

The Department of
GEOLOGY & GEOPHYSICS,
in the School of Ocean and Earth
Science and Technology, at the
University of Hawai'i, Mānoa

Summer 2010

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issue in an electronic-only format.*

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Nuhou Kanaka Puka

*Nuhou Kanaka Puka ("Alumni
News" in Hawaiian) is published
by the Department of Geology
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and friends.*

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FRED M. BULLARD FELLOWSHIP for Outstanding GG Graduate Students

*text sources: UH Foundation Press Release from June 28, 2010 and additional
material compiled by the editor*

Thais Freda Bullard, daughter of pioneer volcanologist, geologist and geophysicist **Fred Mason Bullard**, endowed a fellowship in his name with a gift of \$1.8 million to GG before she passed away last year. This is the biggest gift GG department has ever received. "The gift of this fellowship will perpetuate the work of Fred Bullard, who motivated generations of Earth science students," said SOEST Dean **Brian Taylor**.

The Fred M. Bullard Endowed Graduate Fellowship "will allow our Department to endow a Fellowship to support our best graduate students. This donation is much appreciated and will start to support a graduate student this academic year" said incoming GG Chair, **Greg Moore**. The first recipient of the Fellowship was **Seung-Sep Kim**, a PhD student advised by **Paul Wessel**. Wessel is a former GG Chair who helped set-up the Fellowship, and was a friend that Thais visited on campus when she was in the islands. Seung-Sep will use fellowship funds to complete his dissertation work on the global seamount distribution and its implications for intraplate volcanism later this year.

Fred Bullard (1901-1994) dedicated his life to teaching and research. Emeritus GG professor **Ralph Moberly** recalls that "Fred Bullard is

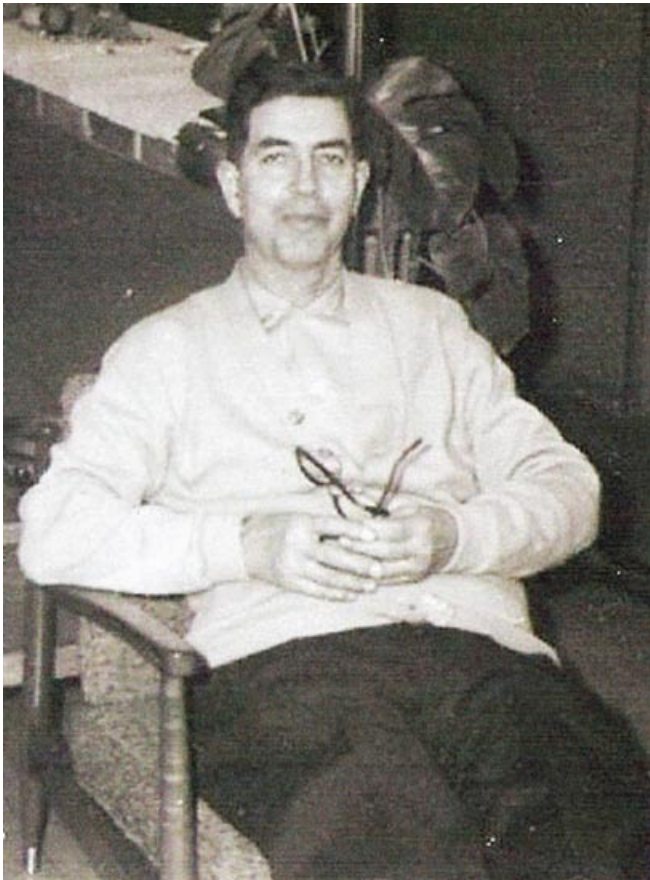


Thais Freda Bullard and her father, Fred Mason Bullard

(continued on page 2)

best known for his observations of Parícutin Volcano, Mexico”, a monogenetic cinder cone and lava flow field that began erupting in a farmer's field in 1943 and continued until March 1952, “affording Bullard the opportunity to study many aspects of Strombolian volcanism”. Bullard taught geology and volcanology at the University of Texas at Austin, where he was considered an outstanding professor and credited with inspiring many of his students to follow careers in geology. During his career, he served as a visiting professor at universities both nationally and internationally, drawing on his extensive fieldwork on volcanoes and geology in the U.S. West Coast and North West regions, Canadian Rockies, Europe, Africa, Asia, Central America and South America. He also was the author of a general text on volcanology.

