



NUHOU KANAKA PUKA

Department of
GEOLOGY & GEOPHYSICS
University of Hawaii, Manoa
Summer 2006

Inside this issue...

Brian Taylor Appointed Dean	1
Message from the Chair	2
Degrees & Awards	3
In the News, G&G Picnic.....	5
Memorial, Pow-foong Fan.....	7
Patty Lee Retires	8
New G&G Faculty	9
Experimental Petrology Lab.....	12
Time Critical Studies	13
Real Time Seismic Display.....	14
Michael Jackson	15
G&G Field Trips	16
Alumni News.....	18
Faculty News	22
New in G&G Curriculum.....	27
G&G Publications 2005-2006.....	28
Alumni Challenge	32

Nuhou Kanaka Puka

Nuhou Kanaka Puka ("Alumni News" in Hawaiian) is published by the Department of Geology and Geophysics of the School of Ocean and Earth Science and Technology (SOEST) for its alumni and friends. Throughout the year, we'd like to hear from you. Contributions of photos, news items, changes in address and monetary donations may be sent to Department of Geology & Geophysics, University of Hawaii, 1680 East West Rd., POST 701, Honolulu, HI 96822.

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Geology & Geophysics' Brian Taylor Appointed Dean of SOEST

Brian Taylor, Professor in the Department of Geology and Geophysics, has been appointed by the University of Hawaii Board of Regents (BOR) to the post of Dean for the School of Ocean and Earth Science and Technology (SOEST). The BOR approved Brian's appointment as dean of SOEST, effective July 1, 2006. Brian's appointment is for three years.

Brian has been a faculty member at UH Manoa since 1982. He has extensive knowledge of the sciences, credentials as a researcher and educator, has authored a broad list of publications, and has been an integral part of the SOEST leadership team.

Brian came to SOEST from the Lamont-Doherty Geological Observatory of Columbia University, where he was an Australian Fulbright Scholar. It was there in New York that he met his wife Barbara, an artist, who worked for the CLIMAP project.

Foremost a painter, Barbara has diversified her media to include wall murals, digital art, and web design. Their daughter Stacy, born in Honolulu, survived climbing trees at an early age in the HIG courtyard at TGIF to graduate from Punahou, where she spent a lot of time as a Theatre "techie". She wants to be a veterinarian and has just completed the second year of a B.S. in Biology at Cornell University.

In addition to going to sea a lot, Brian served as SOEST Acting Associate Dean of Research since 1994. Not content to only study Earth with remote sensing, Brian spends some weekends working with rocks at home, building rock gardens, walks and walls.

Brian's vision for SOEST is "To serve society by acquiring and disseminating new knowledge about the Ocean, Earth, and Planets, and to enhance the quality of life in the State and the Nation by providing world-class education, contributing to a high-tech economy, and promoting sustainable use of the environment. In addition to strengthening our core competencies, Brian envisions renewed emphasis on service and education, and growth in the areas of ocean observing, small satellites, marine ecosystems, and climate change."



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Message from the Chair

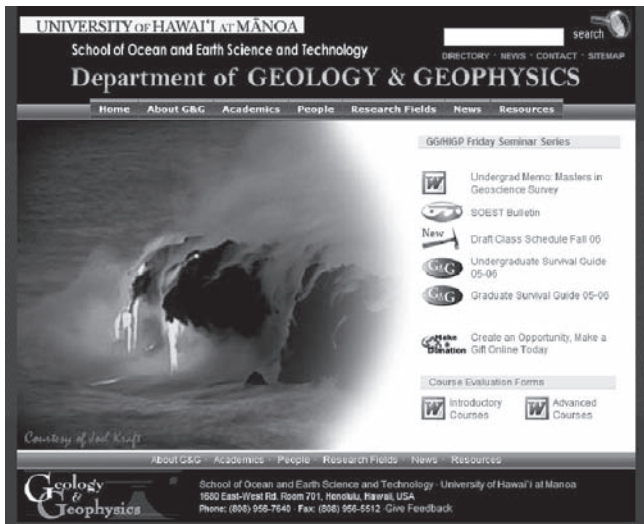


Greetings from the Department! Every year the newsletter grows with reports from faculty, honors and awards, and other timely information.

This year we add a list of faculty publications. As you can see from the over 70 publications in peer-reviewed scientific journals, the department continues to be nationally prominent. Growth in research is a major part of promoting and planning a department such as ours. But most of this effort falls on the shoulders of individual faculty members, graduate students, and the technicians and post-doctoral scholars that work here. Every day the UH geology community churns out new and improved understanding of:

1. Composition and dynamics of Earth's deep interior;
2. Formation, motion and recycling of Earth's crust;
3. Interaction of water, sediments, and life on Earth's surface;
4. Earth history;
5. Earth hazards, resources, and sustainability, and
6. The Solar System.

In fact, these are the research categories on the new GG web site: <http://www.soest.hawaii.edu/asp/GG/index.asp>. Link up and check it out (and while you're at it click the "Create an Opportunity" button and make a donation to the department).



Research is only part of our mission. Like last year, there is news to report on the curriculum. We have completed changes to the undergraduate program by increasing the level and number of courses designed to prepare students for the workplace: scientific programming, GIS/GPS training, remote sensing, and the role of water. Further, we plan to implement a new grad-

uate degree—the MGEO. This degree will be a non-thesis option for students wanting advanced training in “workplace” geology such as soils, hydrology, geoen지니어링, and other geotechnical fields. Ideally, obtaining this degree would qualify a student for professional certification if and when it becomes required in Hawaii. If you like the idea please let us know by sending an e-mail through the “give feedback” link on our web site, or take the “Masters in Geoscience Survey.”

From everyone at the Department of Geology and Geophysics, we wish you a wonderful summer, a great rest of the year, and invite you to write back with your own stories so we can include them in the next issue.

My very best wishes,
Chip Fletcher
Department Chairperson

Mahalo to the generous donors who have supported our programs, field trips and scholarships financed through generous donations to our UH Foundation accounts.

Confirmation of Degrees & Student Awards

Undergraduates

David Gremminger	(BA, Spring 2006)
Kyle McHarge	(BA, Spring 2006)
Elizabeth Roberts	(BS, Fall 2005)
Carolyn Robinson-Lazar	(BS, Spring 2006)
Chad Shishido	(BA, Spring 2006)

Masters of Science

Orion Carlise—*Thermal Infrared Weathering Trajectories In Hawaiian Basalts: Results From Airborne, Field and Laboratory Observations* (Advisor: P. Lucey, Spring 2006)

Michael Chandler—*Improving the Quality Control of Marine Geophysical Trackline Data* (Advisor: P. Wessel, Spring 2006)

Christopher Conger—*Identification and Characterization of Sand Deposit Distribution on Oahu Fringing Reefs, Hawaii* (Advisor: C. Fletcher, Fall 2005)

Andrew Delorey—*Surface Wave Tomography of the Upper Mantle Beneath the Reykjanes Ridge* (Advisor: R. Dunn, Spring 2006)

Ayesha Genz—*The Predictive Accuracy of Shoreline Change Rate Methods and Alongshore Beach Variation on Maui, Hawaii* (Advisor: C. Fletcher, Summer 2005)

Christian Gandy—*Volume and Petrologic Characteristics of the Koloa Volcanics, Kauai, Hawaii* (Advisor: M. Garcia, Spring 2006)

Seung-Sep Kim—*Separation of Regional and Residual Components of Bathymetry Using Directional Median Filtering* (Advisor: P. Wessel, Summer 2005)

Lucas Moxey—*A Complete Space-Based Synopsis of Eruption Dynamics: The 2002 Eruption of Reventador Volcano, Ecuador* (Advisor: A. Harris, Summer 2005)

Romy Schneider—*Evidence for Locally-Derived, Ultramafic Intracrater Materials in Amazonis Planitia, Mars* (Advisor: V. Hamilton, Spring 2006)

Doctor of Philosophy

John Bailey—*Evolution of Dynamic Volcanic Landscapes* (Advisor: P. Mouginiis-Mark, Summer 2006)

Nathan Becker—*Recent Volcanic and Tectonic Evolution of the Southern Mariana Arc* (Advisor: P. Fryer, Summer 2006)

(continued on page 4)

Jamshid Gharib—*Clastic Metabasites and Authigenic Minerals within Serpentinite Protrusions from the Mariana Forearc: Implications for Sub-Forearc Subduction Processes* (Advisor: P. Fryer, Summer 2006)

Christopher Gregg—*Natural Hazards in Hawaii: Some Studies of Awareness, Risk Perceptions and Preparedness* (Advisor, B. Houghton, Fall 2005 [correction from Spring 2005])

Nicole Lautze—*Dynamic Nature of Volcanic Phenomena: 2001-02 Eruption Processes at Etna and Stromboli, Italy* (Advisor: B. Houghton, Summer 2006)

Matthew Patrick—*Strombolian Eruption Dynamics from Thermal (FLIR) Video Imagery* (Advisor: A. Harris, Summer 2005)

Julia Sable—*Mechanisms of the onset and evolution of basaltic Plinian eruptions inferred from case studies of Etna 122 BC and Tarawera 1886* (Advisor: B. Houghton, Summer 2006)

Sergey Tkachev—*Compressibility of Hydrated and Anhydrous Sodium Silicate-Based Liquids and Glasses, as Analogues for Natural Silicate Melts, by Brillouin Scattering Spectroscopy* (Advisor: M. Manghnani, Summer 2005)

Student Awards

Agatin Abbott Memorial Award

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

Elizabeth Roberts

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.

Jared Marske

J. Watumull Scholarship

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

Kolja Rotzoll and Brett Wilcox

GG Field Camp Stipend Award

Stipend award toward a mainland field camp for a successful GG undergraduate applicant.

Penny Larin

ARCS

Awarded by the Achievement Rewards for College Scientist foundation.

