



**GEOP 572 students at the ocean's edge where lava from Kilauea Volcano pours into the ocean**

## **NMT Graduate Students Participate in Geophysics Field Course in Hawaii**

*by Jeffrey Johnson, Assistant Professor of Geophysics; photos © 2008 by Jeffrey Johnson*

Pele, Hawaiian goddess of volcanoes, smiled on us this summer. Back in March, in anticipation of our July field course on the Big Island, she blew open a new eruptive vent at Kilauea summit. It was the first summit eruption at Kilauea since 1982 and the first explosive eruption from

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**Halema'uma'u crater and gas plume from the summit vent**



**Students digging holes and installing seismic equipment**

Halema'uma'u Crater since 1924. Now ten students and instructor Jeffrey Johnson had a panoply of eruptive activity to investigate ranging from this summit vent to East Rift degassing and lava fountaining to lava tubes and ocean lava entry down near Kalapana.

Despite the obvious attraction of an easily accessible incandescent ash-spewing vent, the summit activity at Halema'uma'u was perfect for our science and instruction objectives, which were to record and interpret earthquakes and sounds produced by an erupting volcano. Students spent the

first day of the course lugging car batteries, seismometers, digitizers, and microphones to locales about two kilometers from the active vent. Under glorious weather with soft trades blowing the fumes away from our deployment sites, they dug holes, programmed the acquisition systems, and then waited for earthquakes to occur.

They didn't have to wait long because Halema'uma'u has been producing a symphony of tremors since March. Our class waited for a day, learning fundamentals of digital signal processing, before impatiently retrieving the first batch of data from our stations.

From our makeshift laptop computer lab in the Volcano Village community center, students opened the digital archives to view earthquake after earthquake. This active volcano was the mother

lode of seismicity. Every five minutes ground vibrations from beneath Halema'uma'u had radiated outwards, reaching our array of sensors in a matter of seconds to be recorded in digital perpetuity for our analytical pleasure.

We spent the next few days playing with the abundant wiggles (slang for working



with seismograms), learning to pinpoint the direction to the volcano seismic source, and investigating the occasional extra-volcanic earthquakes, including a whopping magnitude 7.7 event from the Sea of Okhotsk thousands of kilometers away.

In addition to ground-propagating seismic waves, students had the opportunity to record and interpret the “deafening” infrasound that is continuously emitted by the Halema'uma'u maw. Fortunately for us, infrasound is inaudible as it is by definition low frequency (below 20 Hz). Nevertheless, our sensors were able to detect episodic roaring with equivalent pressure amplitudes at our recording site reaching 110 dB (equivalent to a nearby jet engine). This infrasound was being produced by rhythmic gas “exhalations” from the throat of Halema'uma'u and characterized, in a manner of speaking, the way that the volcano talks.

During a mid-course “day off” all students and instructor visited the Disneyland of the recent Kalapana lava flow fields more than 20 km from Kilauea Summit. We peered in lava tube skylights and watched molten 1100° C lava course toward the ocean beneath our



**Instructor Jeffrey Johnson observing lava through a “skylight”**

feet. Then we followed the tube system to the ocean entry where a “lavafall” collided with the waves producing billowing steam and small phreatic explosions (cover photo).

Ten students were permitted to register for this first iteration of Volcano Geophysics Field Course. Christina Forbes, Kyle Jones, and Sonja Behnke were graduate students from NMT. The other seven were volcano observatory personnel from Indonesia, the

Philippines (x2), Vanuatu, Costa Rica, Nicaragua, and Ecuador participating in the NMT field course as a culmination of a six-week field course sponsored by the Center for Study of Active Volcanoes (CSAV) operated by the University of Hawaii in Hilo.

CSAV was a co-sponsor of the NMT Volcano Geophysics course providing vehicles, classroom, and generous funding support. Darcy Bevens and Don Thomas of CSAV were exceptional partners, and future collaboration (in alternate years) is planned for continuing course work in Hawaii.

During odd years, however, the Volcano Geophysics Field Course is headed internationally. In 2009 Johnson and others at NMT EES plan to offer an iteration of the course in Ecuador at the brooding and frequently erupting Tungurahua Volcano. Together with Dr. Mario Ruiz, an NMT alumnus (*MS Geophysics 2004*) working with the Instituto Geofísico of the Escuela Politécnica Nacional (Quito), NMT students, graduate students from other U.S. universities, and Latin American professionals will have the opportunity to collect, process, and interpret data from a violent andesitic stratovolcano that, if the last ten years are any indicator, will be every bit as seismogenic as Kilauea.

As with Kilauea the proposed four-week field course in Ecuador relies upon the support and instrumentation lent to us by IRIS PASSCAL. Mike Fort, Noel Barstow, Bruce Beaudoin, and others at IRIS PASSCAL were “instrumental” in providing us the necessary equipment for our data acquisition needs.

During the last few days of our Kilauea field course we lucked out once again. During the night of July 8th Pele interrupted her continuous roaring to “belch” a couple of times, exploding with unusual vigor and producing high-amplitude seismic and acoustic waves. Our sensors were optimally placed to record these explosive events and even the Hawaii Volcano Observatory (HVO) took an interest. NMT alumnus Dave Wilson (*PhD Geophysics 2004*), seismologist for HVO, agreed that infrasound monitoring provided important constraints on this particular activity. We left our infrasonic microphones behind so that Dave could complement the existing arsenal of HVO monitoring tools.