Thais was very proud of her famous father and wanted to honor him in a meaningful way. In recent years, Thais would visit Hawaii each Fall, drop-by to chat in our GG Department and take a few UH classes. She loved to oil paint (her mother was an artist) and often she painted volcanoes, remembering many travels she enjoyed with her parents.



Young Fred Mason Bullard.

Photo courtesy of the Estate of Thais Freda Bullard

Message from the Outgoing Chair

Aloha everyone. I want to report that the Department of Geology and Geophysics moves into its 51st year as a strong and vibrant place of learning, and a unified community of scholars. Our research enterprise is thriving with the addition of new faculty over the past 2 years. We have new undergraduate majors and graduate students in record numbers; and our classes are full of learners from across the campus.

In my mind, the headline for the past year should be “GG STAFF RESCUE BUDGET SHORTFALL.”

As the year developed and the recession loomed into our lives GG faculty, secretaries, fiscal officers, and even the Dean stepped up with an amazing array of contributions to the GG budget: we used external funds to supple-



ment salary, we taught our own labs, we assigned portions of paychecks to the GG budget, we returned overhead funds back to the department, we volunteered pay periods to avoid staff reductions (which was not ultimately needed), we chose externally funded sabbaticals, we picked up additional duties, and more. In the end we managed a six-figure shortfall with a generous and unified effort among the entire department. We are not out of the woods yet – but, by repeating the cuts and donations for one more year, it appears at this early date that the 2011 budget will balance.

Budget cuts force us to direct all available funds into staffing. The result is that we have no funds for classroom activities including new lab equipment, field trips, software licenses, computer replacements, audio-visual equipment, and others. Several faculty have even taken the extraordinary personal step of directing a portion of their paychecks into the GG account at the UH Foundation.

In closing, I want to welcome on board Greg Moore as our new Chairperson! Greg will make a wonderful chair and we can all look forward to continued departmental success in coming years.

Please accept my very best wishes for a happy 2010/2011!

Chip Fletcher, Chair

P.S. We've never needed your help more. Link to <https://www.uhf.hawaii.edu/give/giving-gift.aspx> and please make a donation (under “Accounts”) to the Geology and Geophysics Fund, or see page 12.

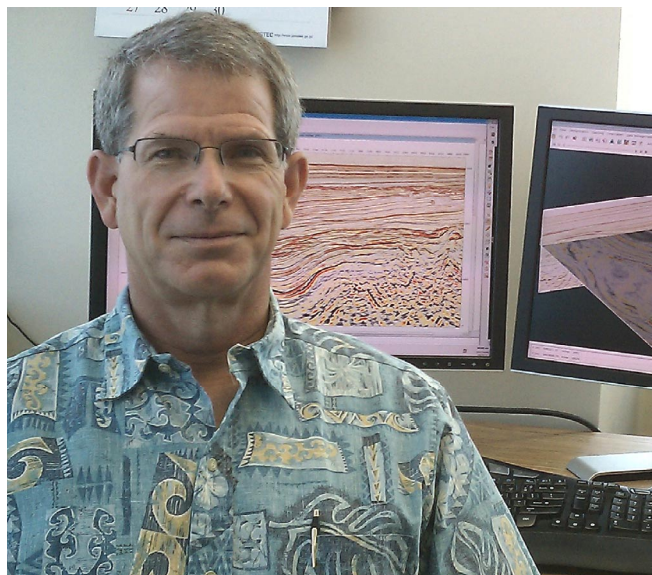
Meet the New GG Department Chair

The Department of Geology and Geophysics is about to enter unfamiliar territory as Chip Fletcher, our Chair for the previous 6 years (!), finishes his terms. I would like to thank Chip for his dedicated service to the Department – his shoes will be hard to fill. As Chip points out, however, our Department is strong and unified and **will** surely continue to prosper, even during the tough financial times ahead. I look forward to continuing Chip's tradition of strong support for our faculty and students – please contact me at gmoore@hawaii.edu if I can help you in any way.