Eric Mittelstaedt

In the News... Honors and Awards

Faculty

F. Scott Anderson, graduate faculty member of G&G, received the Defense Intelligence Agencies Chief Scientist Award for Excellence. Only five of these awards have been granted. Scott received this award for his new ideas in science and technology. The three other awards were for performing science under adverse conditions.

Charles (Chip) H. Fletcher was given the Hung Wo and Elizabeth Lau Ching Faculty Service to the Community Award. This award honors significant contributions that strengthen ties between the university and the community and includes a cash award of \$5,000.

Klaus Keil, graduate faculty member of G&G, was awarded the J. Lawrence Smith Medal by the National Academy of Science “for his pioneering quantitative studies of minerals in meteorites and important contributions to understanding the nature, origin and evolution of their parent bodies.” The Smith medal was established by a gift of Sarah Julia Smith in memory of her husband and has been presented once every three years since 1888 to recognize “recent original and meritorious investigations of meteoric bodies.” It includes a cash award of \$25,000. In the last year, he also became President of the Hawaii Academy of Science and an Honorary Member of the Microbeam Analysis Society.

Fred T. Mackenzie, graduate faculty member of G&G, was given the 2006 Claire C. Patterson award from the Geochemical Society. The Clair C. Patterson Award is given in recognition of a recent innovative breakthrough in environmental geochemistry of fundamental significance and published in a peer-reviewed journal.

Steve Martel was recognized by AGU and awarded a citation for excellence as a journal referee. This is his 6th recognition for his skill and commitment as an AGU referee.

Brian N. Popp has been elected a Geochemistry Fellow by the Geochemical Society and the European Association for Geochemistry. The title is bestowed upon “outstanding scientists who have, over the years, made a major contribution to the field of geochemistry.”

Scott K. Rowland received the Chancellor’s Citation for Meritorious Teaching. This award recognized Manoa faculty members who have made significant contributions to teaching and student learning.

Steven Stanley was awarded the Mary Clark Thompson medal by the National Academy of Sciences for his analysis of the meaning of shell forms of bivalve mollusks and for his studies of patterns of large-scale evolution and extinction in relation to global environmental changes of geologic past. The Thompson Medal is awarded every three years; a cash prize of \$15,000 goes with the honor “to recognize important services to geology and paleontology.” It was established by a gift of Mary Clark Thompson and has been presented since 1921.

Students

Ben Sellers and **Lisa Tatsumi** were awarded undergraduate summer research awards from the Vice Chancellor’s Office for Research and Graduate Education. Ben will receive \$2,250 to fund summer research for his proposal entitled *Microtextured analysis of the 934 A. D. Eldgia and 1783-84 Laki tephra: patterns of vesiculation and fragmentation for explosive basaltic eruptions*. Lisa will receive \$2,400 to fund summer research for her proposal entitled *Magma speedometry: determining the kinetics of the hornblende breakdown reaction*.

Kolja Rotzoll is the first ever UH student poster contest winner of the American Water Works Association, Hawaii section. The award was given at their 32nd annual conference in May 2006. Kolja’s poster was titled *Effect of large ocean swells on water-table fluctuations in Hawaiian aquifers*.

Staff

Matt Barbee, G&G cartographer with the coastal geology group, won Best Poster of the Meeting at the National Shoreline Change Conference held by NOAA in Charleston, SC in April 2006. Matt’s poster was titled *National Assessment of Shoreline Change: Hawaii Region*.

Grad Students WIN the Softball 2006 Challenge

At the annual G&G Spring Picnic and Softball Challenge on April 9, 2006, the student-to-teacher ratio was high for the game, so some ringers had to be called in, including returning favorites such as Ruth Fletcher and new additions like young Chase Fletcher. For the first few innings, the game resembled last year's, as the grad students sent a distressing number of easy pop-ups straight into the faculty's gloves, and struggling to field deep hits by sluggers such as Garrett Ito and Ben Sellers.

The grad students began to recover from this rough start as they became familiar with each other's strengths and with their opponents' patterns of play. The grad students appeared dominant midway through the game, but then their outfielders were rattled by a barrage of cunningly placed power hits by the faculty. By the bottom of the fifth inning, the faculty were several runs ahead, but they were starting to tire. Sensing this, honorary coach Todd Bianco rallied the grad students to fight back. Through a steady flow of sound pitches and solid hits, along with some daring risks in base running, they regained their lost ground. In the final inning the faculty nearly overtook them again, but Andy Delorey made the catch that clinched the win—the first grad student win in at least a decade with a final score of 20-24!



(above) While Todd Bianco (Grad Team Coach) was in Zurich, teammates Eric Mittelstaedt and Kolja Rotzoll accepted and hoisted the Johnny Geangee Memorial Trophy at the G&G Year End Party on May 12, 2006. (below) The ousted champions from 2005. Will they be out for blood in 2007?



In memory of

Professor Pow-foong Fan ***September 4, 1933 to July 30, 2005***

Pow-foong Fan was born September 4, 1933, in the Dutch East Indies into a thriving family; he was the eldest son in a family of five children. Although in his earliest childhood his family was prosperous, they suffered during World War II and the transition to Indonesian independence. As a consequence, the family moved to Singapore. “Pow’s” education in the U.S. included a BS from Wheaton College (1955) and an MA and PhD from UCLA (1963/1965), where E.L. ‘Jerry’ Winterer was his PhD advisor. At UCLA he began a life-long friendship with fellow grad student Barry Raleigh, who years later became his dean in SOEST.

Pow, as he preferred to be called, came to Hawaii in 1965 when he was hired by George Woollard, Director of the Hawaii Institute of Geophysics, to assist in a research program that required a general knowledge of the geology of eastern Asia.

That work commenced a lifelong interest in the geological literature of the region, especially of China. When a fraction of his university position was assigned to teaching, those interests became the basis for his advanced course, “Geology and Mineral Resources of Asia.”

At the entry level, Pow taught GG 103, “The Geology of the Hawaiian Islands,” a course that was the principal exposure to science at the college level for many of Hawaii’s residents and visitors. Leading numerous field trips to the Big Island created many fond memories for Pow and his students.

Except for a sabbatical at the University of California at Riverside, determining the mineralogy of deep-sea sediments with x-ray diffraction, Pow’s travels and studies were mainly in the Far East. He was especially important as the department’s main supporter of the aims of the East-West Center, advising several of its Asian students enrolled in the department, and working with Center staff on investigations of Asian resources. Pow was devoted to his wife Carol and children: Evelyn, Laura and Samuel, as well as to his church, students, friends, and our department.

Ralph Moberly, Emeritus

* * *

Professor Pow-foong Fan was, for me, one of those people you meet along life’s journey that can literally change the direction of your life. As a senior majoring in geological sciences at the University of California at Riverside, where Dr. Fan was taking his sabbatical leave, the turning point started first in his “Introduction to Oceanography” class, and in his kind offer of a part-time job. Under his guidance, I completed an undergraduate senior research project on the “Clays and clay minerals of the Santa Ana River drainage basin,” which we later published together. It was the beginning of several fruitful research collaborations. Applying to graduate schools, I was undecided where to choose, until I visited Hawaii over spring break. Dr. Fan wisely knew Hawaii would best sell itself.

At the UH, Dr. Fan was my first academic advisor and employer. Through those graduate years, Pow was always cheery, optimistic and so informal, an educator in and out of the classroom. Always ready to dispense advice on any of life’s matters, excited by the latest gossip (“Gary, let’s go for coffee”) and quietly watching over me like a third parent, being relocated so far from home.

Pow was an expert on the geology of China, and had keen interests in natural energy resources. We worked together in the 1970s in helping to establish the geothermal potential of the Hawaiian Islands. I was extremely fortunate to have Pow in my life. Professionally, Pow-foong Fan was a resource geologist, sedimentologist, clay mineralogist, geochemist and educator. Pow was my teacher, advisor, co-author and colleague, but mostly, he was my friend.

Gary McMurtry (Associate Professor, Oceanography)



Patricia Lee Retires

18 years of teaching GG 101 and GG 103 and leading 35+ Big Island field trips

Patty Lee always loved rocks! She spent her early years looking out the back seat window of a Ford driving back and forth across America noting that the east and west parts of our great land really are different.



Dan and Patty Lee and friends at her Retirement Party, April 17, 2006

She found her way into geology via a back door. Her first geology class was in 1959 at Stephens College, Columbia MO where she was smitten with geology. A transfer to the University of Colorado, an ideal place to study geology, was not all that she had expected. Upon arrival at the geology building, she was informed that they did not have women geology majors! That accounts for the Political Science major and Economics minor from CU!

Two years (1963-65) in the Peace Corps teaching English as a second language in Thailand followed. She returned to the U.S. choosing Hawaii (where she had never been and had no desire to go) because her parents had relocated there. There Patty met Dan Lee, married, had 4 children, taught social studies in the public high schools, took a sabbatical, found geology instructor Gary Stice at Windward Community College, and discovered geology again!!

Back in school one more time, Patty had to take all the undergraduate courses followed by the graduate courses in order to get her degree(s) in geology. Yes, it took a long time! She finally graduated in 1985 with

her Master of Science. “Hurrahhhh!!” her mother said—who, now living in Utah, came to Hawaii three times for her graduations.

Patty joined the G&G Department in 1988, after working at Dames & Moore for three years. For 18 years, she taught introductory geology courses, worked with undergraduates, started the SOEST Open House and the Geology Club (with help from the students), led many field trips, designed 10+ years of t-shirts, organized the photo contests and lab tours and Huakai Ohi Ohi trips and has seen the departure of many of the old guard and arrival of the new order.



Patty Lee and Mike Theune (G&G undergraduate), who presented her with the ASUH Senate Resolution 23-06, in recognition and appreciation for her years of dedication and commitment to SOEST.

