

# on the faultline

*GMES and Michigan Tech:  
In service to the world*

The rapid retreat of Bering Glacier

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*Vitus Lake at the terminus  
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**MichiganTech**

## In service to the world

**WELCOME TO ANOTHER ISSUE** of *On the Faultline*. We have changed the appearance of the newsletter—I hope you will agree it is for the better. The new format should also allow us to publish this twice a year, enabling us to touch base with you, our alumni and friends, more frequently.



In this issue, we have tried to emphasize a certain theme: *In service to the world*. Many of our faculty and students are involved in research and outreach programs that have as their primary goal the good of society. We interact with government agencies both domestically and abroad to ensure that our policymakers are well-informed on important issues regarding Earth and its resources and hazards.

Photo-ops: You may have noticed the fuzzy (cell phone camera) picture of me with Senator Carl Levin. Senator Levin is a collector of antique maps of Michigan, and something of a geology buff, but he did not have an antique geologic map on his office wall in Washington, DC, so the GMES department provided him with one “on permanent loan.”

Elsewhere in this issue, you may also notice a picture of graduate student Agustin Robles-Morua meeting President George W. Bush. An accompanying article describes the background of that meeting.

Other topics covered do not have accompanying photos with political celebrities, but are certainly significant. John Gierke was named Michigan Distinguished Professor of the Year. The State of Michigan developed new laws to govern mining of non-ferrous minerals, developed by a team that included Ted Bornhorst. Bill Rose was a member of the authoring team of a National Academy of Sciences report that advises NASA on its priorities—which have been shifting of late.

You will also find articles about field work in Africa, the poorest continent; artwork by our students now on display in a new coffee shop on campus; and interviews with two graduate students and two undergraduates, just as each was about to complete their degree program and move on in their career.

I am pleased to report that the GMES department is as healthy and vibrant as these articles imply, and that we look forward to future growth and expansion under



Aleksy Smirnov

the new administration at Michigan Tech. This growth has already started, with the hiring of two new faculty. Aleksy Smirnov, who researches the nature of Earth’s magnetic field and its early history, comes to us from the University of St. Petersburg and the University of Rochester, with post-doc experience at Yale University. Greg Waite studies volcanic seismology, using earthquakes and surface deformation to understand



Greg Waite

volcanic eruption mechanisms, and comes to us from St. Norbert College, the University of Utah, and a post-doc experience with the US Geological Survey.

Our next newsletter will include profiles of new faculty and more. Until then, enjoy this *Faultline*, and please keep in touch.

Wayne D. Pennington, Professor and Chair

## TRAVELOGUE

### My time in Kenya by Alex Guth



*Little salt-loving microbes live in the pools of Lake Magadi and turn it bright red.*

**I VISITED KENYA** for two weeks in 2005 and for a month in 2006. This year I’ll be in Kenya for two weeks again. Each time I’ve gone with my advisor, Professor Jim Wood. We always try to go in May and early June, right at the end of one of the rainy seasons but before plane tickets jump in price. Jim has also been including his family. In 2005 he brought his daughter, in 2006 his son came along, and this year he’ll be bringing his wife.

The first time I was there I felt that two weeks really wasn’t long enough. It takes a while to get used to an area’s geology, especially trying to link it with what you’ve read. When I came back in 2006, one of my ideas was to get enough pictures and GPS locations to create a virtual tour of the area to post online. I would have gotten into the geology groove sooner if I’d had something like that at my disposal before my first trip.

As far as field work goes, we collected numerous rock samples and water samples from the various springs and lagoons around Magadi. (“Lake” Magadi is a bit of a misnomer as it is only flooded

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## Bering Glacier melting faster than scientists thought



*On Vitus Lake, at the terminus of the Bering Glacier. From left to right, undergraduate geophysics students Endsley, Richardson, and Espino.*

**ASSOCIATE PROFESSOR** John Gierke, and applied geophysics students Kevin Endsley, Josh Richardson, and Silvia Espino recently traveled with the Michigan Tech Research Institute (MTRI) to project sites in Alaska.