**Acknowledgments:** We thank Dave Wilson and HVO for lending us lead-acid car batteries, CSAV staff for immense support on the Big Island, IRIS PASSCAL for instruments support, Hawaii Volcanoes National Park for permission to work at Kilauea, and NMT’s Vice President for Academic Affairs for general support.



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Professor of Geophysics

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## Note from the Chair

It's a great pleasure to introduce the latest issue of TECHtonics as incoming EES Chair. I am humbled, yet fortunate to be inheriting such a healthy department, thanks to the efforts of my predecessor, Rob Bowman, and prior EES Chairs.

We continue to make our mark as one of the most exciting and productive Earth science departments in the nation thanks to outstanding contributions by faculty, students, staff, and alumni. News items from our broad-ranging department highlighted here include the arrival of Professor of Hydrology Mark Person, an NMT alumnus (*MS Hydrology 1983*) specializing in crustal-scale numerical modeling, and a new international volcano field course spearheaded by Jeffrey Johnson.

On a sad note, Dr. David Norman, Professor of Geochemistry in the department for 30 years, passed away in May while leading a field trip to Ghana with his students. To honor his lifetime contributions to Earth science and to sustain our long-standing research and teaching excellence in Dave's field, we have established the David I. Norman Endowment for Faculty Development in Economic Geology (*details on page 10*).

We hope that you enjoy hearing about the latest developments and achievements of the department and hope to see many of you at the GSA and AGU meetings in Houston and San Francisco (as well as at 49ers in Socorro!) this year. Please don't hesitate to keep in touch. Send us your news items, visit our department and alumni web pages, and feel free to stop by when you are passing through Socorro!

## Faculty Spotlights

### Mark Person

*Professor of Hydrology*

Mark Person will be moving back to Socorro in January, 2009, to join the hydrology faculty at NMT. “I have wanted to join the faculty at NMT for some time,” he says.

Mark, whose specialty is paleohydrogeology, has had a long-term connection with the EES department. He received an MS degree from NMT in hydrology in 1983. “That was a great time in my life,” he says. “Being exposed to the science of hydrology for the first time by a world class faculty was very stimulating. And my fellow graduate students were a hoot as well. NMT is a very special place.”

Mark also spent a sabbatical year at NMT in 1996 while teaching at the University of Minnesota. “At that time, I realized that NMT was the place for me, but the timing just wasn’t right,” he says. “I found the combination of an outstanding and collegial faculty, a spirited group of graduate students, and *enchiladas de mole* a hard combination to beat.”

While on a rafting trip down the Grand Canyon in 2006, Mark learned of a job opening in the Hydrology Program. “I got on the phone with Fred Phillips once I got back and asked if there was a possibility of applying for the position.” After a long period of negotiations, everything fell into place.

Mark, along with his wife Deborah Bankson and dog Emma, will be renting in San Antonio while their house in Lemitar is being built during 2009. “We are looking forward to having a lot of students and faculty over for some memorable dinner parties once our house is built.”

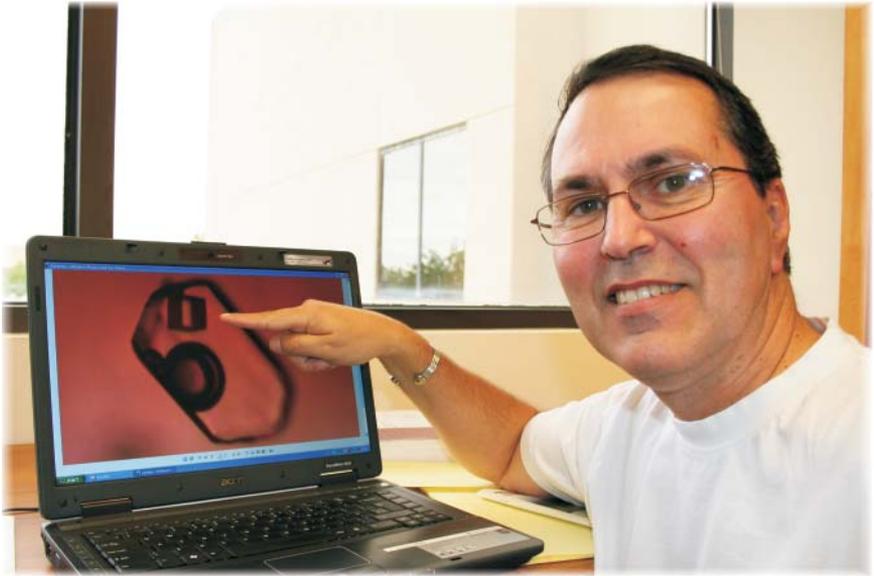
Mark currently holds the Malcolm and Sylvia Boyce Chair of Geosciences at Indiana University in Bloomington.



**Mark Person collecting carbon 14 groundwater samples in Germany in 2007**

## Nigel J. F. Blamey

*Visiting Professor of Geochemistry*



### **Nigel Blamey looking at a daughter halite crystal in a fluid inclusion**

NMT alumnus Nigel Blamey (*PhD Geology 2001*) joined the geochemistry faculty as a visiting professor for the 2008–2009 school. Nigel was visiting in New Mexico when he learned about the need for a visiting faculty member due to the untimely passing of his advisor, Dave Norman. We were extremely fortunate that Nigel was available to fill critical department teaching and advising needs in time for the fall semester. Nigel worked with Dave both as a student and later during a postdoctoral appointment at NMT where he developed a quantitative technique for fluid inclusion gas analysis and interpretation that can be used as an exploration tool for the geothermal industry.

After Nigel left NMT, he continued to collaborate with Dave and had planned on meeting him in June at the PACROFI IX conference in Reston, Va., where they were both giving presentations.