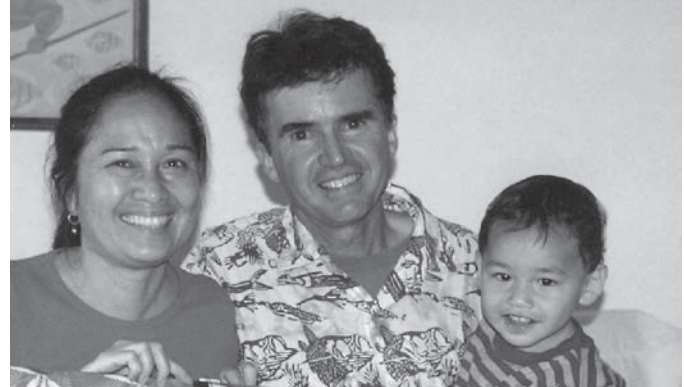
Patty said “It has been a dream to be a part of this stimulating, dynamic, enlightening, fascinating, wonderful organization. What a privilege! Thank you!! Mahalo!! Khap Khun, Ka!”

Scott Rowland Joins G&G Full Time Faculty

In late 2004, Scott Rowland, G&G alumnus and long-time HIGP researcher, joined G&G as a full-time instructor. Scott regularly teaches Field Methods and Remote Sensing and offers Dynamic Earth, Geology of the Hawaiian Islands, Work of Water, and Geospatial Information on a rotating basis.

“The first full year in G&G has definitely been full. In addition to teaching, Mele and I adopted a baby boy named Kai, so my days and hours have been filled to the brim. But fun. Kai has rearranged my priorities; when it’s time to leave the office, it’s time to leave the office!”

Scott taught Remote Sensing and Big Island field trip portions of the international CSAV course. “I always feel that I’m doing something useful when I help with CSAV. The participants, from developing countries, are truly inspiring—they work under harsh physical conditions with a minimum of equipment and funding.”



During Fall 2005 Scott taught Geospatial Information (essentially GIS for geologists). However, the real challenge that semester was GG 103. Eighty-eight students were attracted by the H-focus (Hawaiian and Pacific) designation. To graduate, all undergraduates now must take one H-focus, one O-focus (oral-intensive), one E-focus

(ethical-issues), and five W-focus (writing-intensive) courses. “There aren’t many H-focus courses, especially in the sciences, so when one comes along, it is popular. In GG 103, Hawaiian and non-Hawaiian guest speakers added cool cultural perspectives on geology and the interaction between geology and Hawaiian people.” For their final projects, Scott had students make a stone implement in the authentic Hawaiian way and describe how the geological aspects of their particular stone affected what they made and how they made it. The results are impressive and currently are on display on the ground floor of POST. Three students actually made pohaku ku’i poi.



GG 305 this semester has all male students (a complete reversal from last year), and they recently returned from 11 fun-filled and almost snake-free

days in the Mojave Desert. Scott is also teaching a joint course on the geology of Hawai’i and Alaska with Cathy Hanks of University of Alaska, Fairbanks. They each have 9 students of Pacific Islander or Native Alaskan heritage, and take turns teaching via TV. They will be running a 2-week field excursion that will bring the Alaskans to Hawai’i for a week of young rocks and then they all go to Alaska for a week of accreted terranes.

Finally, the above-mentioned Kai. “He is a joy to behold, smiling at least 95% of his waking hours, a few of which have been spent in POST 617A. I’m also finally getting some upper-body strength because da bruddah is off da chart! Mele deserves tons of credit for giving up much of her work time to watch him, allowing me to devote my hours to G&G.”



The 2006 GG 305 students (and Sponge Bob) at the triple-overtuned Barstow anticline.

New Faculty in G&G—Robert Dunn

This year, Dr. Robert Dunn, a veteran G&G researcher, joins G&G as a full-time Associate Professor.



While he is best known for his contributions to seismic tomography and mid-ocean ridge magmatic processes, his papers have had a broad impact on several fields. “I like to work on a variety of topics and working this summer with Neil Fraser and Olga Hernandez [a visiting graduate student from L’Ecole Normale Supérieure in Paris] on locating whales using seafloor hydrophones has been a treat. Locating whales is theoretically similar to locating earthquakes,

but whales are rather more interesting.” Robert hopes to team up with other marine mammal researchers to place additional hydrophones around the islands to track and identify these creatures. Robert teaches *Data Analysis*, *Seismology*, and *Numerical Methods*, and does guest lectures in *Accelerated Introduction to Geology*. He will teach *Inverse Theory* this fall. “Ten graduate students and I had a lot of fun this past semester in my new numerical modeling course. Students worked on projects of their own choice, wrote finite difference equa-

tions to describe the physics of their systems, and then simulated the phenomena on a computer. Topics ranged from heat flow out of lava lakes, to trace element partitioning, tsunami wave propagation, bioturbation, and lithospheric loading.”

“I have a strong commitment to undergraduate academic development and believe in supporting undergraduate learning through internships.” In the last few years, Robert has mentored five undergraduate interns, all of which have worked on research projects in his lab. “Some of the undergraduates that I’ve mentored performed at the graduate level. It’s just a matter of giving them a chance.”

He is the University’s representative to the Board of Directors of IRIS (Incorporated Research Institutions for Seismology) and has been working hard to get an IRIS sponsored museum display of worldwide seismic data for the POST building (see article this issue). “All of the hardware has finally arrived, so later this summer we will commence the construction phase” he explained.

Robert enjoys designing and building wood furniture in his home woodshop and has made several pieces for his office and home. He and his wife Julia spent two weeks last summer whitewater canoeing down a remote river in the Yukon.



New Faculty in G&G—Steven M. Stanley

Steven M. Stanley (widely published author and honored scientist) joined SOEST and the Department of Geology and Geophysics on July 1, 2005. Most recently working at Johns Hopkins University, Steve packed up his lab and office and moved into the 7th floor of the POST building. While busy getting installed in the department, he married Ellen last December, “a beautiful woman on a beautiful beach along eastern Oahu.”

Steve’s central interest is in the history of life in the context of past environmental change. He analyzes particular events, and is an evolutionary theorist, using fossil data to derive general macroevolutionary principles by analyzing rates, trends and patterns of evolution, and studies both living organisms and fossils.

Recently, he sent off a large manuscript on the pattern of diversification of marine life during the past half

billion years and has another in press on secretion of calcite by corals in Cretaceous seawater, which favors a low magnesium-calcium ratio precipitation for this form of calcium carbonate over aragonite. This summer, Steve returns to the Maryland/ Washington D.C. area, where, after receiving the Mary Clark Thompson Medal of the National Academy of Sciences, he will spend time at the Smithsonian Institute. There he will be studying the large Pliocene molluscan fauna from Florida that suffered heavy extinction at the onset of the modern ice age, and begin studying variations in growth rates of fossil corals in space and time. He plans on returning to the UH Manoa campus in August to continue setting up his new lab and working with the faculty and students in G&G.



December 28, 2005, on a beautiful sunny day at the beach on Bellows Airforce Base (East Oahu), Steve and Ellen were married in a traditional Hawaiian-style wedding.

G&G's New Experimental Petrology Laboratory

The G&G Department has a new state-of-the-art experimental petrology laboratory under the supervision of Dr. Julia Hammer. Julia is researching chemical and physical processes taking place in terrestrial and planetary magmas. Members of her research group, including graduate student Carrie Brugger, undergraduate Lisa Tatsumi, and Laie Elementary teacher Barbara-Jean Kahawaii, are studying the chemical reactions taking place among crystals and liquids in magmas in order to better understand magmatic processes culminating in eruptions at arc volcanoes. Jeffrey Gillis (HIGP) and incoming postdoc Julie Bowles are synthesizing lunar and Martian magmas, respectively, in order to study their distinctive optical and magnetic properties.

Many aspects of the dynamic chemical environment of an erupting magma can be simulated using laboratory apparatus that reproduce the temperature and pressure conditions of natural magma chambers. This subject essentially represents an application of the principles of physical chemistry to molten rock in order to understand magmatic processes. An area of Hammer's experimental research relevant to several of the world's volcanoes, including the current eruptions at Merapi

(Indonesia), Soufriere Hills (West Indies), and Bezymianny (Russia), involves understanding processes that occur in magma syn-eruptively, that is, while magma ascends through crustal conduits to the Earth's surface during a volcanic eruption.

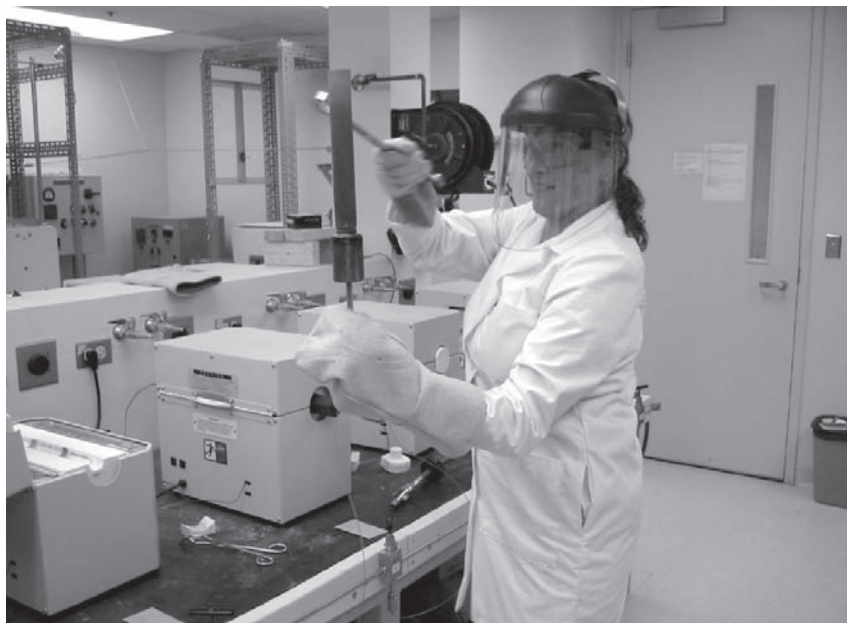
During rapid decompression, gases dissolved in the liquid portion of a magma boil away. This results in an increase in the stabilities of certain minerals. Thus, magma degassing provides a driving force for magma crystallization. The "drying out" of melt and addition of crystals to magma increase its viscosity, which can in turn modulate the style of the volcanic eruption that occurs when magma reaches Earth's surface.