While there, the group worked with MTRI to conduct research at the terminus of the Bering Glacier, including Vitus Lake, Midtimber Lake, and Seal River.

MTRI’s scientists and engineers support a Bureau of Land Management (BLM) and US Geological Survey (USGS) hydrological study of the Bering Glacier—the largest and longest glacier in continental North America.

The MTRI team, working with USGS and BLM scientists, designed an autonomous sensor that enabled BLM to accurately measure and analyze the melting of Bering Glacier.

Their findings indicate that Bering Glacier is melting at double the rate

that scientists thought. The glacier is releasing approximately 30 cubic kilometers of water a year, more than twice the amount of water in the entire Colorado River, said Robert Shuchman, codirector of MTRI and adjunct professor in GMES.

“This could potentially change the circulation of coastal currents in the Gulf of Alaska,” Shuchman said. And, as glaciers melt, sea levels rise. “If it continues to rise at this rate, parts of the state of Florida could be under water at the turn of the next century,” he added.

Gierke and the three GMES undergraduates conducted studies new to the glacier, designed and coordinated by the students.

One study looked into the transition between the salt water of the Gulf of Alaska and the fresh (or brackish) water of Vitus Lake. Because Vitus

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### Michigan Tech Research Institute (MTRI)

Michigan Technological University dedicated the new Ann Arbor-based Michigan Tech Research Institute (MTRI) on May 17, 2007. The research institute was purchased from the Altarum Institute by Michigan Tech last year with a gift from the House Family Foundation, established by former Intel executive Dave House, a Michigan Tech alumnus.

At the new institute, research focuses on the development of innovative technology for measuring and analyzing natural and man-made environments. MTRI’s thirty scientists and their student interns design and test sensors that can measure water quality, help eliminate traffic congestion and road safety hazards, assess factors contributing to global climate change, and conserve and protect natural resources.

When Altarum refocused recently on health systems research, the private, non-profit organization decided to sell its environmental and emerging technologies division. The House Family Foundation gift and Michigan Tech’s purchase of the division enabled the high-tech environmental and national security technology research to remain in Michigan, where it continues to grow, providing jobs and educational opportunities.

MTRI’s work is funded entirely by research grants and contracts with agencies such as the US Bureau of Land Management, NASA, the Department of Agriculture, the Natural Resource Conservation Service, the Michigan Department of Transportation, and the Department of Defense. <http://mtri.org>



## NASA'S shifting priorities—can we influence them?

**"YOU HAVE TO MAINTAIN** your own house first." This was the response given by GMES Professor Bill Rose in response to the question of why it is important NASA continue to develop Earth observation programs instead of focusing only on future space explorations.

Rose, along with many of the country's expert scientists, contributed to a report called *Earth Science and Applications from Space: National Imperatives for the Next Decade and Beyond*, published by the National Academy of Sciences and the first of its kind. Six panels were convened, each one focusing on a different application for remote sensing of the Earth. Rose took part in the panel on solid-earth hazards, resources, and dynamics, his specialty being remote sensing of volcanic processes.

The National Academy of Sciences approached Rose to participate in the 426-page report which details the benefits of satellite-borne Earth observations, and the necessity of continuing those programs. Rose says this report was necessary because money is tight and politicians are currently trying to refocus NASA's mission away from further development of Earth observation instruments. "Scientists are not opposed to space exploration," says Rose, "but we don't want NASA to forget stewardship of the Earth."

Many of the instruments currently used are beyond what their lifetime was intended to be. There are now over a dozen new instruments at different stages of development that the scientific community has deemed critical to maintaining a sufficient Earth observation program. "The science community is many times the driver of the designs of these instruments," says Rose, but also adds that politics can sometimes influence government agencies, like NASA, more than scientists are able to. "Our current government has politicized NASA's role and turned it away from the Earth toward other planets," he adds.