Nigel was previously at the National University of Ireland where he was a researcher conducting fluorescence lifetime analysis of hydrocarbon-bearing fluid inclusions in the frequency domain. This is a quantitative technique that Nigel copioneered, and he is the leading fluid inclusionist using this methodology.

## EES Alumni Receptions for 2008

This year we will be hosting alumni receptions at GSA and AGU. If you are attending a meeting, we hope you can fit one of the receptions below into your schedule. If you aren't attending a meeting but live in the area, please come. You don't have to be registered for the meeting to attend the reception. We look forward to seeing you. Check [www.ees.nmt.edu/alumni/](http://www.ees.nmt.edu/alumni/) for updates.

### Geological Society of America EES Alumni Reception

Monday October 6, 2008 at 7 pm

Hyatt Regency Houston

Imperial Ballroom West

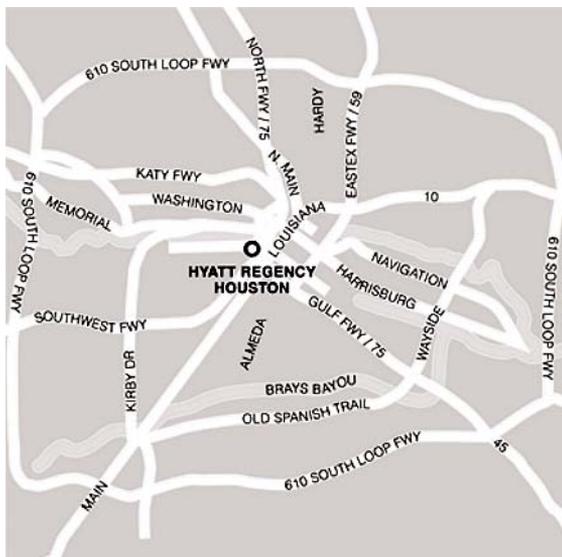
1200 Louisiana Street

Houston, Texas

Phone: (713) 654-1234

Website: [houstonregency.hyatt.com](http://houstonregency.hyatt.com)

In the GSA program this will be listed as the Rio Grande Universities Alumni Reception and will be held in conjunction with UNM, NMSU, and UTEP.



### American Geophysical Union EES Alumni Reception

San Francisco, California

The meeting runs Dec 15–19, 2008.

Time and place to be announced

## Alumni Relations and Fund-raising

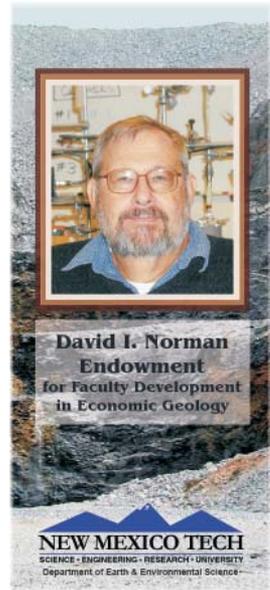
by Andrew R. Campbell, Professor of Geology

Our recent efforts at fund-raising have shown growing success. In 2006 we raised \$2,775, and in 2007 we raised over \$13,000 with about \$11,000 of that going toward the Clay T. and Sallie Smith student fund ([www.nmt.edu/mainpage/giving/smithfund.html](http://www.nmt.edu/mainpage/giving/smithfund.html)). To date in 2008 we have raised almost \$10,000 with \$3,000 going to the Smith fund.

This year, we are kicking off our efforts to establish the David I. Norman Endowment for Faculty Development in Economic Geology in memory of Dave, who passed away this May ([www.ees.nmt.edu/norman/memorial.html](http://www.ees.nmt.edu/norman/memorial.html)). The creation of this endowment was a joint effort involving Dave's family, the department, the New Mexico Tech Alumni Affairs office, and a generous startup contribution by Borden Putnam. To be successful in endowing a faculty position, this effort will require that we raise a minimum of \$250,000. Now is an auspicious time for this ambitious plan because of the potential of matching funds from the State of New Mexico once we reach the minimum. If you have been putting off donating to the department, this would be a great time and opportunity to start and would help us achieve our goal of establishing the first endowed chair in Earth and Environmental Science. You should have received our fund-raising letter for this effort already. If you haven't, more information is available at [www.ees.nmt.edu/alumni/normanfund.html](http://www.ees.nmt.edu/alumni/normanfund.html).

As usual we are sponsoring alumni receptions at GSA in Houston in October and at AGU in San Francisco in December (see page 9). We hope that you will be able to attend one of these affairs to catch up with fellow alumni and faculty.

We haven't been receiving much news from you; I hope you will send in stories about what you are doing now. We love hearing about your successes, adventures, and families. Please email [alumni@nmt.edu](mailto:alumni@nmt.edu) with your information updates and news. From all of us at Earth and Environmental Science, we thank you



for your interest in the department and hope you enjoy this issue of TECHtonics.

## **EES Alumni Fund Donors**

We would like to thank the following people who have generously donated to the EES Alumni Fund in 2008.