As we start the 2010/2011 Academic Year, we should congratulate Eric Gaidos for his promotion to Full Professor and Hope Jahren for receiving a Fulbright Fellowship for a year's study in Norway. We will be welcoming nine new graduate students and several new undergrad majors in the Fall. We have a full list of courses for the coming semester that should keep everyone very busy.

Best wishes for a happy 2010/2011,

Greg Moore, Incoming Chair



Greg starts his term as GG Dept. Chair on 1 July 2010.

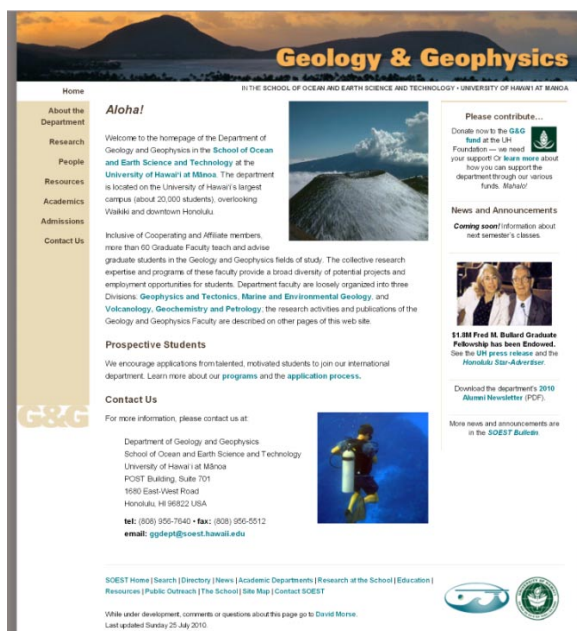
In Other News ...

Life after GG:



On April 21, 2009, three GG graduates were kind enough to spend more than 2 hours talking to our current undergraduates about what to expect in the local geological job market. From left to right, David Gremminger (2005; GeoLabs), Erin Miller (2009; Bureau Veritas North America), and Marcael (Ball) Jamison (1997; USGS Water Resources). The undergraduates appreciated the time they took. We would like to invite any alumni who are interested to do the same. To volunteer Please contact us at gg-dept@soest.hawaii.edu

New GG Website



A new version of the GG website will debut in Summer 2010. This makes version 5 of the website, which debuted at www.soest.hawaii.edu/GG in late 1994. Come explore the site, contact us, or learn about and our programs.

Degrees, Awards & Honors

Undergraduates

Chandler Penn	<i>BA Fall 2009</i>
Mark Raymond	<i>BA Fall 2009</i>
Svetlana Natarov	<i>BS Fall 2009</i>
Jason Turban	<i>BS Fall 2009</i>
David Gandy	<i>BA Spring 2010</i>
Matthew Markley	<i>BS Spring 2010</i>
Lauren Swavely	<i>BS Spring 2010</i>

Masters of Science

Carolina Anchieta – *Seismicity Along the Hawaiian Islands Recorded by the Plume Land and Ocean Bottom Seismometer Network* (Advisor: C. Wolfe, Fall 2009)

Owen Neill – *Influence of Pre-eruptive Degassing and Crystallization on the Deposits of Laterally Directed Volcanic Explosions* (Advisor: J. Hammer, Fall 2009)

Ashton Flinders – *Gravity Anomalies of the Northern Hawaiian Islands: Implications on the Shield Evolutions of Kauai and Niihau* (Advisor: G. Apuzen-Ito, Fall 2009)

Elaine Lampitoc – *The Geology of Ford Island, Oahu, Hawaii* (Advisor: S. Rowland, Spring 2010)

Lisa Petrochilos – *Experimental and Analytical Studies of Titanomagnetite in Synthetic and Natural Samples* (Advisor: J. Hammer, Spring 2010)



GG "Sweet Success" party honorees - Spring 2010.

(L-R) Greg Moore (Chair Elect), Patty Lee, T. Anderson, M. Markley, S. Weaver, J. Marske, Chip Fletcher (Chair), B. Romine, L. Swavely, D. Gandy, J. Kelly.