Rose says that one scientist alone is not enough to raise awareness about an issue. He uses the example of James Hanson from NOAA, who was, in effect, ostracized by the government for his findings on the impact of global warming. A report written by a large number of scientists, though, who have expertise in many fields, is harder to dispute. "It may be how scientists can influence the government," says Rose.

The report sets a "decadal vision", meaning it gives declarations on how NASA should carry out its Earth observation programs for the next decade. One of the major problems with setting a decadal vision, though, is that the mission of NASA often changes. "NASA's mission is not very clear, and it can change with administrations," says Rose.

The current administration would like NASA to focus more on space explorations and manned space mis-

sions and less on Earth observation. In fact, by 2010, there is likely to be a 40 percent drop in the number of Earth-observing instruments on NASA satellites. For this reason, says Rose, it is imperative that the scientific community clearly state their concerns and present them to the community.

Rose says that the report is written for the general public, but "is a vehicle to guide the politics." Rose also adds that it takes input from the scientific community to bring about changes in policies that will benefit society, citing how remote sensing of the ozone layer led to the Montreal Protocol and a decrease of chlorofluorocarbon emissions into the atmosphere.

His main concern is that the missions of NASA, whatever administration is in charge at the time, will focus on the importance of remote sensing applied to Earth processes. As the report states, "these observations have served the nation, helping to save lives and protect property, strengthening national security, and contributing to the growth of our economy through provisions of timely environmental information."

"It's a no brainer," says Rose, "We have to take care of our family."

—Alexandra Matiella Novak

FOR MORE INFORMATION, check out the National Academy of Sciences report at [www.nap.edu/catalog.php?record\\_id=11820](http://www.nap.edu/catalog.php?record_id=11820)

## GMES students win Aftermath Café art competition

**TWO WORKS OF ART** by GMES students were recognized in a recent campus-wide art competition at Michigan Tech. Rex Crouch received a third place prize, and Alex Guth received an honorable mention. Both works have since been matted, framed, and installed at Michigan Tech's new Aftermath Café, located in Fisher Hall.

### Rex Crouch

Here's the short story on the drawing: Art class was strange. I felt out of place with all of the students—you know, the ones that take introduction to astronomy for their one science class. During the class I tried to produce art pieces that related to science just to maintain my identity in the herd of liberal arts majors. This drawing is that class. I was still working on a physics problem when the art instructor directed us to draw something meaningful that we had on our person and the medium was graphite—one hour limit. My calculator, TI Voyage 2000, was already in hand and soon found its way to the paper (eighteen by twenty-four inches). I finished the physics problem and didn't think about the drawing again until Dr. Pennington asked students in his department to submit an art piece for the Aftermath Café art contest.

### Alex Guth

This is a watercolor painting that I did in one of Mary Ann Beckwith's art classes here at Tech (I adore her classes!). It was done using techniques like stamping and stenciling, with the large trilobite being a stencil I cut by hand specifically for this work.

Trilobites are among my favorite ancient critters, and I thought they would make for an



"Primordial"

interesting subject, allowing me to blend two things I love (geology and art).

I actually did a mini series of three paintings, with "Trilobutts" (featuring only the pygidium and inspired by an email that had funny answers found on real geology tests) and "Trilobit" (which features the shape of a trilobite made with 0s and 1s that spell out "trilobite" in binary) joining with "Primordial"—the painting I submitted for the contest.



"Keyboard"

## Want to make a gift to the GMES department?

ALTHOUGH Michigan Tech is a state institution, it receives less than one-third of its funding from state appropriations. Your gift helps keep the GMES department on the cutting edge. There are three ways to give:

**Use** Michigan Tech's online gift form at [www.mtf.mtu.edu/gift](http://www.mtf.mtu.edu/gift)

**Call** the Michigan Tech Fund at 906-487-2310

**Mail** a gift to the Michigan Tech Fund using the enclosed envelope. In order to make sure 100 percent of your gift goes to the GMES department, please specify GMES account #1325AO. Many, many thanks!