**DIAMOND \$10,000 and above**  
Borden Putnam

**CORUNDUM \$2,000–\$9,999**  
Mining Foundation of the Southwest

**TOPAZ \$500–\$1,999**  
Ray Bellande  
Dennis Buck  
Michael Camara  
Joseph Cepeda  
Debra Maucione

**QUARTZ \$200–\$499**  
Jerry Oliver  
Michael Zolensky

**FLUORITE \$1–\$199**  
Paul Bauer  
David Carroll  
Richard Chamberlin  
Julie Hagenbuch  
John Hall  
Charles Hammond  
Robert Koger  
Michael LeBaron  
Swen Magnuson

Donald Meyer  
Lee Paprocki  
Marvin Ratcliff  
Marion Richter  
Regina Rone  
Joel Siegel  
Michelle Walvoord  
Jiamin Wan

## Alumni News

**William “Will” H. Wilkinson (BS Geology 1970, MS Geology 1976, [william\\_wilkinson@fmi.com](mailto:william_wilkinson@fmi.com)) wrote in October 2007:**

In March 2007, Freeport McMoRan Copper and Gold took over Phelps Dodge Corporation for whom I have worked for 16 years. Things have continued unabated, and I am currently Vice President Exploration for Africa, but still based in Phoenix.

My wife, Pam, and I have been married for 25 years and have two daughters: Susan, a Junior at NAU and Mary Kathryn, a Junior at Horizon High School. Pam recently returned to work with the Arizona Geological Survey.”

**John (Jack) Purson (BS Geology 1976, MS Geology 1985, [purson@earthlink.net](mailto:purson@earthlink.net)) wrote in January 2008:**

In January of 2008, I retired from Los Alamos National Laboratory after 32 years and several careers. In those years, I have worked as a geologist, chemist, engineer, and most recently, intelligence specialist. I was also a volunteer technical recruiter for 10 years and enjoyed speaking with many Tech students at Career Fairs.

The time has come to focus on traveling with my wife Rita, riding dirt bikes, collecting mining artifacts, playing with the dog, and finally solving the problem of getting high quality, cheap Bose-Einstein condensates on the shelves of Wal-Mart. Perhaps yet another career lies ahead?

Friends and former Chem lab 101/102 students (1981–1983): I still have your quiz scores! You can reach me in Santa Fe.

**Michael LeBaron (MS Geology 1980, [mrlebaron@alltel.net](mailto:mrlebaron@alltel.net)) wrote in February 2008:**

In my 5th year teaching hormonally-crazed high school students and loving it! My older son Anthony is graduating from NMT this spring in Minerals Engineering! Anyone need a mining engineer?

**Charlotte Rowe (BS Geology 1981, PhD Geophysics Dec 2000, [carowe@cybermesa.com](mailto:carowe@cybermesa.com)) wrote in January 2008:**

I just bought a house in Santa Fe after renting for five and a half years—looks like I am here for the long haul! I am chairing the 2008 annual meeting of the Seismological Society of America, which will be held in Santa Fe April 16–19.

**Jim Moore (MS Geology 1986, [jam4elko@gmail.com](mailto:jam4elko@gmail.com)) wrote in September 2008:**

Not much happening with me. Gold mining is still booming in Northeast Nevada. I work in exploration (at Miranda Gold Corporation). Sedimentary petrology is becoming more important in exploration models for Carlin-type deposits. There are a few geologists here from New Mexico Tech who had Dr. Norman, including myself. We are saddened by his passing, and share the loss.

**Maphumzana Victor Nkambule (MS Geology Dec 1988, [victor@liketh.co.za](mailto:victor@liketh.co.za)) wrote in January 2008:**

After completing my MS degree I worked in Swaziland exploring for gold and base metals in the Barberton greenstone belt. In 1991 I joined Bhpbilliton as a Mine Geologist at Koornfontein Mines which is situated in the Witbank coalfield of South Africa. I worked at several Bhpbilliton mines, spending ten years at Optimum Colliery where I became Chief Geologist in 2006. In October 2007 I joined Liketh Investments as Manager: Projects. I am currently involved with coal exploration in the Witbank coalfield of South Africa, coal exploration in Tete Mozambique, gold exploration in Mutare Zimbabwe, and gold exploration in Tanzania.

My wife Gloria is an accountant at Standard Bank, Swaziland, my daughter Karen is a lawyer, and my son is still at university reading computer science.

**Mohammed Saleh AL-Fagih (BS Geophysics 1993, [mohammad.fagih@aramco.com](mailto:mohammad.fagih@aramco.com)) sent us the picture on the right in September 2008:**

Mohammed works for Saudi ARAMCO in the Upstream Ventures Department as a Consultant & Co-ordinator of Foreign Investments.



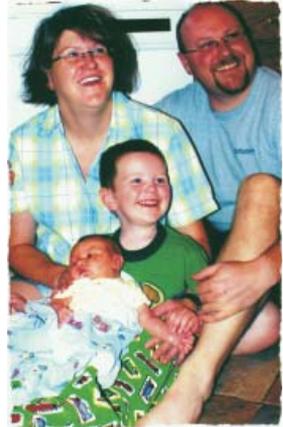
**Rose-Anna Behr (MS Geology 1999, [rose\\_annabehr@yahoo.com](mailto:rose_annabehr@yahoo.com)) wrote in January 2008:**

I am now happily and gainfully employed as a field geologist (at DCNR Bureau of Topographic and Geologic Survey). Currently I am in the coal division but look forward to one day mapping in the Valley and Ridge.

I am a hobby beekeeper and still play roller hockey. This past summer I had my first successful garden and am already planning for next year. Tessy the cat is still with me, and this winter I adopted a new rabbit, Blackie. I hope all the Techies are well and look forward to hearing from you.