Doctors of Philosophy

Joshua Cahill – *The Composition of the Lunar Crust: Radiative Transfer modeling and Analysis of Lunar Visible and Near-infrared Spectra* (Advisor: P. Lucey, Fall 2009)

Deborah Eason – *Magmatic Processes and Mid-Ocean Ridges: Evidence for High-Pressure Crystallization and Crustal Assimilation* (Advisor: J. Sinton, Fall 2009)

Tom Fedenczuk *Visualization, Quantification, and Automatic Gradient Defined Features* (Advisor: P. Fryer, Fall 2009)

Meryl McDowell – *Laboratory and Applied Studies Using Thermal Infrared Spectroscopy and Other Remote Sensing Tools for the Understanding of the Geologic History of Mars* (Advisor: V. Hamilton, Fall 2009)

(PhD's con't)

Christopher Hamilton – *Explosive Lava-water Interactions on Earth and Mars* (Advisor: S. Fagents, Spring 2010)

Jared Marske – *Magmatic History of Lavas from Kilauea Volcano, Hawaii and South Pagan Volcano, Northern Mariana Islands* (Advisor: M Garcia, Spring 2010)

Student Awards

Agatin Abbott Memorial Award

Presented to an outstanding senior each year in memory of department faculty Agatin Abbott. **Samantha Weaver**

Fred M. Bullard Fellowship

Endowed by Thais Freda Bullard in memory of her father, Fred M. Bullard, a pioneer in the studies of Volcanology and general Geology and Geophysics. **Seung-Sep Kim**

William T. Coulbourn Fellowship

Endowed by friends and family in memory of department alumnus and faculty member William T. Coulbourn.

Jaque Kelly

Harold T. Stearns Fellowship

Endowed by longtime department friend for the purpose of supporting student research on geological and geophysical problems in Hawaii and the Pacific Basin.

TBA

J. Watumull Scholarship

Awarded annually to the department's outstanding graduate student from an endowment from the Watumull Foundation. **Bradley Romine**

ARCS Award

Awarded by the Achievement Rewards for College Scientist foundation. **Tiffany Anderson**

SOEST Achievement Tuition Scholarships

Awarded based on outstanding Spring 2010 grades of Undergraduates - **Samanth Jacob, Joseph Kennedy, Adonara Mucek, Edward Wolzien**

G&G Achievement Scholarships

Awarded based on merit service, achievements and outstanding grades of Graduates - **Carrie Brugger**

Faculty – Promotions, Awards & Honors

Eric Gaidos – Promotion to Full Professor, Aug. 1, 2010

Julia Hammer - Geological Society of America Exceptional Reviewer for the journal *Geology*, 2009

A. Hope Jahren - 2010 Fulbright Award in Arctic Science (Norway) 2010 Scientist of the Year: ARCS (Achievement Rewards for College Scientists) -Honolulu Chapter

John Sinton - Appointed by the Governor, to the State of Hawaii Natural Area Reserves commission

2009-2010 Research and Teaching Highlights

Examples of innovation and collaboration

Editor's note: Research Division heads Apuzen- Ito (GT), Ravizza (MEG) and Rubin (VGP) prepared these reports on activities in their respective groups

VGP

The group continued to be a hub of activity this past year, with members conducting field work, teaching, working on new or continuing research projects, and hosting visitors. VGP was particularly flush with guests this year, hosting students, postdocs and faculty members from far flung places such as France, China, Australia and Vancouver, all of whom contributed to the vibrant research atmosphere as they worked with our faculty and in our specialized lab facilities. The SOEST Isotope lab and MC-ICP-MS facility each hosted multiple visitors who worked on projects ranging from coral growth rates to river terrace development, and isotopic investigations of fossil teeth and bones, as well as investigations of eruption timing, magma petrogenesis and mantle composition.

The past year has also been especially good for funding, with 5 new NSF grants to **Ken Rubin** and **John Sinton**, 2 of which are collaborations between them that build on their prior work. The new projects involve (1) melt supply effects on magma chemistry, eruption timing and volcanic accretion styles on the global ocean ridge system and (2) volcanological investigations of the Galápagos Spreading Center. The latter had a 1 month field program in Spring 2010 (see photo), in which a group of GG faculty, post-docs and students participated in the deep submergence investigation along with people from U. South Carolina, U. Minnesota, U. Iceland, U. Buffalo, La Pietra Hawaii School for Girls and Woods Hole Oceanographic Institution.