## Gierke named Michigan Distinguished Professor of the Year

**JOHN GIERKE IS ONE** of three faculty members statewide to receive the first Michigan Distinguished Professor of the Year Award from the Presidents Council of the State Universities of Michigan.



Gierke, an associate professor of geological and environmental engineering in Michigan Tech's Department of Geological and Mining Engineering and Sciences, was cited for excellence in both undergraduate education and research.

The winners were selected from a slate of fifteen candidates, each nominated by one of the state's public universities. This is the first time the Presidents Council has presented the awards, which recognize superior achievement in undergraduate education.

Gierke advises the Aqua Terra Tech Enterprise, which developed a watershed model for the Keweenaw Bay Indian Community and has worked in Nicaragua to help provide a town with a clean, reliable water supply. His students have also helped a Detroit-area school develop a rain garden to minimize runoff and restore groundwater.

"I have watched this program closely and am continually impressed with it,

using it as a model for others," said Wayne Pennington, chair of geological and mining engineering and sciences. "Dr. Gierke and his student groups publish regularly, and students present their work

Kathleen Lindstrom appreciated Gierke's teaching style, which relies on "hand-written notes and equations on the chalkboard."

"Rather than dazzle his students with pretty PowerPoint presentations, he really took the time to plan and carry out his classes in a way that led his students to a true understanding of concepts and techniques," she said.

Gierke stressed the importance of integrating mentoring and teaching. "Teaching without mentoring is, for me, only a transfer of facts and information," he wrote. Mentoring, especially through projects such as Aqua Terra Tech, "has allowed me to have the greatest impact on the most students, helping them develop practical and leadership skills that otherwise might not be experienced until their first professional position after graduation."

The other two recipients of the Distinguished Professor of the Year Award are geology professor Mark Francek of Central Michigan University, and Heather Neff, a professor of English literature at Eastern Michigan University.

Undergraduate education is a central mission of the state's fifteen public universities, and the Michigan Distinguished Professor of the Year recognition program honors the outstanding contributions made by faculty in this arena, said Michael Boulus, executive director of the Presidents Council.

"Our universities are only as good as our faculty," he said. "These fifteen nominees demonstrate the quality of education we celebrate. We'd like to thank every faculty member for their dedication to higher education and to each and every student."

at conferences among professionals. Sometimes, they are not even recognized as undergraduates."

Jacqueline Huntoon, dean of the Graduate School, supported Gierke's nomination. "He has an easy-going,

**"Teaching without mentoring is, for me, only a transfer of facts and information."**

**John Gierke**

down-to-earth approach that allows him to interact in a collegial way with people from all walks of life," she said. "His ability to motivate students and community members is phenomenal. I can think of no other person who is more deserving of this honor."

Former Michigan Tech student

## Agustin Robles-Morua meets US President in Mexico



**WHILE IN MEXICO** to visit with Felipe Calderon, President George W. Bush met with Training, Internships, Exchanges and Scholarship (TIES) recipients at the Hyatt Regency in Mérida Mexico in March 2007. Michigan Tech graduate student Agustin Robles-Morua, a PhD candidate in environmental engineering, was among fourteen students selected by the US Agency for International Development (USAID) to meet with Bush.

Robles-Morua's work to design and build support for a new wastewater system in the rural Mexican town of Rosario earned him the visit.

Robles-Morua told the Houghton *Daily Mining Gazette*, "It was a big honor to represent Michigan Tech, the University of Sonora, and the people from the community of Rosario—who should be the people we honor, because they took on the project for themselves."



### Environmental Engineering PhD students in GMES

This issue of the newsletter mentions two environmental engineering PhD students mentioned—Agustin Robles-Morua and Domenico Bau. The advisor for both is Alex Mayer, a professor of geological and environmental engineering in the GMES department.

The PhD in Environmental Engineering is an interdisciplinary degree, currently administered through the Department of Civil and Environmental Engineering, but with faculty drawn from across the engineering disciplines.

Many of the environmental engineering graduate students are part of the GMES family, a relationship we all find enjoyable and rewarding.