Thus, an important motivation for studying the process of crystallization in degassing magmas is to understand the consequences of these syn-eruptive processes for volcanic events. Turning the problem around, if we develop knowledge of the chemical thermodynamics of magmas undergoing decompression through laboratory studies, we can use the textures of volcanic rocks to make inferences about processes occurring as magma transits upward from a reservoir many kilometers below the surface. Because a volcano's past activity provides

clues about the styles of future eruptions, improving our ability to interpret magmatic processes from erupted materials is important for assessing volcanic hazards.

The laboratory contains all the facilities necessary to synthesize experimental starting materials from chemical reagents and impart to them an intrinsic fO_2 , generate temperature, pressure, and gas atmosphere conditions from 0-3 kbar and 700-1600°C, modulate pressure automatically, rapidly quench high-temperature experiments, prepare polished charges and small thin sections, and analyze products and natural samples using microscopy and digital image analysis.

The new experimental petrology lab is located in POST 732. You may contact Julia via e-mail at jhammer@soest.hawaii.edu or call her office at (808) 956-5996.



Graduate student Carrie Brugger quenches an experiment in the water-medium high-pressure line.

Time Critical Studies of Submarine Eruptions

We get spoiled, living in Hawaii, because our mostly mild-mannered volcanic eruptions happen frequently and are easy to observe. But the majority of Earth's active volcanoes lie deep beneath the sea at submerged island arcs, hot spots, and especially mid-ocean ridges, where most eruptions go unnoticed and unobserved by scientist or tourist. Like volcanoes on land there is much to learn at submarine eruption sites, not only about the rock formations produced, but also about the punctuated delivery of unusual chemicals and organisms to the marine environment. It is key to arrive at these sites soon after an eruption is detected because events are usually fast, and the strongest signals rarely persist for more than a month. Yet, imagine the logistics of traveling to one of these places on a few days notice: the tools you take, the ship you use, and the speed you travel... all depend on where, how and by whom it was detected, the time of year, and numerous other possible obstacles. One group that plans and conducts submarine eruption responses is the Time Critical Studies group (TCS) of the RIDGE2000 program, in which G&G Associate Professor Ken Rubin plays an active role.

Over the past 18 years, Ken has had the good fortune to participate in numerous studies of new submarine eruption sites, from the deep spreading centers of the eastern tropical and northern Pacific Ocean, to arc and hot spot seamounts in the Pacific and Indian oceans, to our own submarine volcano Loihi. One of his specialties is super high resolution dating of lava flow surfaces using ^{210}Po , a naturally occurring semi-volatile metal in the uranium decay chain. With it, he, his group and their collaborators around the country have mapped out submarine eruption durations, vent migrations, and lava flow domains with monthly resolution. Though easy and commonly done on land, such research on marine sites occurs nowhere else on Earth but our own G&G Department.

As we go to press, UH oceanographer Jim Cowen (TCS leader) is directing a rapid response effort to a suspected April 2006 eruption site on the East Pacific Rise, while Ken begins analysis of the first rocks recovered by another ship that was just passing by. They both hope to return next month to dive at this site with the submersible Alvin.



Bacterial floc and warm water exit a collapsed lava flow after the 2004 eruption at 10° 45'N on the East Pacific Rise, as viewed by the forward-looking digital camera of the submersible Alvin. (photo courtesy of Woods Hole Oceanographic Institution)

Ken Rubin

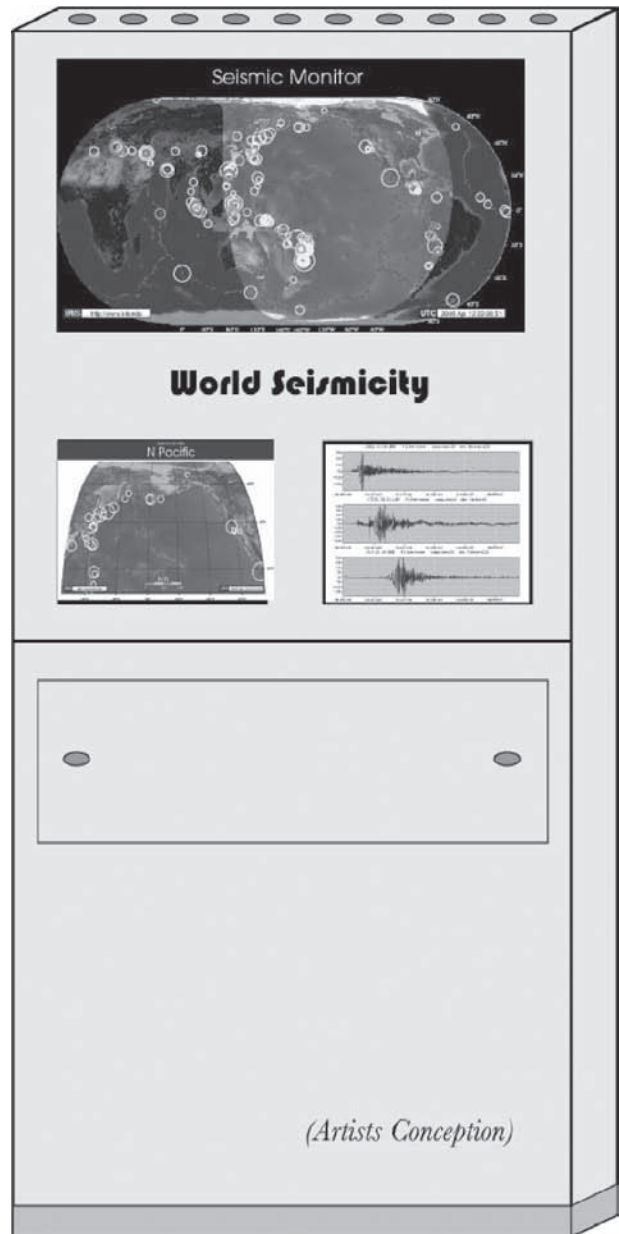
Coming soon to G&G—Real Time Seismic Display

Technology provides constant access to the latest news and weather, so how about the latest seismic data? The Department of Geology and Geophysics is installing a real-time display of worldwide seismic data in the POST building, 7th floor, hallway. “Real-time seismic displays are some of the most popular displays at places like the Smithsonian and the American Museum of Natural History,” says Dr. Robert Dunn, who is spearheading the effort. Dunn is collaborating with Rhett Butler of IRIS (Incorporated Research Institutions for Seismology) to de-



sign and implement the display.

IRIS has generously offered to pay for the hardware and supply the live data feeds via the Internet. The display will be situated outside the department’s main office and will consist of one very large LCD screen and two smaller screens. Passersby will find information such as the location of earthquakes listing the time, magnitude, geographic location of earthquakes that have occurred within the last few days, and seismograms of select events. “The biggest eye-grabber for this display,” says Dunn, “is the sheer number of earthquakes occurring around the world during any given week. But the wiggly lines are neat too.” Dunn hopes that the display will inspire other SOEST groups to install similar displays of real-time data showing Earth processes. He is also raising funds to build a seismology and geodesy display of Hawaii-only data.



Distinguished Alumni Michael Jackson

As a geology major, G&G alumni Mike Jackson is a long-standing generous supporter of the department. Donations by Mike, and matching funds from his company, Noble Energy, send geology majors to mainland field camps, every year. For the 2005/2006 academic year, Mike is the “G&G Distinguished Alumni.” We asked Mike to send a report of his activities and background.

Relations and Honor Committee

My family moved to Hawaii from Los Angeles in 1960, in time for me to attend Manoa Elementary and Kalaheo Intermediate before graduating from Saint Louis High in 1974. My distraction-addled school grades were fortunately balanced by strong SATs, and I squeaked onto the Manoa campus. My initial Food Science and Technology major never had a chance after “Rocks for Jocks”. I honestly cannot recall who taught the course because, truthfully, the subject matter made up for the lecturer. Some quirks I remember well are Mike Garcia perched on a bluff at Hanauma Bay with his folding campstool during Field Methods, Pow-Foong Fan’s incredible jokes, John Rose’s packrat office, and John Philpotts’s pronunciation of meteorite – “Mew-tyur-rite”—which confused me for at least a month.

Originally, I only took GG101 to fulfill a core science requirement, but instead got sucked into a great career. That one course explained many phenomena—volcanoes, earthquakes, and even why surf gets to certain heights and breaks where it does. At the time I thought, “Gee, here’s something interesting and it’s outdoor stuff and geologists seem to drink a lot of beer.”

Hours of class work were finally interrupted by the junior-level field course. The next chance to be in the field was summer field camp, so I saved up a few bucks, borrowed a few more from The Palmer Geology Fund and headed off to the University of Nevada’s field camp where I discovered sedimentary rocks and continental tectonics. For a Hawaii kid, it was an invaluable experience to work this type of geology and to meet students from across the nation.

These field experiences led me to my on-going support of the G&G department’s field trip fund—I want to make it easier for students to experience geology outside of the classroom. Hawaii students are at a disadvantage relative to other students—they just can’t cram into a vehicle and drive to a field site in another state or even in another county.



A summer job in the Rockies with a geophysical contractor in 1980 preceded my graduate studies. While a graduate student, two cruises on the old Kana Keoki got me out of HIG. A recruiter from Exxon hired me in 1992.

At Exxon, I traveled the world looking for oil. China, Kazakhstan, Russia, ending up on Sakhalin Island as Exxon’s office manager for 3 years: big salmon, mountain biking, cheap skiing, and a wonderful expatriate community. After 15 years with Exxon, a good job market led me to jump to the world of independent oil and gas producers. My current position with Noble Energy again requires a lot of travel in the oil search with my favorites being Argentina and Vietnam. A charitable foundation associated with the company generously matches my field trip contributions dollar-for-dollar.