**Andrew P. Mioduchowski (MS Geology 2001, [amioduch@hotmail.com](mailto:amioduch@hotmail.com)) and Joy Marie Rosen-Mioduchowski (MS Geology, Dec 2004) sent the picture on the right and wrote the following in May 2008:**

Joy, Andrew, and Fredzio welcome  
Keil T. Mioduchowski  
5:01 am 5/27/08  
8 lbs. 3 oz. 21 in. long



**Emily (Desmarais) Montgomery-Brown (BS Geology 2002, [emilymb1@gmail.com](mailto:emilymb1@gmail.com)) wrote in September 2008:**

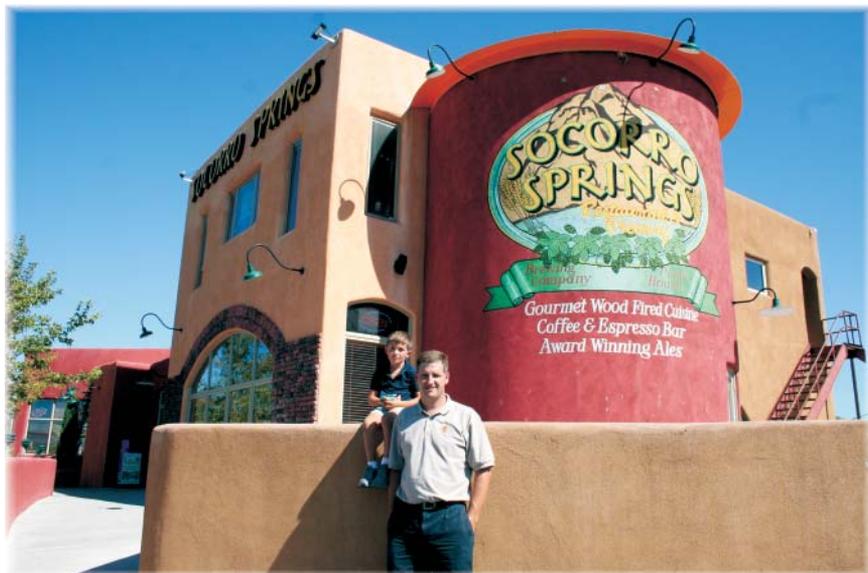
I will submit my PhD thesis (Time dependent deformation of Kilauea Volcano, Hawaii) in Geophysics at Stanford University next week and have a Post-doc at the Earthquake Research Institute of the University of Tokyo starting immediately after.

**Geoffrey Marshall (MS Hydrology Dec 2005, [marshallgeoff@gmail.com](mailto:marshallgeoff@gmail.com)) wrote in October 2007:**

I'm back in Jamaica working as a hydrogeologist at the Water Resources Authority. I work with the Planning and Investigation Unit, so if there's any detective work or well siting that needs to be done, we do it. I've also had the chance to do training courses in Sweden (March 2007) and a follow-up presentation on climate change and drought in Jamaica in South Africa (November 2007). Hopefully, I will get to pass through Socorro again sooner rather than later!

## Alumni Improving Socorro

by Susan Delap Heath, Computer Publishing & Graphics Specialist



### EES alumnus Mic Heynekamp and son Moab in front of the Socorro Springs Restaurant and Brewery on California Street

The Socorro restaurant scene has risen an order of magnitude with the marriage of EES alumnus Mic Heynekamp's (*BS Geology 1995, MS Geology 1998*) homebrewing hobby and his wife and NMT alumna Molly McFadden's (*BS Business Administration 1997*) dream of opening her own restaurant. Socorroans and Techies flock to the popular Socorro Springs Restaurant and Brewery to enjoy wood-fired gourmet pizzas, calzones, steaks, seafood, burgers, multiple vegetarian options, and an impressive selection of locally brewed beers including a rich and creamy root beer.

The success of this place is not only due to the great food and atmosphere, but to Mic and Molley's vision of "being a destination where one could receive an entire experience centered around being served the highest quality food and beverage delivered with the best possible service."

Five years after this popular restaurant first opened in the restored Baca Mercantile building off the plaza offering three pizzas and three beers, Socorroans loved it so much that Mic and Molley had to build a larger home for it on California Street. Their website

([www.socorrospings.com](http://www.socorrospings.com)) boasts a vastly expanded menu, and the brewery options are now up to nine beers, including award-winning ales and lagers such as Pickaxe IPA.

In 2007, Socorro Springs “entered an exciting new phase where it was able to reach out and give back to the community of Socorro.” The Hilton Open golf tournament held in Socorro was in need of a new title sponsor, and Mic and Molley felt like this was a perfect match for them. “It’s the loyal customers that have allowed us to grow, and we recognize the best path to growth is to keep the community of Socorro vibrant and thriving.” Through their shared vision of hospitality with Conrad Hilton, the Socorro Springs Brewing Company now sponsors the Socorro Springs Open “to continue to improve the community by adding to Socorro’s presence and recognition statewide and nationwide.”

Before Mic and Molley opened their restaurant, Mic was a senior lab associate at the New Mexico Bureau of Mines and created digital maps with Paul Bauer for the state mapping program. Now Mic enjoys geology from the air on frequent flights to Colorado in his Cessna 340 twin-engine plane.

Why is he flying to Colorado so often? Expansion, of course! After drawing a circle around Socorro with a 1.5 hour radius—the maximum time Mic wanted to take to travel between businesses—he discovered a new community named South Main, a 41-acre parcel between Buena Vista, Colorado, and the Arkansas River that is being developed as an environmentally, economically, and socially sustainable neighborhood. (See [www.southmainco.com/](http://www.southmainco.com/).) This appears to be another perfect match for the Heynekamps—expanding their tradition of giving back to the community by supporting a community that is giving back to the Earth. So after nine successful years in Socorro, the Socorro Springs Brewing Company will be breaking ground in mid-September to build the Eddyline Restaurant and Brewery which will open in May 2009.

