peter

Geophysics Award  
Jorge Crempien

Alumni Graduate Award for  
Research Excellence  
Timothy Becker, Qiming Liu,  
Daniel Livsey

Fugro West Award  
Nicole Neira

Coast Geological Society Award  
Lauren Simkins



Undergraduate Award Recipients



Julian Stahl received three undergraduate awards



Olivia Anderson snagged a brunton as this year's Norris Prize recipient.



Post-Awards Ceremony celebration

## Departmental Undergraduate Awards

William Bushnell Memorial  
Scholarship  
Christopher Older

Robert M. Norris Prize in  
Field Geology  
Olivia Anderson

Outstanding Graduating Senior  
Allison Kimbrough,  
Andres Lapostol, Evan Monroe

Outstanding Academic  
Achievement  
Brian Juarez, Michael Kenney,  
Allison Kimbrough,  
Andres Lapostol, Evan Monroe,  
Kyle Moulton, Jason Schmidt,  
Julian Stahl

Distinction in the Major Award  
Michael Kenney, Evan Monroe,  
Kyle Moulton, Jason Schmidt,  
Julian Stahl

Charles Douglas Woodhouse  
Award  
Julian Stahl

Venoco Field Scholarship  
Angela Roman

Department Field Award  
Jonathan Cuong, Cameron  
Dobbs, Geoffrey Hardaway,  
Allison Kimbrough,  
Matthew Lewis, Kyle Moulton,  
Jason Schmidt, Kaelyn Schwartz,  
Alexander Wood

Coast Geological Society Award  
Julian Stahl

# 2012/2013 Earth Science Fund Drive

We had a great response to our funding appeals last year. It is gratifying to see our alumni taking a lasting and consistent interest in their department. When I explain to potential donors that we have substantial commitment of support from our alumni, it makes us believable about our needs and we are taken seriously. The department has benefited in particular from employer matching gift programs. Be certain to check with your company when you make your gifts this year!