The last six months have been hectic—in addition to work-related travel, I’ve managed to run the Honolulu, Houston, and Boston Marathons and finish a cottage on Maui between Haiku and Makawao. I’ll be retiring there someday, but in the meantime, I think I’ll keep looking for those hydrocarbon molecules, wherever they might be hiding.

Aloha!
Michael Jackson

G&G Field Trips

GG 402—Visiting Maui

During spring break of 2006 John Sinton's GG 402 Hawaiian Geology class spent four days exploring the wonders of Maui including an unforgettable hike through Haleakala Crater. John showed us many awesome places including a lava tube in the Haleakala Crater where we hiked 40 minutes with minimal light from our flashlights. The class consisted of graduate and undergraduate students, and visitors from our German exchange program. After days full of sightseeing and learning about the local geology, we made our home at the cockroach friendly but still highly enjoyable Piiholo Girl Scout camp.



GG 402 taking a break in Maui

This already great camping experience was sweetened with a flaming drink called Feuerzangenbowle, games including *Girl Talk* and *Spoons*, and magical card tricks by Jerrad! We would like to take this opportunity to extend a special thank-you to JoAnn Sinton and oth-

ers who cooked the wonderful food each night. We had a great time with a lot of fun both in the field and at the Girl Scout camp.

A big thank you to all that made this trip possible. It was a great experience.

Big Island Field Trip GG 101 & 103 Students

Professors Brian Popp and Patty Lee (on her final pre-retirement Big Island field trip) lead their students on the traditional Big Island adventure to explore the volcano and experience first hand what they read about in their textbooks.



Students begin to wonder about the wisdom of their fearless leaders on the Big Island field trip.



(left) Some people lift weights in a gym; GG 101 and 103 students show off lava lifting.

Please consider a tax-deductible donation to support our field trip programs for students. Donations can be made online at the GG website <http://www.soest.hawaii.edu/asp/GG/index.asp> “create an opportunity” button or by mail to the University of Hawaii Foundation, P.O. Box 11270, Honolulu, HI 96822-0270. (Make your check payable to the University of Hawaii Foundation and indicate Geology & Geophysics Field Trip Fund on your check.) Mahalo for your support!

GG 710—Exploring in California

University of Hawaii/NASA Astrobiology Institute Field Trip to the Precambrian/Cambrian formations of Death Valley, California, March 27-29, 2006, GG 710 field trip lead by Eric Gaidos and Steven Stanley.

(right, top) Dr. Martin Kennedy (UCR, left) describing the Kingston peak Precambrian glacial tillite deposits to students and Dr. Steve Stanley (UH) (seated). (right, bottom) Dr. Mary Droser (UCR) and students examining trace fossils in earliest Cambrian rocks. (below) Field trip leaders and participants from the University of Hawaii, University of California Riverside, and other institutes outside the SHEAR facility in Shoshone, California.



Alumni News

1960

Fris Campbell (MS '66) was one of the founders of Seafloor Surveys Int., now Fugro Seafloor Surveys, with Don Husson, Grant Blackinton, John Williams, and Diane Hills. He spent 16 years with SSI, retiring as Vice President in late 2002 after spending 7 years in Seattle. He has been happily retired in Kailua since 2003.

1980

David Grooms (MS '80) is working at Maui Community College as an associate professor.

Bryan Terauchi (BS '83) will soon be celebrating his 20th year as a teacher of physics at Aiea High School. Outside the classroom, he is the track coach.

David Chaffee (BA '84) shared that he is alive and well, healthy, wealthy and wise having just turned 50. He is kept busy as a co-owner of Scientific Consultant Services, Inc., a contract Archaeology firm in Honolulu and father of 3 children: Malia, Ryan and Jill.

Mike Knight (PhD '85) has recently opened his own consulting firm in Hawaii—Geologic Environmental Hazards Limited, LLC. Mike was formerly the manager of environmental programs for BAE Systems.

Daniel Johnson (PhD '89) We sadly report that Daniel, a geophysics researcher, was killed in an accident involving a logging truck in Washington State in October 2005. He and another scientist, Anthony Qamar, were riding in a car that was hit by logs that fell off a trailer being pulled by a truck. They were on an Olympic Peninsula trip to check on instruments and collect data concerning the "slow-slip" quake that had occurred off the coast.

1990

David Foss (MS '93) senior hydrogeologist at Foss & Oneill, Inc in Rhode Island, reports he works on a wide range of projects including some legitimate hydrogeology, as well as assessment and remediation work. Married in 1997, he has a son and daughter and can now add to his CV that he has made 2 hour presentations on volcanoes in pre-kindergarten classes.

Alexandra Cheng (BS '94) works for Apple Computer, Inc. in California as a Mac OS X system administrator.

Jack McMillan (MS '94) is an instructor of physics and astronomy at Chaminade University in Honolulu.

Iris Stewart-Frey (BS '94) is a climate researcher at the Scripps Institute of Oceanography and a consultant for the U.S. Geological Survey. She and her colleagues have documented shifts in the timing of stream flow and snowmelt runoff in rivers across western North America. They've determined that runoff timing has shifted 10 to 30 days earlier each spring over the last 50 years.

S. Rajan (PhD '95) is a project director (LCS) at the National Centre for Antarctic and Ocean Research Headland Sada, Goa, India. He oversees the Indian Continental Shelf Program, including a national multi-institutional initiative that uses marine geological and geophysical data to define outer limits of the continental shelf, as per the provisions of the United Nations Convention on the Law of the Sea. He is currently co-authoring a chapter with Prof. Craig Glenn on mineral authigenesis in the Plio-Pleistocene Black Sea for a forthcoming IAS Special Publication on authigenic minerals.

Chris Okubo (BS '96) is working in the Planetary Research Image Laboratory as a research associate at the University of Arizona in Tucson.

Kimberly Sides (BS '96) is on the staff of the UCSC Educational Partnership Center at UC Santa Cruz.

Stephan Bergbauer (MS '98) recently transferred from Anchorage to Aberdeen Scotland working with British Petroleum. He is working on "a structure... discovered 25 years ago, but to this point nobody has been able to make sense of."

Jack Kronen (PhD '98) is a senior geologist and project manager for URS Corporation in Honolulu, HI. He joined URS in 2000 and has been involved in various projects ranging from environmental investigations to geotechnical engineering. Environmental projects include groundwater monitoring in Honolulu, Ewa Plain, and Central Oahu, and remedial investigations at Wake Island. Geotechnical work has included geophysical investigations along Saddle Road and within Hawaii Volcanoes National Park on the Big Island to rockfall miti-

gation studies on Oahu and Kauai. Prior to joining URS, Jack worked for Sea Engineering as an observer aboard a Russian ship supporting seafloor mapping operations by a German company using British equipment. He was the only American on board this cable route survey throughout the Caribbean Sea. Married in 2001, Jack and his wife Susan have 2 children, Elsa and Cable.

Stefano Baffi (BS '99) is currently working for Horizon Energy Partners B.V. as a seismic interpreter.

Jordan Muller (BA '99) is a National Research Council Research Associate at the Planetary Geodynamics Laboratory at NASA Goddard Space Flight Center. He is wrapping up a study of the AD ~900 Seattle earthquake and is poised to begin a study of the Sumatran earthquake. Jordan said he is engaged but "we don't have the wedding date."

2000

Clark Sherman (PhD '00) is an associate professor in the Department of Marine Sciences, University of Puerto Rico at Mayagüez. Clark joined the UPRM faculty in January 2005 and is situated at the department's Isla Magueyes Marine Laboratories in southwest Puerto Rico. His work focuses on characterizing terrigenous sedimentation in reef environments and documenting patterns of Quaternary reef accretion and sea-level history. Prior to joining UPRM, Clark was a visiting assistant professor of marine geology at UNC-Chapel Hill, a geologist with Research Planning, Inc. in Columbia, SC, and an assistant professor of geology at Charleston Southern University, Charleston, SC.

2001

Jackie Caplan-Aurbach (PhD '01) After graduating from UH in 2001, Jackie took a postdoctoral fellowship with the Alaska Volcano Observatory and spent the next 5 years in Alaska, first in Fairbanks and then in Anchorage. She continued doing research in volcano seismology and on the seismic signals associated with landslides and avalanches. Happy side-effects of living in Alaska include the fact that Jackie met and married fellow volcanologist Pete Stelling and gave birth to twins Naomi and Tucker. The twins were born 3 months premature, so Jackie and Pete had a rocky intro-



duction to parenthood, but at 18 months of age now, the children are happy, healthy and as far as they can tell, miraculously normal. In January of this year Pete and Jackie started faculty positions in the Geology Department at Western Washington University (in Bellingham, WA) where they are unbelievably busy, and incredibly happy. No they don't share an office in a bucket but their kids like to pretend to!

2002

Geoff Garrison (PhD '02) completed a 2-1/2 year National Academy of Sciences post-doc at the University of Washington with Peter Ward studying sedimentary stable isotope geochemistry across the Permian-Triassic and Triassic-Jurassic boundaries and has been working as a senior Geochemist with URS Corporation in Seattle, WA. URS is the world's leading Civil-Environmental Engineering/Design firm, and home to many UH graduates. Geoff's experience at URS has varied widely: study of geochemical impacts to groundwater and surface water at mine sites; examining watershed systematics and sources of water quality degradation; fault line paleoseismicity; investigation of contaminated soil and groundwater and more. Drop Geoff an e-mail if you're looking for a job—URS has 300 offices.

2003

Kimberly Arita (BS '03) and husband Mike Sears welcomed the birth of a son, Aidan Mikala Arita, on February 28, 2006. The family recently packed-up their belongings, leaving Reno, NV and relocating to Carbondale, IL, where Mike started as a new assistant professor in the Zoology Department at Southern Illinois University.