Science party of R/V Atlantis cruise AT15-63 included GG members **Alice Colman**, **Deborah Eason**, **Owen Neill**, **Ken Rubin**, **Chris Russo**, **John Sinton** and the HOV Alvin.

John Mahoney sailed on IODP Expedition 324 to the Shatsky Rise, an approximately 140-Myr-old oceanic plateau in the northwestern Pacific, and **Rubin** sailed on the *R/V Kilo Moana* for follow-up investigations in the NE Lau basin after the discovery of active volcanism on an earlier cruise in May 2009.

Bruce Houghton has become the Science Director of the new FEMA-funded National Disaster Preparedness Training Center and has been involved in a new collaboration with HVO looking at summit eruption mechanisms at Kilauea. Meanwhile, **Mike Garcia** saw **Jared Marske** complete his studies and has gotten involved with the Nuclear Regulatory Commission as a judge, having been trained and assigned to his first case. Two graduate students advised by **Julia Hammer** also completed their studies this past academic year (see all graduates on page 4). **Owen Neill** has now gone to the University of Alaska-Fairbanks to work toward a PhD in volcanology while **Lisa Petrochilos** is seeking employment with a local geotechnical firm.

Finally, **Ken** passed the torch of VGP division leadership to **John Mahoney** at the end of June 2010 and will enjoy a 1 yr sabbatical at home and in the UK.

MEG

Submarine Groundwater Flux to the Coastal Ocean (**Henrieta Dulaiova**, **Craig Glenn** & **Aly El-Kadi**). Dulaiova has come on board a project initiated by Glenn and **Paul Lucey** (HIGP) aimed at quantifying groundwater discharge to the coastal ocean. If you've ever encountered a sudden temperature drop while swimming along one of Hawaii's beaches, chances are you swam across a plume of cold ground water. Detecting these discharges isn't difficult, yet quantifying volumes and fluxes is a much bigger challenge. **Henrieta** has brought her expertise in radiochemistry to **Craig's** work on nutrients and airborne thermal imaging of surface waters, in an effort to tackle this question. Quantifying these groundwater fluxes is important for both water resource and coastal resource management. It is impossible to construct a closed hydrologic cycle for any of the islands without including this very significant fresh water flux. So, in a project focused on Kona watersheds. **Aly** intends to construct a hydrological model including fluxes measured using geochemical tracers and thermal imagery. The high loads of nutrients, derived primarily from human activities, are commonly carried into the

Research and teaching highlights (continued from page 5)

coastal ocean by groundwater, making them an important issue for water quality management.

Reconstructing past shoreline position and projecting future changes is the focus of a project by **Chip Fletcher** and **Neil Frazer** (GT). Rising sea-level and continuing shoreline development threaten the beautiful beaches that underpin Hawaii's tourism industry. **Chip** and **Neil** have teamed up with a gang of graduate students to translate this concern into practical guidance for state and county officials. The process begins with the arduous work of digitizing historical aerial photos of beaches while ensuring the images share common reference points throughout the time series. Next, these records are interpreted. **Chip** and **Neil** recognized that beach morphology varies on many times scales and for many different reasons. To address these issues, they have brought a more versatile and realistic set of approaches to regressing temporal trends in shoreline position and made important contributions to quantifying uncertainties in these changes over time. In addition, efforts are underway to integrate decadal variation in historical records of winds and surf, which play central roles in governing sand movement on and off shore, with specific beach shoreline position data.

Hope Jahren and **Brian Popp** have just purchased new state of the art instrumentation for Carbon and Nitrogen Isotope Biogeochemistry with funds from the NSF Major Research Instrumentation program. Three new cutting edge light stable isotope ratio mass spectrometers will join their facility, bringing it to a new grand total of 8 instruments. These will keep our department at the forefront of stable isotope biogeochemistry. They will use these tools to investigate biological metabolism in multiple forms, including plant life, animal DNA, and human blood. Recently much of **Brian's** work has been focused on using isotopes to elucidate the key role that nitrogen plays in regulating the carbon cycle. Stay tuned for stories of their work, which will take them literally around the world in the next 3 years.