### PhD students reflect on time in GMES

#### Q & A WITH DOMENICO BAU, PhD

##### Where did you go for your undergraduate degree/other graduate degrees?

I went to the University of Padua, Italy, where I obtained a joint BS/MS degree (or *laurea*, Italian for "degree") in civil engineering in 1997.

##### When did you start at Tech?

I started in 2001. I came to the US and to Tech to pursue a PhD in environmental engineering under the supervision of Dr. Alex Mayer.

##### In brief, what was the focus of your research?

It focused on developing decision-making frameworks for the optimal design and management of groundwater remediation systems under conditions of parameter uncertainty.

##### What have you enjoyed most about the department?

Its very dynamic academic environment, with the possibility to conduct research with a high degree of freedom. I have also benefited from interacting with students and faculty from different scientific backgrounds.

##### What are you doing now that you've graduated?

I recently began working as an assistant professor in the Department of Civil and Environmental Engineering at Colorado State University.

##### What advice would you give to first-year graduate students?

Start gradually without taking too many classes, especially in the first semester. Reserve some extra time for orientation on research topics. It is also important to quickly interact with your advisor to learn how to organize time for both research and class work.

#### Q & A WITH ADAM DURANT, PhD

##### Where did you go for your undergraduate degree/other graduate degrees?

I completed my first degree, a Master in Science (MSci) in geology, from the University of Bristol, UK, in 2001.

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## Healing Huron Creek Watershed

**HURON CREEK WATERSHED** is located in Houghton County in the Upper Peninsula, a ten-minute drive from Michigan Tech. The roughly three-square-mile watershed encompasses much of the new commercial development for the City of Houghton and Portage Township.

Unfortunately, commercial development along M-26 has greatly impacted Huron Creek, which is important to various forms of wildlife.

The creek also empties into the Portage Canal, which is hydraulically connected to the source of drinking

**“The MDEQ watershed proposal was the most satisfying engineering project in my undergraduate education. It required the integration of history, science, economics, and politics to develop a practical solution.”**

*John Gaffney,  
Civil Engineering*

water for the City of Houghton.

GMES Professor Alex Mayer has spent the past two years working with Michigan Tech students to create a watershed management plan to restore and protect Huron Creek. About a dozen senior design students have been working on the project—from geological engineering, civil engineering, and environmental engineering.

“They are having a real impact on the creek and the community,” says Mayer.

In addition, Mayer and his team have cooperated with Department of Social Sciences Associate Professor Hugh Gorman and his environmental decision making class, which has included graduate students in environmental policy and environmental engineering. “I’m proud of the fact that this project has been a cross-college cooperation.



*Alex Mayer guides a class through one of the remediation sites along Huron Creek in Houghton.*

Hugh and I have learned quite a bit from each other’s disciplinary background as a result,” he adds.

Mayer and his students formed a watershed advisory group last year, consisting of residents, developers, representatives from the city and Portage Township, environmental groups, and the local schools, among others. “The public advisory group is supposed to motivate the watershed management plan, so the students have worked with the group to find out what is most important to them as far as restoring and protecting the creek.”

In addition, Mayer says, students have had to realize that this is not a hypothetical project—the plan will be submitted to the Michigan Department of Environmental Quality (MDEQ) for approval, and if approved, will open the door to funds for implementing the plan.

The first group of senior design students wrote a proposal to MDEQ to fund the development of the plan, which was approved last year. “This was a real-life funding proposal, which competed against proposals from watershed groups across the state. It was the only one approved in the UP last year. This was quite

an accomplishment,” notes Mayer.

It couldn’t come soon enough. Water quality monitoring within the Huron Creek watershed has been infrequent over the past decade. The majority of the sampling efforts have focused on the former Houghton City Landfill located next to the stream.