Michael Dahilig (BS '03) was appointed to fill the student position on the University of Hawaii Board of Regents. A third-year student in the William S. Richardson School of Law at UH Manoa, he is concurrently pursuing a master's degree in urban and regional planning. He received a bachelor's degree with honors in geology and

(continued on page 20)



geophysics from UH Manoa in 2003, and was president of the Associated Students of the University of Hawaii. He also was awarded the UH Manoa Student Service and Leadership Distinction Award in 2003.

Donielle Chittenden (BS '03) is excited to be using her degree in her career as a geologist working for URS Corporation, an environmental consulting firm in Honolulu.

2004

Ole Kaven (MS '04) is finishing the second year of his PhD research at Stanford. Ole is married to Jessica Suduth (both are former UH volleyball players) and they live in San Jose, CA.

Marc McGowan (MS '04) is currently working as a hydrogeologist for Errol L. Montgomery & Associates, a consulting company in Tucson, Arizona. Marc tells us "I work on a variety of projects across the state including groundwater resource development and artificial groundwater recharge. I am most often the on-site geologist during the drilling and construction of deepwater wells. Upon completion of the wells, I conduct pumping tests to estimate aquifer parameters (transmissivity,

storativity, etc.) and collect water samples for chemical analysis."

2005

John Bailey (PhD '05) is now working at the Alaska Volcano Observatory & Arctic Region Supercomputing Center in Fairbanks, Alaska.

Nathan Becker (PhD '05) accepted a position at NOAA/ National Weather Service Pacific Tsunami Warning Center in Ewa Beach.

Chris Gregg (PhD '05) has relocated to Tennessee and is working for East Tennessee State University as an assistant professor in the Department of Physics, Astronomy, and Geology.

Christina Hirsch (BS '05) is now working in Arizona for Phelps Dodge Mining Co.

Jeremy Kimura (BS '05) is a geologist for EA Engineering, Science and Technology in Waimanalo, Hawaii.

Sara Wilson (BS '05) is employed as a geologist/business development agent for Edward Kraemer & Sons, Inc. in Minnesota.

G&G Logo Contest

Calling all creative G&G students, alumni, faculty and staff. We are looking for a new G&G logo to represent our group on our website, t-shirts, caps, beach towels, mugs—wherever we choose to display, wear or gift-out showing our pride in who we are and what we do.

If you want the honor and glory of being our G&G logo designer, here are the contest details:

- Contest is open to all G&G students, alumni, faculty and staff—ONE entry per person
- Keep it simple, we must be able to reduce it and still have a clear image
- Image size: a 2" x 2" to no larger than an 8.5" X 11" page; two color maximum
- Submit by: email (gg-dept@hawaii.edu), drop-off or mail to our address in POST 701 (no FAX, please)
- Entry deadline: entries must be received by September 30, 2006, please include your name, status (e.g. undergrad student, alumni MS 99, etc.) address, email and phone number with your entry.

All entries will be given to a committee of seven volunteers (selected by the Chair) representing students/faculty/staff : 2-undergrads, 2- grads and 3 faculty/staff (who have not entered the contest) and will choose the top three logos to put to a vote on our website in early October. We will announce the winner of the contest after a two week voting period on-line. The contest winner will receive a G&G gift basket of goodies, a feature story in our next newsletter and most important...BRAGGING RIGHTS!

SOEST Open House



Faculty News

Garrett Apuzen-Ito continues theoretical work on mantle flow, melting, and geochemistry at hotspots with PhD. student, Todd Bianco, and John Mahoney, Mike Garcia, and Janet Becker. Garrett also studies magmatic-tectonic processes shaping morphology and evolution of mid-ocean ridges with PhD. student, E. Mittels-taedt, and colleague Dr. M. Behn (Woods Hole).

Garrett's bike racing career is (temporarily?) on hold to make way for daughter, Sekai Kahlil Apuzen-Ito, born 11 Feb. 2006. He and Kahlil, are loving the new life, challenges, and joy Sekai brings!



In an effort to better understand beach change, **Janet Becker** and colleagues study video observations of nearshore sand ripples at Waimea Bay, Hawaii. Ripples cause hydrodynamic roughness in the nearshore flows that drive sediment transport, and ripple migration may contribute to sediment transport. Sediment transport rates estimated from ripple migration indicate that ripples contribute to beach recovery following erosion. Current work involves *in-situ* measurements of currents and ripple migration at greater depths.

Patrizia Costa Pisani continues to work on surveys of the Nankai Trough to define drilling locations for IOD and to improve understanding of processes at seismogenic zones. She completed migration of the 3D Muroto transect in this area, and published her results in *Geophysical Research Letters*. She is helping Melody Studer and Garrett Kramer (New Mexico Tech) with their MS projects using this data set. She is also continuing a study of tectonics and sedimentation in the Central Apennines of Italy. She co-taught GG 711 (Seismic Interpretation) in Fall 2005

Robert Dunn's research on mid-ocean ridges focuses on new seismological techniques for revealing mantle processes, and investigating ridge-crest magmatic systems. He studies East Pacific Rise and Arctic ridge systems, while student Andrew Delorey wraps up investigation of the upper mantle at Reykjanes Ridge. This summer's undergraduate intern, James Hebden from Northwestern U., will examine energy flux of seismic surface waves. James will extend Rob's early work showing that

surface waves are trapped in lateral waveguides beneath mid-ocean ridges. Robert and Neil Frazer are sponsoring a Master's student, Olga Hernandez, from L'Ecole Normale Superieure in Paris, for five months this year. Olga examines blue whale calls recorded during a seismic experiment along the East Pacific Rise. She hopes to locate these whales and examine the transmission properties of their calls. Robert continues to wait for ship time for a 3-D seismic experiment along the Eastern Lau Spreading Center to image mantle flow, melting, and shallow magma systems. Spring semester Robert taught numerical methods and simulation to 10 graduate students. Students solved problems in heat flow, crystallization, trace element partitioning, tsunami propagation, bioturbation, lithospheric loading, and other fascinating topics.

Aly El-Kadi and the hydrogeology group work on: modeling hydrocarbon biodegradation; dissolved helium as an environmental water tracer; modeling stream flow and flood delineation; and estimating hydraulic properties for Hawaiian aquifers. Among these projects, the flood study covered the October 2004 flood, which caused extensive damage to the University of Hawaii campus and neighboring residential areas. The study concluded that a simplified watershed model is suitable for simulating storm runoff response because of the nature of small Hawaii watersheds, which generate hydrographs with steep rising and falling limbs. However, there is a need for better characterization of rainfall distribution. The model treated the flood as a hypothetical dam break, and accurately predicted the floodwater pathway, flood zone extent, maximum flood depth, and the time to reach that depth. It also predicted an upper value for storm total flow volume that would not cause flooding in the UH campus. These results can guide data-collection and decision-making processes and demonstrate that it is possible to mitigate flooding by flow diversion and dredging, channel realignment, and lining.

Chip Fletcher reports the coastal geology group continues to be active. Matt Barbee is studying for his MS while working full time for their group. Chyn Lim maintains their web site and assists in various research projects. Matt Dyer is a full-time field technician as well as helping with data collection in the office. Chris Bochicchio enters his third year on the Army Corps project assessing shoreline change and sand resources at windward

Oahu. Sean Vitousek is modeling shoreline evolution at Kaanapali, Maui using the software Delft3D. Tiffany Anderson is researching shoreline change on Kauai. Brad Romine is assessing shoreline change on Oahu. Melanie Smith completed a senior thesis on bed shear stress in Kailua Bay. Ayesha Genz lives with husband Joe in the Marshall Islands and is collaborating with Neil Frazer on statistical modeling of erosion hazard zones.

Neil Frazer continues to work on algorithms for tracking marine sound sources. Graduate student Eva-Marie Nosal and Neil developed the Pairwise Spectrogram processor for locating continuous sources many wavelengths distant from receivers, and Eva-Marie's presentation at a meeting of the Ocean Engineering Society in Europe won \$E 1,000 prize for best student paper. They also work on methods more suited to impulsive sources, such as sperm whales, and a paper on this subject is in press. Neil also works on: (1) beach erosion, with Chip Fletcher and former graduate student Ayesha Genz; (2) INSAR seismology with HIGP's Ben Brooks; (3) prediction of volcanic eruptions, with Ben Brooks and Matt Patrick; and (4) transfer of disease from farmed fish to wild fish with Marty Krkosek, U. of Alberta and John Volpe, U. of Victoria.

This summer, **Eric Gaidos** led an expedition to drill and sample a volcanic lake beneath the 400 m thick Vatnajökull glacier in Iceland. He and collaborators searched for evidence of active microorganisms in the lake, an environment that is analogous to potential habitats on the planet Mars and the Jovian satellite Europa. It also provided experience for investigations of water bodies and sediments beneath the Antarctic ice sheet, including the largest known subglacial lake at Vostok station. This research follows a successful sampling expedition to another lake beneath the same glacier in 2002. Sampling a second lake allowed Eric and his colleagues to draw more general conclusions about the character of microbes that live in this "extreme" environment where there is no sunlight as an energy source, temperatures are at the freezing point and nutrients are scarce. This work is funded by the University of Hawaii component of the NASA Astrobiology Institute and the Science Foundation of Iceland.

Michael Garcia works on Hawaii's volcanoes with PhD student, Jared Marske, including monitoring petrologic and geochemical evolution of the 23 year Pu'u O'o eruption. Mike received a 4-year NSF grant to work on rejuvenated volcanism on O'ahu, Kaua'i and Ni'ihau with Garrett Ito, Brian Taylor and Bruce Applegate in-

volving at land and sea operations. This helped support Chris Gandy (MS, May, 2006) and Tracy Ibarra (senior project). Two papers were published on submarine geology of Mauna Loa with Dorsey Wanless, providing the first detailed geologic map of a submarine area in Hawaii. With Greg Moore and Sarah Sherman, he published results of ODP hole 1223 in the Nu'uuanu debris fan, showing Koolau volcano has repeatedly collapsed, probably creating large tsunami waves. With geochronologists from Kyoto University, he published ages of Honolulu eruptions discovering two eruptive pulses and speculating that the second pulse may not be over. Garcia initiated a cooperative geology-geophysics program with the University of the Philippines in Diliman.