These past nine years haven’t been all business for Mic and Molley. They now have three children: Moab, 6, who is in first grade and says that cheese pizza is his favorite food at the restaurant; Marieka, 4, and Micaya, 2.

So when in Socorro or next year in central Colorado, be sure to visit one of the “Brew-Pubs” as EES affectionately calls them, and enjoy the Heynekamps’ vision for improving the community around them.

## EES Department News

### Sallie Smith Passes Away

We're sad to report that Sarah Austin (Sallie) Smith, 91, passed away on December 8, 2007. She was the widow of Professor Emeritus of Geology Clay T. Smith.

Sallie had recently moved to California to be closer to her family. Her son, Dean Smith, said that he had gone to her house to pick her up for an outing and found her waiting for him in a chair by the door where she had peacefully passed away.

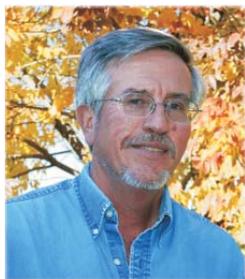
After Clay's death in 2003, Sallie remained active in the community and continued to attend many EES events. Her graciousness, kindness, and generosity will be missed.

NMT's Valerie Kimble wrote a beautiful article about Sallie before she left for California that is available on the web at [www.nmt.edu/mainpage/news/2006/7july01.html](http://www.nmt.edu/mainpage/news/2006/7july01.html).



**Sallie and Clay Smith in 1940**

### EES Faculty Awards and Honors

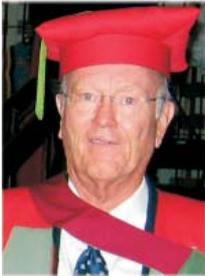


**Fred Phillips, Professor of Hydrology**, was elected in October 2007 to the rank of Fellow in the American Association for the Advancement of Science (AAAS). He was honored for "pioneering interdisciplinary work with interactions between hydrology, geochemistry, and geology, especially cosmogenic isotopes and surface exposure dating."

**Rick Aster, Professor of Geophysics**, was elected in 2008 to serve a three-year term as a board member of the Seismological Society of America (SSA) by the SSA membership. Founded in 1906 in San Francisco, the Society now has members throughout the world

representing a variety of technical interests: seismologists and other geophysicists, geologists, engineers, insurers, and policy-makers in preparedness and safety.

**Associate Professor of Geophysics Susan Bilek and Associate Professor of Geology Peter Mozley** were nominated by NMT students in Spring 2007 as Outstanding Teachers. Memorable quotes submitted by students for Dr. Bilek included, “She has tremendous dedication to both her students and to her teaching . . .,” and for Dr. Mozley, “He is open to students’ questions and possesses an immense knowledge of the subjects that he teaches.”



**Professor of Geochemistry Kent Condie** was awarded an honorary doctorate from the University of Pretoria in September 2007 in recognition of the significant contributions he has made to global geosciences. The University Council decided to honor him as a leading thinker and innovator in the greenstone belt studies, mantle plumes, and super plumes.

**Professor of Hydrology Rob Bowman** was one of two winners of the 2008 New Mexico Earth Science Award for outstanding contributions advancing the role of Earth science in areas of applied science and education in New Mexico. The annual award is co-sponsored by the NM Bureau of Geology and Mineral Resources and the Energy, Minerals, and Natural Resources Department in Santa Fe.



Rob has taught hydrology for 20 years and has mentored over 40 graduate students who are now working in industry, consulting, government, and academia. His research includes the origin of dissolved materials in surface and ground water, the transport of solvents and fuels from spill sites, and the movement of nutrients and pesticides below irrigated fields in shallow aquifers. (See [www.nmt.edu/mainpage/news/2008/7jan01.html](http://www.nmt.edu/mainpage/news/2008/7jan01.html).)

### Associate Professor of Hydrology

**Enrique Vivoni** was selected as a Fulbright Scholar in February 2008. This award provides funding for living in and doing research in an international setting. Enrique has chosen to work in University of Sonora in Hermosillo, Sonora, Mexico and the CICESE center in Ensenada, Baja California, Mexico.



**Rick Aster, Professor of Geophysics**, has been selected to give a sequence of public lectures during 2009 as one of two Incorporated Research Institutions for Seismology–Seismological Society of America Distinguished Lecturers. Rick will be giving lectures that include his recent work linking seismology, icebergs, and global wave climate to science museums and audiences around the nation. For more information, watch [www.iris.edu/hq/programs/education\\_and\\_outreach/distinguished\\_lectureship](http://www.iris.edu/hq/programs/education_and_outreach/distinguished_lectureship).

### EES Staff Changes



In the last issue of *TECHtonics*, we reported that Patci Mills had retired and Connie Apache had moved to the Bureau. We would like to introduce our new office and technical staff.

Barbara Fazio, above on the left, has taken over Patci's position as Administrative Services Coordinator. She worked previously in NMT's Chemistry Department and most recently at the NM Bureau of Geology bringing many years experience to the department.

Leigh Davidson, above to Barbara's right, joined the department two years ago as an Administrative Secretary and is the department's receptionist. She worked previously in NMT's Skeen Library.

Colleen Villanova, above to Leigh's right, took over Connie's former position as Administrative Secretary II and handles the purchasing for the department. "I love shopping, and now I'm getting

paid to do it.” She is an NMT alumna (BS Physics 2006) and also makes pottery on the side.

John Weber joined the department in 2008 as our new Systems Manager for the EES computing network. He was previously Manager of Systems Engineering for NMT’s computer center (TCC).