**“Working on the project was very enjoyable, especially working with people from different backgrounds—whether citizens in the community, political workers, or government employees. The most challenging aspect was gathering the required information to make the proper recommendations.”**

*Colin Daining,  
Environmental Engineering*

Leachate from the landfill is visibly seeping into the creek in at least six locations along Huron Creek. The discharging leachate contains elevated concentrations of iron and ammonia. Downstream of the landfill, mercury and copper

concentrations have been measured that exceed Rule 57 aquatic life protection values. Orange staining of the creek bottom by iron floc (known as yellow boy) is obvious for a quarter mile downstream of the landfill. Last but not least, mining residuals, stream modification, and failing septic tanks may also be contributing metals, sediments, and harmful bacteria.

Linda Kersten, who is earning an MS in Environmental Engineering, will write up the plan over the next nine months for submission to MDEQ.

“Working on a Watershed Management Plan (WMP) is more than just writing a document—it’s also very multi-disciplinary,” she explains. “The formation of a WMP is completed by identifying those individuals who have a stake in the watershed’s management and getting their input on what should or should not be done—identifying goals for the watershed.”

These goals can encompass water quality and hydrology, vegetation and stream bank management, wildlife, local government management (ordinances), wetlands, and more.

“A WMP is created based on identified goals and carried out by local individuals or organizations. So, a large part of creating the plan is public outreach and education so that the community will want to carry out the plan.

“One of the most interesting things has been working with various members of the community. From government to developers to local business owners and residents—each has their own take on what the watershed means to them and what should be done to manage it.”

Participating in public education events has been a rewarding experience for Kersten. “Someone like myself often takes for granted how much people know about their local watershed. It’s great to pass on even a little bit of info, and most people really appreciate it.”

## The future of mining in Michigan

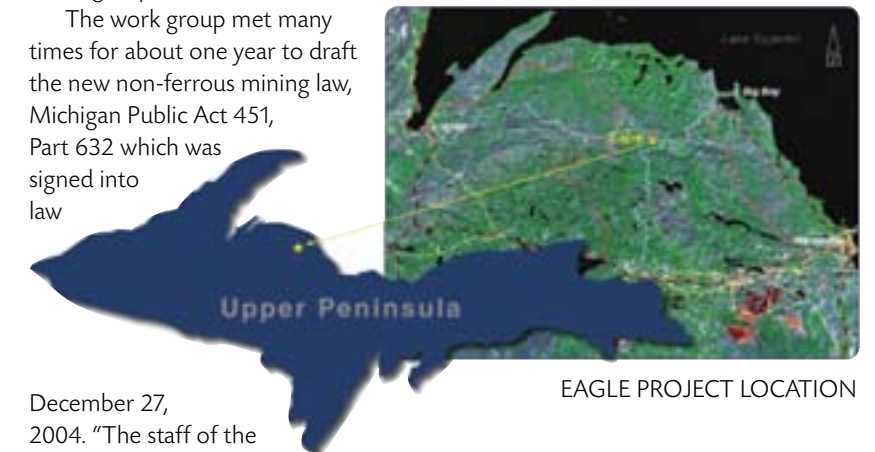
**SOME OLD MINES** in the western US have made front-page headlines over the past few years because of acidic mine drainage and contaminated tailings. The negative environmental legacy of these old mines has increased public awareness of the potential for environmental impact from mining.

When Kennecott Minerals Company announced the discovery of a sulfide-rich ore body in the Yellow Dog Plains north of Ishpeming, Michigan, environmental advocates called upon the State of Michigan to modernize the mining regulations.

The Michigan Department of Environmental Quality formed a work group to develop a new non-ferrous metallic mining law, led by Director of the Office of the Geological Survey Hal Fitch, a graduate of the Michigan Tech geology department.

Ted Bornhorst, professor of economic and engineering geology at Michigan Tech, was also part of that group. “There were members of the state legislature, national environmental advocacy groups, state environmental groups, local environmental groups, the general public, legal profession, four metallic and ferrous mining/exploration companies active at the time in Michigan (including Kennecott), applicable branches of state government, and myself, as the only academic in the group,” said Bornhorst.