Craig Glenn splits his research between ancient paleoproductivity, marine authigenic mineral formation (phosphorites, glauconites, organic shales), and modern subterranean fresh groundwater and pollutant discharge in Hawaiian coastal zones. He is currently working with Israeli co-workers to publish reconstructions of Late Cretaceous paleoceanography associated with phosphorite giants of southern Tethys, and editing thematic issues on marine authigenesis in Deep-Sea Research-II and a new publication of the International Association of Sedimentologists. Closer to home, Craig has jumped from coastal waters of Oahu to the Big Island where he and graduate student Adam Johnson detect, map, and measure groundwater and nutrient discharge along the Kona Coast using airborne infrared imagery.

Lucia Gurioli works with Bruce Houghton, on microtextures of scoria from low energy explosions at Villarica volcano, Chile. These will be integrated with thermal, seismic, and infrasonic data collected by Andrew Harris and Maurizio Ripepe to understand the explosion source and dynamics. Since 2005 Lucia also been involved in three other studies: 1) past eruptions at Vesuvius as deduced from deposits of pyroclastic density currents; 2) mapping ash dispersal for eruptions of different intensity and magnitude at Vesuvius; 3) examination of eruptive products, eruptive scenarios, and hazards at Vulcano Island.

Julia Hammer is completing installation of the Experimental Petrology Laboratory. This marks the beginning of PhD student Carrie Brugger's study of crystallization kinetics in decompressing magmas. Undergraduate Lisa Tatsumi received a Summer Research Award to study kinetics of mineral reactions under Julia's guidance.

(continued on page 24)

Julia continues to pursue interests in planetary petrology, focusing on igneous rocks of the moon and Mars. She and HIGP researcher Jeff Gillis are making a suite of glass samples with compositions relevant to lunar magmas to determine optical constants in the ultraviolet-visible wavelength range. A three-year award from NASA will support investigation by new postdoc, Julie Bowles, planning to arrive in August. The large class in Mineralogy last fall posed a challenge for both Hammer and TA Loyc Van der Kluyzen. Hammer's NSF CAREER supported peer mentors Elizabeth Roberts and Chad Shishido to the team. Liz and Chad attended labs and drop-in sessions and implemented a semester-long Mineral Specimen Investigation project. This summer, the CAREER award will support professional development of Barbara-Jean Kahawaii, a science teacher at Laie Elementary with participation in research for 6 weeks.

Richard Hey spent January-March 2005 at sea as a leader of a Alvin submersible/Jason II ROV/DSL-120 kHz sidescan sonar investigation of crustal structure exposed at Pito Deep, Earth's deepest seafloor spreading axis. This project, led by Jeff Karson of Duke, took advantage of 3,000 m scarps in 3 m.y. lithosphere formed on the superfast-spreading part of the East Pacific Rise. Next year he will lead a marine geophysical expedition to the Reykjanes Ridge to investigate interactions between the Iceland hotspot and Mid-Atlantic Ridge system. He continues to teach his plate tectonics class, GG 444, and has just agreed to revise the once classic but now out of date Cox and Hart textbook, *Plate Tectonics: How It Works*.

Most importantly, Richard and Donna recently gave birth to their son Dylan, eliminating the problem of what to do with his spare time.

Bruce Houghton's physical volcanology group played a major role in the Cities on Volcanoes 4 conference in Quito, Ecuador. The group presented 7 papers. Sarah Fagents and Bruce obtained NSF funding for 21 students to attend the meeting. Research projects are continuing at Stromboli and Etna (Italy), Askja and Hekla (Iceland), Tarawera (new Zealand) and Masaya (Nicaragua). The group is spending increasing time at Kilauea in an exciting collaboration with Don Swanson of HVO, to study the Keanakakoi and Kilauea Iki eruptions. The dynamic of the group has shifted subtly with the arrival of a \$560,000 interdisciplinary award to study tsunami awareness and preparedness in the United States. Major

surveys in Kauai, Washington, Oregon, California, Florida, North Carolina and Puerto Rico are taking place this summer and fall. Chris Gregg and Nancy Adams have completed their PhDs; Julia Sable and Nicole Lautze defended in May 2006. Nicole will leave us to take up a prestigious Mendenhall fellowship at USGS, Menlo Park. Thor Thordarson has accepted a tenured post at University of Edinburgh and Helge Gonnermann is joining us from Harvard, as a SOEST Young Investigator, in November 2006.

Stephanie Ingle joined SOEST in the "Young Investigator" position in August, 2005. She is working with John Sinton, John Mahoney, Garrett Ito, and their students on the Galapagos Spreading Center. She also participated in the recent Integrated Ocean Drilling Program's expedition to the Guatemala Basin with an aim of drilling through the upper oceanic crust into the gabbro layer. This expedition generated quite a bit of media and public interest and was an excellent finale for the current US drill ship, the JOIDES Resolution, which will be re-outfitted before future use. The media attention was stimulated by the on-line publication of an article on the results of the expedition in Science Magazine, entitled "Drilling to gabbro in intact ocean crust", by Wilson et al. due out in print next month. The expedition was even spoofed on a popular web site, with the title "Drilling our way to Satan". Stephanie's research interests lie in understanding the processes in the mantle that lead to the formation of new crust and lithosphere. Testing the mantle plume hypothesis and searching for alternatives to it are among her long-term goals. Stephanie looks forward to her second year as a SOEST Young Investigator.

Kevin Johnson reports: I went to sea on the IODP drill-ship JOIDES Resolution last spring drilling lower crustal gabbros on the Mid-Atlantic Ridge. Since returning, I've been working on the rocks we drilled trying to understand mechanisms of magma intrusion in the oceanic crust. Because ocean crust makes up some 70% of the Earth's surface, and because it is volcanic in origin, mid-ocean ridges transfer many important chemical elements from the deep Earth to the oceans and atmosphere. Ultimately, we want to understand how this mass transfer works by studying the magmatic products of the volcanic activity. Undergrads got to hear a lot about this when I taught GG 170 Physical Geology in Fall and Spring semesters. In the fall of 2006 I will be going to sea again with a French research ship to the Indian Ocean to study volcanoes formed by a hotspot that comes up under the Southeast Indian mid-ocean ridge.





After nearly three years, **Klaus Keil's** appointment as Interim Dean of SOEST ended on June 30, 2006. He has decided not to return to the directorship of HIGP. Rather, he will return to his tenured Researcher faculty position in HIGP and to full-time research. He is very much looking forward to working with his colleagues in their new W.M. Keck Cosmochemistry Laboratory and doing research with their new CAM-ECA 1280 Ion Microprobe.

Barbara Keating and **Chuck Helsley** traveled to the Cities on Volcanoes meeting in Ecuador. They had a lay-over in Houston and contacted John and Mary Sinton. John received his PhD in seismology at UH and has worked in the oil industry ever since. The Sintons moved from Bartlesville, Oklahoma to Houston a few years ago and have a beautiful home in West Houston. They shared a dinner of Texas Barbecue and Pecan Pie that was out-of-sight wonderful. Will Sager, another UH alumni at Texas A & M (Dept. of Oceanography) has received an Honorary chair within his department, that will cover research costs. Also, one of the Aachen students Thomas Walter, who did practical training at UH with Keating, received his PhD and a 5-year honorary post-doctorate from the German government. He has spent his post-doc time at the University of Miami.

John Mahoney enjoyed a long rough-water cruise in the "roaring forties" this year, studying the Louisville Seamount Chain with PhD student Loyc Vanderkluyzen and colleagues at Scripps. He also completed a project on Shatsky Rise with former student Marissa Tejada, and a study of high-Mg lavas of the Emeishan continental flood basalt province in western China with Zhaochong Zhang. Collaborative work with Garrett Ito on melting processes in a heterogeneous mantle continues, as does a project with Vanderkluyzen on the feeder-dike systems of the Deccan Traps of India. Studies of the Easter Seamount Chain, with Jyoti Ray and Paul Wessel, and the Galapagos Spreading Center, with Stephanie Ingle, John Sinton, Garrett Ito, and Ken Rubin, are wrapping up. A new project, headed by Scott Anderson, to develop a mini-mass-spectrometer is ramping up. Mahoney continues to teach in GG 200 and the "Big Gulp" sequence. But the biggest news is that the new clean-lab facility on the 6th floor of the POST Building was finally completed in March, after nearly a decade of construction delays. Mahoney shares this lab with faculty colleagues

Ken Rubin and Doug Pyle. Thus far, the new lab is proving to be a delight.

Steve Martel is continuing his work on faults and fractures. He is very pleased to be starting a new study of sheeting joints ("exfoliation joints") in Yosemite National Park. These fractures are discussed in virtually every introductory physical geology class, and they are traditionally explained as

forming by removal of overburden. Steve's research so far indicates that this explanation is fundamentally misdirected, and that the fractures instead form in response to high compressive stresses parallel to curved slopes. A recent article in *Geophysical Research Letters* describes this research; it can be found on Steve's home page. This research has the potential to link geomorphology, structural geology, rock mechanics, and the geometry of curved surfaces in new and exciting ways. Steve continues to work locally with others to show how geologists can contribute to informed decisions (and informed policies) on land-use and public safety in Hawaii. He has been most active in the area of slope stability.