Welcome to all our new staff!

## EES YouTube Site

The department has set up its own YouTube site at [www.youtube.com/user/eeswebmaster/](http://www.youtube.com/user/eeswebmaster/). There are a variety of videos here from promotional ones about the department to the more risque such as this past spring’s faculty roast. Video of the student awards banquet with memorial tributes to Dave Norman are also here. Please email suggestions or comments to [sdelap@nmt.edu](mailto:sdelap@nmt.edu).



## EES Faculty on PBS



New Mexico Tech has entered into an agreement with the local PBS station, KNME, which includes airing 60-second TV spots about professors describing why they became scientists. Four EES professors have been featured so far: Rick Aster, Penny Boston, Bill McIntosh, and Enrique Vivoni. The 60-second spots are available on this website: [www.knme.org/sciencecentral/](http://www.knme.org/sciencecentral/). On the same website, a video will soon be posted of a Science Cafe featuring Rick Aster describing how the EarthScope project is imaging the interior of the earth. In the meantime you can read about it on this NMT webpage: [www.nmt.edu/mainpage/news/2008/11aug01.html](http://www.nmt.edu/mainpage/news/2008/11aug01.html). There are also full length shows available for free download on the KNME website, including *Sleeping Monsters*, *Sacred Fires*, an interesting program about New Mexico’s volcanic history, which features EES Adjunct Faculty, Bureau scientist, and alumna Nelia Dunbar (*MS Geology 1985, PhD Geochemistry 1989*).

## EES Spring Awards Party 2008



The annual spring awards party and barbecue was held at the Capitol Bar in the courtyard in May 2008. Over 80 people attended, and although we ran out of food, we didn't run out of fun. (See the department YouTube site for video.)

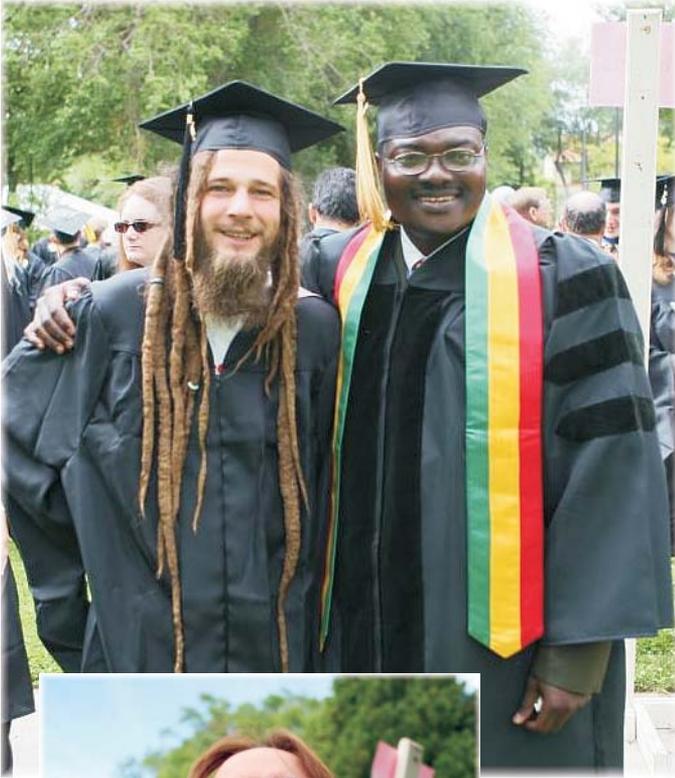
One person who was not there but was greatly missed was Dave Norman, who had died unexpectedly just three days earlier. His wife, Mary, and daughters, Anna and Kirsten, were there, and Andy Campbell and former student Frederick Partey reminisced about the good times they had experienced with Dave.

Many student awards were given out by the department. A complete list is on the EES website at [www.ees.nmt.edu/Dept-NewsSpring2008.html](http://www.ees.nmt.edu/Dept-NewsSpring2008.html). Besides the traditional faculty roast by the students, three other faculty were roasted by each other. Videos of all are available on YouTube. (See page 20 for URL.)

## EES Commencement 2008

NMT gave out 303 degrees on Saturday, May 17, 2008. The ceremony was held on the lawn south of Brown Hall. There were eight undergraduate and eighteen graduate students from the EES department. The NMT website ([www.nmt.edu/mainpage/commencement/c2008/](http://www.nmt.edu/mainpage/commencement/c2008/)) includes a link to video of the entire ceremony. The EES website ([www.ees.nmt.edu/Grad2008/index2008\\_02.htm](http://www.ees.nmt.edu/Grad2008/index2008_02.htm)) includes listings and pictures of EES grads.

**Next page picture captions.** Top: Ariel Dickens (MS Geology), left, and Frederick Partey (PhD EES-Geochemistry). Middle: Shari Houston (BS Earth Science, Geology Option, with High Honors). Bottom: Sung-ho Hong (MS Geology 1999, MS Hydrology 2002, PhD EES-Hydrology 2008) hugs advisor Jan Hendrickx after being hooded.