The work group met many times for about one year to draft the new non-ferrous mining law, Michigan Public Act 451, Part 632 which was signed into law



December 27, 2004. “The staff of the Michigan Department of Environmental Quality, especially the Office of the Geological Survey, created draft wording for the new law from discussions of the work group,” he explains. According to Bornhorst, the work group deleted, added, and modified the words in the document through consensus building.

“Michigan now has one of the most modern and progressive non-ferrous mining laws that promotes sustainable mining,” he adds. “I think that Michigan’s law could be a model for other states. It sets high but reasonable environmental, health, and safety standards which must be satisfied before a company can obtain a mining permit. As long as the new mining law is allowed to operate as envisioned, I am satisfied with the result.”

The first test of the new regulations: Kennecott’s Eagle Project, north of Ishpeming. Kennecott will not process the ore in Michigan but instead ship it to Ontario for processing. The Michigan Department of Environmental Quality has approved the three principal environmental permits needed to launch construction. For the latest information go to [www.michigan.gov/deq](http://www.michigan.gov/deq) and click on “Kennecott Eagle Project.”

—Alexandra Matiella Novak

## Spotlight on graduating seniors

## Q &amp; A WITH KATIE RICHARDS

**What made you decide to major in Geology?**

I initially came to Tech for a degree in chemical engineering, but decided that it wasn't really for me. Next I decided to try for a degree in chemistry and during that time I was taking GE200 and I loved it. So, in the spring of 2005 I changed my major to Geology and I've loved every minute of it.

**What was your favorite class in this department?**

That is a tough one. I'd have to say any of Bill Gregg's classes. I learned a lot and I got to color! Having the lab portion of that class really helped.

**What's your favorite rock/mineral? Why?**

My favorite rock is chert and my favorite mineral is specular hematite. I like chert because the outside of this rock can be so misleading and the inside has a waxy luster and can be quite unique. I like specular hematite because it is so unique to the UP and because it is shiny!

**What are you planning on doing after graduation?**

After graduation, I will be working for Baker Atlas as a junior field engineer in Rock Springs, Wyoming. I will also be getting married!

**Any advice for first-year geo students?**

Don't be afraid to ask questions. Some instructors can be intimidating at first, but not after you get to know them. Don't ever listen to someone who tells you that you can't do something, prove them wrong and do it!

## Q &amp; A WITH ROB PORRITT

**What made you decide to major in Geological Engineering?**

I heard about the volcanic research in the department, and it sounded like a good chance to travel and see the world.

**What was your favorite class in this department?**

Aqua Terra Tech Enterprise—the practicality of using what I learned in class, learning outside of class, and leading teams has been rewarding.

**What's your favorite rock/mineral, why?**

Obsidian and beryl—I love the cool-looking, shiny, black, glassy surface of obsidian, and I've always liked emeralds.

**What are you planning on doing after graduation?**

In the summer of 2007, I will intern for Newfield Exploration in Tulsa, Oklahoma. After that, and for the next four to five years, I will be working on my MS/PhD in seismology at UC Berkeley.

**Any advice for first-year geo students?**

Get to know the faculty, challenge yourself, and look to help on a research project which interests you.

*POSTSCRIPT: Katie indeed did get married, to the son of an alumnus, and is now in Rock Springs as planned. Rob completed his internship and is now at UC Berkeley.*

## TRAVELOGUE

Kenya *continued from page 2*

with water seasonally, and the rest of the year it is a salt pan.)

One of our biggest accomplishments was collecting as many maps as we could from the Kenya Geologic Survey. These maps really served as the backbone for my thesis.

I was surprised by the odd dichotomies of the country. Nairobi is a large city with sky scrapers and lots of traffic, but there are Maasai herding cattle through parts of town. There are people in nice suits going to jobs, but they are going in and out of the largest slum I have ever seen.