GT

Garrett Apuzen-Ito's Ph.D student **Todd Bianco** graduated, did a post-doc with **Clint Conrad**, is moving to Brown University for a postdoc, while M.S. student **Ashton Flinders** graduated and will enter the Ph.D. program at Univ. of Rhode Island after traveling in S. Africa. **Garrett** welcomes postdocs **Maxim Ballmer** and **Alejandro Gallego**, and new student Sam Howell. **Garrett**, Sam, and colleagues from UCSD and Norway went on a 3-week cruise to study the magma-starved

Aegir ridge (extinct), near the Iceland hotspot.

Janet Becker enjoyed her Fall 2009 sabbatical on the east coast, including a 2 month stay at Yale, while her PhD student, **Anne-Christine Pequignet** (OCN) advanced to candidacy and had a daughter, Maile.

Clint Conrad's group now includes MS student **Svetlana Natarov**, postdocs **Joost van Summeren** and **Bianco**, and undergraduate researcher **Julia Fiedler**. **Fiedler** and **Conrad's** project on the influence of dams on sea level recently got a 1st place poster award at the 2010 UH Undergraduate Research Symposium and appeared in a recent issue of *Nature*. **Conrad** and **Bianco's** work on the Shear Driven Upwelling and volcanism appeared in *Nature Geoscience*, and **Clint** and **Eric Gaidos** (MEG) hosted the Hawaii Open Meeting on Exoplanets in May 2010.

Robert Dunn and his research assistants spent the year working up seismic data from his 2009 Eastern Lau Spreading Center experiment. He returns to that area in November, aboard the *Kilo Moana*, to recover 54 broadband ocean bottom seismometers that were deployed for a year. **Rob**, **Julia Hammer** (VGP), and their son Arjen, welcomed Madeleine Dunnhammer to the family in December.

Steve Martel continues his studies of sheeting joints in Yosemite National Park, Pit Craters on Kilauea, and the Deep Underground Science and Engineering Laboratory, BlackHills, South Dakota. **Steve** is currently serving as Steering Committee Chair, of the National Center for Airborne Laser Mapping while his student, **Kelly Mitchell**, is wrapping up her M.S.

Greg Moore is working with a visiting Taiwanese postdoc **Yi-Ching Yeh** on new seismic reflection data from the Taiwan Collision Zone. **Moore** also continues work on deformation and sedimentation in the splay fault region of the accretionary prism of the Nankai subduction zone.

Neil Frazer and graduate student **Tiffany Anderson** continued to develop models to study future Hawaiian shoreline change (see MEG summary), including the effects of large storms, long shore drift and diffusivity. **Neil** also works in the area of mathematical epidemiology, developing models to understand why sea-cage aquaculture causes nearby wild fish populations to decline.

Paul Wessel continues work with graduate students **Seung-Sep Kim** and **Michael Chandler** on seamount distributions, plate tectonic reconstructions, ship data quality assessments, and GMT software development. They all spent time at the Univ. of Sydney in Fall 2009, collaborating with Dietmar Muller's EarthByte group, and enjoying lawn bowling, snake petting, and plenty of VB.

GG DEPARTMENT ACTIVITIES and FIELD TRIPS

Practical knowledge



Driller Tracy Runnells shows the Hydrogeology (GG455, taught by **Aly El-Kadi**) class and Glenn Oyama (from the Honolulu Board of Water Supply, HBWS) a repair operation in Waiola, Oahu using a cable drilling rig, an old but reliable and inexpensive tool. An unstable section of this deep monitor well has repeatedly caved - Tracy has filled in the incompetent borehole section, drilled through, and demonstrated for us the bailing of cut material.

Chillin'



The **Jahren** group bundled up to study and sample Ordovician-age rocks in SW Ireland in search of evidence of early life on land (left to right: **Brian Schubert, Caleb King, Glendon Hunsinger, Bill Hagopian, Hope Jahren, and Robert Panetta**).