Pictures by Schlake  
(William Colburn)

## Singing Icebergs

by Richard C. Aster, Professor of Geophysics

**Professor of Geophysics Rick Aster's** research on iceberg harmonic tremors, recently published in the *Journal of Geophysical Research*, is generating a lot of interest lately—the press has coined them “singing icebergs” and “iceberg arias.” The “songs” are low frequency (around 0.5 Hz) vibrations—in audible to the human ear—generated by Earth's largest icebergs near the Antarctic coast. The tremors are detectable up to thousands of kilometers away via their seismic and acoustic ocean waves. The tremors have been recorded by sensitive seismometers deployed to study Mount Erebus volcano and elsewhere on the frozen continent. Once the source became clear, unique recordings were subsequently made by siting IRIS PASSCAL seismographs (supported by the NMT IRIS PASSCAL Instrument Center) deployed atop the giant (up to 90 km long and 300 m thick) icebergs as they jostled just north of the volcano for several years.



Rick Aster, flanked by Rep. Rush Holt (D-N.J.), co-chair of the Congressional Research and Development Caucus (left), and Arden Bement, Director of the National Science Foundation, discusses his research on singing icebergs and climate change.

What's causing the icebergs to sing? Aster, with Doug MacAyeal at the University of Chicago, Emile Okal at Northwestern University, and Jeremy Bassis at Scripps Institution of Oceanography, found that the icebergs were "singing" as they groaned against each other during glancing collisions driven by coastal tidal currents. As the icebergs slipped against each other, they generated up to tens of thousands of precisely repeating icequakes per hour.

The importance of better understanding the dynamics of giant floating icebergs and ice shelves, generally and in the context of climate change, has not escaped the interest of national policymakers. Rick Aster and PhD student Jonathan MacCarthy attended the Coalition for National Science Funding's 14th Annual Exhibition and Reception on Capitol Hill in July 2008 where Aster was a featured scientist and presented the singing iceberg research. Four hundred people attended the event including seven member of Congress. Aster and MacCarthy were able to meet federal policymakers and have "substantive discussions" with them about seismology in general as well as the singing iceberg research.

## **IRIS PASSCAL Expansion Planned for Polar Seismology Studies**

*by Richard C. Aster, Professor of Geophysics*

New Mexico Tech has authorized another expansion of the Incorporated Research Institutions for Seismology Program for Array Seismic Studies of the Continental Lithosphere (IRIS PASSCAL) Seismological Instrument Center. Principal Investigator Rick Aster notes that construction of a 1300-square-foot office and sensor laboratory addition is expected to commence this fall. The facility will principally serve the Instrument Center's rapidly growing presence in Polar Programs seismology, supporting seismic and glaciological research in such spots as Antarctica, Greenland, and Alaska and will augment recent construction of a special seismic sensor test facility. ([www.nmt.edu/mainpage/news/2008/14july01.html](http://www.nmt.edu/mainpage/news/2008/14july01.html)).

# Minerals Industry Booming

by Andrew R. Campbell, Professor of Geology



**Professor Bill Chávez, Melissa Lindholm (MS student) and geologist Jim Lang overlooking a copper prospect in Alaska after being dropped off by helicopter (Photo by Andy Campbell)**

As a result of the recent and continuing boom in metals prices and the shrinking number of graduate programs turning out economic geologists and mining engineers in the U.S., mining and exploration companies are aggressively seeking geologists for summer and permanent employment. This upswing has been great for our students at New Mexico Tech from the EES and Minerals Engineering departments.

Summer jobs are available in industry for all levels of undergraduates. The three entering graduate students in ore deposits this year all got their graduate careers off to a fast start with summer jobs and thesis work before even entering the graduate program this fall.

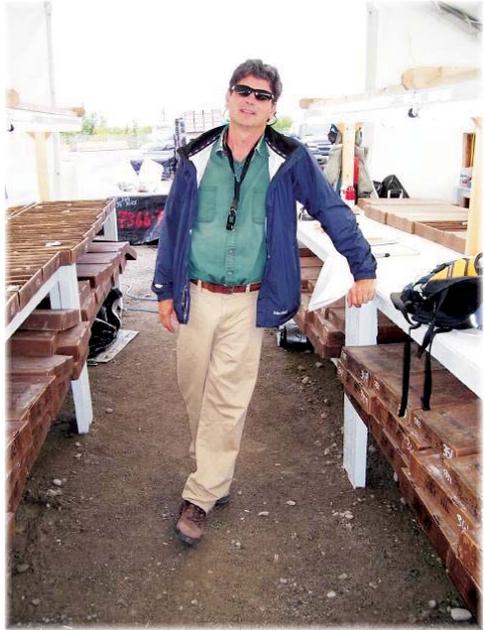
All of our ore deposits graduate students in recent years have had full-time jobs lined up before finishing their degrees—these are great jobs with excellent pay, good potential for advancement, and often with significant international travel possible.

Because of this increase in available jobs, we have had a notable increase of enrollment for students interested in ore deposits. Currently there are about fifteen graduate students in our ore deposits program, including both the EES and Minerals Engineering departments.

Our increase in graduate enrollment has been aided by mining companies now eager to support students to do thesis research; as such, mining companies are kicking in research and salary support.

This also makes for interesting times for the faculty. In the last two years I have had opportunities to visit my students working at the famous silver mines at Fresnillo, Mexico, a potentially huge porphyry copper exploration target in Alaska, uranium mines in Colorado, a super-deep copper target in Arizona, and an old base metal district in Utah. Several of those trips have been with Bill Chávez (*BS Geology and Mining 1977*) from our Minerals Engineering department with whom I co-advise a number of students.

Right now we have more requests from mining companies to have students come do research projects than we have students. At most mines we visit, we run into NMT graduates, many in supervisory positions, underscoring the great reputation that our school enjoys in the industry—a reputation solidly based on the work that those graduates performed during and since their tenures as students here in Socorro.



**Andy Campbell in the core shed in Alaska helping sample for Melissa Lindholm's thesis project**





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