## Donors to Earth Science July 2012 to June 2013

Anonymous	Mr. Robert Davis	Mr. and Mrs. B. Ross McNeil, '88
Coast Geological Society	Ms. Marie Hedberg Degraef, '91	Eleanor and Richard Mignes, '64/'66
Dell Employee Giving Program	Dr. and Mrs. Peter B. DeOreo	Ms. Michele G. Miller, '78
Edison International	Barbara Day and James Dixon, /'84	Dr. J. Casey Moore and
Exxon Mobil Foundation	Mrs. Margaret Donelick, '77	Dr. Hilde L. Schwartz, '78
Intel Foundation	Mrs. Anne M. Elwell	Mr. Thomas E. Moore, '73
International Gas Consulting, Inc.	Mr. John W. Erickson, '72	Mrs. Sharon M. Mottola, '79
Maersk Oil Houston Inc.	Kristina Haggard and	Margie and Gary Nussbaum, /'83
Michael F. Hoover Consulting Geologist	Robert Farriss, '94/'84 and '97	Mr. and Mrs. Bruce J. O'Connor, '67
Mildred E. & Harvey S. Mudd Foundation	Mr. and Mrs. James H. Flynn, '84	Mr. and Mrs. William E. Older
Pioneer Community Investment	Mr. Glenn J. Gregory, '73	Drs. Michael H. Ort and
Plains Exploration & Production Company	Ms. Alice E. Gripp, '85	Nancy R. Riggs, '91
Sequoia Exploration, Inc.	Mr. and Mrs. Mark C. Grivetti, /'79	Dr. Thomas M. Parris, '98
Mr. and Mrs. Richard N. Abrams, /'81	Mr. Mark M. Grolig, '84	Deborah Patterson, '74,'78
Mr. Christopher Adams, '83	Mr. Joseph W. Grow, Jr., '76	Mr. David L. Perry, '84
Ms. Carmen Alex, '98	Mrs. Jennifer M. Guillory, '90	Mr. Stephen D. Piatt, '70
Mr. John M. Alexander and	Dr. Bradley R. Hacker	Mr. William V. Pipes, '76
Ms. Jane A. Divinski, '76	Kristina Haggard and	Susannah Porter and James Kellogg
Dr. Leslie Ames, '95	Robert Farriss, '94/'84 and '97	Dr. Beth A. Pratt-Sitaula, '05
Ms. Christina M. Anderson	Mr. Erik A. Hale, '82	Dr. William A. Prothero, Jr. and
Ursula and Timothy Anderson, /'66	Mr. and Mrs. Michael J. Harding, '66	Ms. Lydia M. Deems
Mrs. Wendy W. Arano, '81	Mr. and Mrs. Steven L. Hart, '74	Melissa and Nathaniel Reish, '96,'99
Lucy and Ralph Archuleta	Rachel Haymon and Ken Macdonald	Dr. Nina D. Rosenberg, '88
Mr. L. Michael Axford, '59	Ms. Judy A. Heffner, '80	Mr. and Mrs. Roger W. Ruegg, '82
Mr. Howard L. Berg and	Jo Helen and Grant Heiken, '70/'72	Dr. and Mrs. Michael D. Santos, '95
Ms. Kristine Fernandez, '88	Mrs. Laurel A. Hewson	Mr. and Mrs. Mark Schwarberg
Lori Bettison-Varga and Rober Varga, '83	Dr. James J. Hickey and	Mr. Robert M. Sengebusch, '77
Dr. William L. Bilodeau	Ms. Karen A. Sanzo, '86	Dr. Christine H. Siddoway, '95
Mr. Patrick V. Boales, '81	Dr. Tessa Hill, '04	Dr. John M. Sinton, '69
Stacey and James Boles, '90/	Michael Hoover, '74	Dr. Margaret J. Sjovold and
Mr. Neil E. Botts, '83	Mr. and Mrs. Curtis J. Hopkins, '86	Mr. Harold M. Sjovold, '68
Kathleen and Brendan Bream, /'95	Dr. and Mrs. Clifford A. Hopson	Patricia and Tim Smale, '70/'78
Mr. Nathan Hale Brewer, '75	Dr. Milton W. Howe, '65	Mr. Stephen A. Soeller, '73
Mr. Stephen R. Brinkman, '86	Dr. Ellery D. Ingall, '81	Marianne and Norman Sprague, /'69
Mr. Christopher C. Bryant, '77	Dr. Eric W. James, '86	Mr. and Mrs. Middleton P.J. Squier, '63
Dr. David C. Buesch, '92	Dr. Craig M. Jarchow, '84	Mr. and Mrs. Michael D. Steinmann
Doug and Rachel Burbank	Mr. Jordan L. Kear, '94	Dr. Neil H. Suneson, '80
Robert Butler, '72	Dr. Edward A. Keller and	Dr. and Mrs. Toshiro Tanimoto
Sherry and Todd Butler, '76/'78	Ms. Valery Rivera	Robin and Bruce Tiffney
Mr. Steven E. Campbell, '81	Diana and James Kennett	Col. (Ret.) Steven M. Tippetts, '79
Mr. Steven H. Campbell, '85	Mr. David L. Kidder, '87	Leslie Warhmund, '85
Mr. James A. Cappa, '67	Dr. and Mrs. David L. Kimbrough, /'81	Dr. Chester A. Wallace, '72
Mr. and Mrs. James N. Carter, /'85	Mr. James P. Krohn, '65	Ms. Yumei Wang, '85
John J. Zucca and	Janet and Alan Krusi, /'77	Drs. Leland and June Webb, '63
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Mr. Thomas B. Danenhower, '86	Dr. George Benjamin Martin, '11	Grant Yip, '03
Dr. Barry M. Davis, '80	Dr. Christopher Gorham Mattinson, '00	Dr. David J. Young, '05
Ms. Christina Davis		Mr. Joseph A. Zamudio, '77

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