Annual GG Picnic

On April 25, 2010, the annual GG picnic was hosted in Lanikai Park by the UH Geophysical Society and the Geology Club. It was a nice sunny Sunday afternoon where students, post-docs and faculty came together to enjoy a tasty BBQ, play volleyball, and of course conduct the annual grad students vs. faculty/undergraduates/post-docs softball game. **Ásdís Benediktsdóttir** recalls that the "faculty" team, better termed the "post-docs", were thrashed by the grad students in a not-so-exciting game. She suggests the faculty be prepared for the next picnic in the spring of 2011! Many people topped off the day at the beautiful Lanikai beach in a nice afternoon breeze.

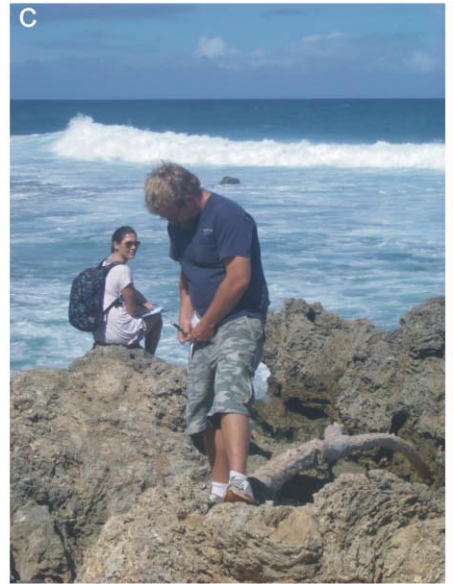


The grads with the trophy



Big swing by Carolyn Parcheta

Department activities and field trips (continued from page 7)



GG104 gathered pōhaku at 'Ōhikilolo (A), and GG101L+104 mapped at Lē'ahi (B) and studied old reefs near Ka'ena (C).



GG101+101L+104 traveled to Kīlauea and 40+ students, TAs, staff, alumni, and faculty hiked out to active lava flows (A), watched coastal erosion in action (B), and marveled at petroglyphs (C).



GG101L students mapped landslide features in Mānoa Valley (A), and measured flow rate in Mānoa Stream near the UH dorms (B).

Department activities and field trips (continued from page 8)



GG303 students and TA near the edge of Devil's Throat pit crater, Kīlauea.



GG101L students study (small-kine) wave dynamics (A) and get a lesson in old-fashioned leveling (B) at Wai'ālae Beach



GG130 visited the Pacific Tsunami Warning Center (A), less than a week after the Feb. 28 evacuation, and practiced gymnastics during a trip to Kīlauea (B)



During the annual Mojave Desert trip, GG305 students mapped at Rainbow Basin (A) and Resting Spring Pass (B), celebrated the end of the mapping assignments at Badwater (C), puzzled over sliding stones at Racetrack Playa (D), and preached the good geological word in Titus Canyon (E).

SOEST Open House, Oct. 2009

Select photos from the event. See more at:

<http://picasaweb.google.com/cheebert/SOESTOpenHouse2009?feat=directlink#>

and <http://www.soest.hawaii.edu/~zinin/> (see public lectures)



Craig Glenn introduces students to fossils



Jenney Engel and friend make an earthquake.



Students watch a simulated volcanic explosion.

SOEST Open House (continued from page 10)



Students learn about diamonds



Exploring the third dimension



Pat Cooper teaches Play-doh 101.



Minerals, up close and personal



A Pahoehoe sample



Thrilling rocks



Chancellor Hinshaw drops by

Remember When...

*you held your first rock specimen in a GG class or took your first GG field trip?
you made your first map, learned about a useful isotope, or looked at a seismogram?
GG department became your academic home, a place of learning, with friends and colleagues?*

Help others have that experience with a gift to the GG department. Your donation would provide funds to maintain and replace aging teaching infrastructure, support field excursions, and provide modern computing and audiovisual equipment for our classrooms and computer lab.

Please contribute today to the GG department fund at the University of Hawaii Foundation and help make those *geo-dreams* come true for a new group of emerging geoscientists. Consider making a gift today, using this form or through the UH Foundation website (see below). *Thank You!*

Mailing address: University of Hawaii Foundation, P.O. Box 11270, Honolulu HI 96828-0270.

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