Greg Moore, along with Assistant Specialist Patrizia Costa Pisani and graduate students Toshi Ike and Melody Studer concentrated this year on analyses of deformation and sedimentation in the Nankai Trough using regional 2D and detailed 3D seismic reflection data. Patrizia's pre-stack depth migration of the Muroto 3D data set provides velocity information that we are using to infer dewatering and pore fluid pressures at the toe of the accretionary prism. Melody is performing section balancing and restoration of individual lines to complete our structural analysis. Toshi's work was used to finalize the seaward reference site locations for the NanTroSEIZE drilling to be carried out in 2007. Greg has been concentrating on logistics for the first ever commercial 3D seismic survey to be carried out for scientific investigation. We have contracted PGS to collect an 800 km² survey in the new NanTroSEIZE drilling area in Kumano Basin. Greg will spend a month on the ship that will be using four 4500 m hydrophone cables to record the data. He has been in Japan since January working with the Japanese group (JAMSTEC) that is jointly funding the survey.

(continued on page 26)

Brian N. Popp continues to study the origins of alkenones in the ocean, origins and cycling of nitrous oxide (N_2O) in seawater and the trophic dynamics of tuna. Alkenones are used by paleoceanographers to measure past ocean temperatures (U^{K}_{37} Index) and ancient atmospheric CO_2 levels. Recent study has focused on the Gulf of California and the subarctic Pacific. This work is spearheaded by Richard Wallsgrove who will soon graduate and hand over the mass spectrometer to Amanda Pontius. Marian Westley is finishing a fabulous study on N_2O in seawater. Her paper on the Black Sea is a landmark study and it will soon be followed by a paper on the eastern tropical Pacific and a techniques paper. Brittany Graham continues a great study of the isotope ecology of tropical yellowfin and bigeye tuna. She is the first to demonstrate the use of isotope biogeography in marine ecosystems, an approach that has been successfully used to study movements of many terrestrial wildlife species. This year Brian was elected a Geochemistry Fellow by the Geochemical Society and the European Association for Geochemistry. Brian, Jan, Jennifer and Nicole are enjoying life back home after a very enjoyable and productive sabbatical in Utah.

In the past year, **Doug Pyle** finally realized the long awaited (8 years +) move of the clean lab support facility for the VGP isotope lab from HIG to the 6th floor of POST. The new lab is nearly twice as large as our old lab and we have taken the opportunity to replace or upgraded much of the old infrastructure. We continue to host visiting scientists and students from around the world (e.g., Mexico, Japan, Italy, Germany) who work on a variety of research problems covering environmental contamination to extraterrestrial and terrestrial magma generation processes. I presently work on a suite of ultramafic to mafic rocks from five dredges within the Nova-Canton Trough collected during a R/V Kilo Moana transit leg. The NCT is a 8-km deep, distal extension of the Clipperton fracture zone situated between the Cretaceous Ontong Java and Manihiki oceanic Plateaus. I continue research on Southeast Indian Ridge MORB and large igneous province magmatism in Costa Rica and the Pacific Northwest (Oregon-Washington Coast Range).

The last year was a busy one for **Greg Ravizza**; it brought with it many changes. Tarun Dalai, a post-doc working with me returned to India to take a faculty position. He spent a productive year and a half working on the marine Os isotope record and platinum group elements. We continue to work together at a distance. Just today we were adding the final touches to the second manu-

script resulting from his work here at UH. Nicole Robinson made good progress on her Masters work studying Masstrichtian paleoceanography and Denys Vonderhaar continued to do a great job in the lab. In the fall Francois Paquay will join our group as a new PhD. student. He is keenly interested in the Cenozoic appearance of large coral reefs and its potential relation to declining levels of atmospheric carbon dioxide. I am happy to announce that we've moved into our own wet lab space adjoining the ICPMS lab. Although we're still getting settled this move promises to greatly enhance our research efforts, both stream-lining ongoing work and allowing us to implement new analytical capabilities.

Johanna Resig, emeritus professor, continues to work on foraminifera related to "local" problems: Paleoenvironments in Lihue Basin, Kauai, based on marine horizons in two sections cored by USGS; age and paleoenvironments of sediment from deep terraces around the northwest Hawaiian Islands collected by Ralph Moberly and herself long ago. She also set-up an awesome "Classifications of Fossils" display case on the 7th floor of the POST building.

Ken Rubin continues to work on submarine and subaerial volcanism in the Pacific and Indian oceans, Iceland, Hawaii and Mexico. He spearheaded two monumental efforts this past year with colleagues in the department: a) funding a new, multi-collector plasma mass spectrometer for geochemical research and b) preparation of G&G department's 10 year strategic planning document. Ken says the strategic planning process was a wonderful way to learn about our past and present, and to help plan for the future. Funding for the new mass spectrometer (\$700K) was received from the Ocean and Earth Sciences Divisions of the National Science Foundation earlier in 2006. The acquisition itself awaits comparative evaluations of 3 instruments on the market and renovation of lab space on POST 6th floor. This news followed shortly after the completion of 8 years of renovations to the new clean room facility (also in POST) for SOEST Isotope group (John Mahoney, Doug Pyle, Ken Rubin). They joyously occupied it in Feb, 2006.

John Sinton's highlights of the last year include near completion of a major revision to the geologic map of the Wai'anae Range (25 years in the making), and publication of mapping and geochemical results from the Western Volcanic Zone of Iceland (a mere 10 years of effort). Spring semester was dominated by the Hawaiian Geology class, which included a student cruise (with Fred Duennebieer and the GG 450 Geophysical Methods

class) to Ka'ena Ridge, multiple day trips on O'ahu and four days of fun and frolic on Maui. Sinton is definitely looking forward to a sabbatical beginning in July with more work in Iceland, followed by a range of other projects, mainly in Hawai'i, including quality time with students Eric Bergmanis, Deborah Eason and Melissa Rotella.

Brian Taylor's research with colleagues, postdocs and students has continued investigating arc-trench-back-arc processes (in the Marianas and Lau Basin) and continental rifting and break-up (in the Gulf of Corinth, Woodlark Basin, and NW Australia). Five papers have been published in 2005-2006, and four other papers are in press (two on the Woodlark Basin, one on the Lau Basin, and one on the Gulf of Corinth). The EPSL paper was an interesting departure from these themes which resulted from a compilation of swath bathymetry data collected on numerous transits between Hawaii and the SW Pacific. Seafloor fabrics indicate that the Ontong Java, Manihiki and Hikurangi Plateaus originally formed as one (about 120 Ma) and then separated by Cretaceous spreading. Additional plateau fragments were moved east and SSE, respectively, together with the symmetric conjugates to the extant Phoenix magnetic lineations. Another project, working with Alli Aaby,

HMRG and PIBHMC, has been compiling swath bathymetry data surrounding the main Hawaiian Islands. These data have been provided to SubComPac and they are working to display them for all to see on Google.

Paul Wessel spent this year on sabbatical at the University of Sydney where he worked with Dietmar Müller. Funded by the National Science Foundation, Wessel worked with Müller's group on redesigning the Generic Mapping Tools (GMT) software to enable its use as an Application Programming Interface, i.e. a library to build GMT-like applications. A prototype of GMT 5 will become available later this year. The Sydney group's experience in geoinformatics and their wholesale use of Mac OSX computers have made the visit here very enjoyable. Between bouts of coding, Wessel also worked on refining absolute plate motions, assessed flexure beneath seamounts, advised two students in Hawaii on these research via iChat video-conferencing, and wrote two review papers. The Wessels enjoyed their time in Australia so much that we will have to bring home one or two kangaroos and perhaps a koala. We have not yet had any intimate experiences with the many lethal creatures found only in Australia but an upcoming camping trip might change those odds.

What's new in the G&G curriculum?

The department continues to re-evaluate and update the course offerings and degree requirements based on changes in the science and job market, new expertise in the department, as well as feedback from students and alumni. Updates to the undergraduate degrees include adding Biology to the allied science requirements, merging GG 200 (Geologic Inquiry) and GG 308 (Earth History) into a single course, and adding (by popular demand) "GG 250 Scientific Programming."

A new "B.S. Track Emphasizing Basic Science and Research" offers an opportunity for students to collaborate with an advisor in designing their own course study program, as well as a culminating research project based on the students' specific interests. This option has more rigorous requirements in the allied sciences and requires a senior thesis. In the graduate program, students can now obtain credit and learn to teach at the same time with GG 609 Graduate Teaching Geology. Also, we are currently pursuing a new, applied Geology M.S. degree—check out our web site for updates!

Garrett Apuzen-Ito
Curriculum Committee Chair

Geology & Geophysics Publications 2005-2006

(Faculty are in bold, current and former student and postdoctoral authors are in italics)

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Congratulations!

Effective August 1, 2006, the UH Board of Regents has approved the following:

Robert A. Dunn—Promotion to Associate Researcher (R4)

Julia E. Hammer—Tenure and Promotion to Associate Professor (I4)

Gregory E. Ravizza—Tenure and Promotion to Associate Professor (I4)

Steven M. Stanley—Tenure

Congratulations to Rob, Julia, Greg and Steve from everyone in G&G.



The Alumni Challenge 2006

Do you miss the “ohana” feeling you experienced when you attended school at UH Manoa, in the G&G Department? And, wouldn't it be awesome to keep in touch with your professors, fellow grads and friends you spent soooooo many hours working (and partying) with during those “good ol' days.” We do too! Here's the challenge.

Have you seen our completely renovated web site at <http://www.soest.hawaii.edu/asp/GG/index.asp>? Did you notice when you click on “People” and choose “Alumni” it lists, in alphabetical order, names and graduation dates of only some of our alumni. And, when you click on any name on the list, you get a profile of personal contact information. Fabulous... Until you find out that some information is pathetically outdated, and many of your fellow grads are not listed. We want to get it right. HELP!!!

We must trash the old, outdated alumni files on our web site and replace them with current information. Please take a few moments to jot down and mail or fax any new address or personal comments you wish to share with us; OR... BETTER YET, go online at the above web site and complete the Alumni Feedback page. YES, even if everything is correct for you, please confirm this by providing the feedback requested. Not only will your fellow alumni be able to find you, but possibly even some potential employers, Publisher's Clearinghouse and the lottery too! DREAM BIG, but act NOW, we're waiting to hear from YOU.



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