Being in another country with your advisor is certainly an interesting experience. On campus you often only see



*Professor Jim Wood enjoying the lack of snow while conducting field work in Kenya.*

the professor-side of your advisor, but in another country, especially when they are around their family, you get to see new facets of them (see photo above). And I'm sure that goes both ways as well. There's nothing like being tired, hot and cranky in the middle of the Kenya Rift to get to know someone.

Check out Alex's travelogue at [www.geo.mtu.edu/~alguth/index/Welcome.html](http://www.geo.mtu.edu/~alguth/index/Welcome.html). Her Magadi Field Guide is at [www.geo.mtu.edu/~alguth/Magadi\\_Project/](http://www.geo.mtu.edu/~alguth/Magadi_Project/)

Glacier melt *continued from page 3*

*A view across Vitus Lake to the Bering Glacier, with the St. Elias Mountains in the distance.*

Lake is fed almost exclusively by glacial meltwater, it should contain only fresh water, yet earlier studies by MTRI have shown that some regions contain water that is quite salty, trapped at depth. By conducting a series of resistivity transects (using GMES equipment purchased through alumni donations) they hope to develop a large-scale profile showing the interface—and possibly its dynamics—between the salty and fresh groundwater beneath the land separating Vitus Lake from the ocean.

"We used electrical methods to do this, because the electrical properties of fresh and salty water are substantially different," Gierke explains. "We hypothesize that during the time of Vitus Lake's low levels (in the winter when glacial melting is reduced) seawater flows underground, albeit slowly, into the lake."

Another experiment involved placing seismometers on and near the glacier. "Since glaciers are remote, and also due to the fact that they are hundreds of feet thick, we do not understand their interactions with the underlying rocks upon which they travel. Since we can not see what is happening, we are attempting to 'hear' the interactions and then deduce where and what is going on," he adds.

Gierke and his team deployed three seismometers on the Bering Glacier and seven others on islands, peninsulas, and shores near the glacier edge. "We hope

the data will tell us when and where bedrock was being broken by the glacier moving and glacier calving events."

A partnership with Southern University in Baton Rouge brought several other students to the glacier, as well. Even Michigan Tech President Glenn Mroz and Vice President for Research Dave Reed visited the camp and helped with the

manual labor of field work.

MTRI's Bering Glacier camp is located on the edge of Vitus Lake on a former terminal moraine. Complete with refueling airstrip, kitchen and mess tent, command center, and restrooms, it can host up to twenty-five people. Scientists and staff sleep in tents or wooden floor huts.

Reflections from Adam Durant *continued from page 7***When did you start at Tech?**

I arrived in Houghton in September 2002, shortly after completing an internship at the Hawaiian Volcano Observatory. I then went on to earn MS and PhD degrees in geology from Michigan Tech in 2006 and 2007, respectively.

**In brief, what was the focus of your research?**

It aimed to improve understanding of the processes that cause fine particles to settle from clouds produced by explosive volcanic eruptions. It has provided a new perspective on this problem by combining atmospheric science and volcanology, and presents a new model for volcanic ash sedimentation.

**What have you enjoyed most about the department?**

The department is tight, and the people connected to the department are very sociable. The department supports its students well. I had a great view of the lake from my office window.

**What are you doing now that you've graduated?**

I am now at University of Bristol as a post-doctoral researcher in the Department of Earth Sciences.

**What advice would you give to first-year graduate students?**

Know your deadlines and observe them. Get comprehensive exams and proposals done as soon as possible. Talk to your advisor as much as possible.





**“Reflection” is a neat scenic picture that I took at Magadi in Kenya. Because the waters are saline, they are denser than normal water and tend to make lovely reflecting surfaces.**

**—Alex Guth**

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We encourage your comments and feedback. Please contact us at:

GEOLOGICAL & MINING  
ENGINEERING AND SCIENCES  
Michigan Technological University  
630 Dow Environmental Sciences  
& Engineering Bldg.  
1400 Townsend Drive  
Houghton, MI 49931-1295

T: 906.487.2531  
F: 906.487.3371  
E: [geo@mtu.edu](mailto:geo@mtu.edu)  
[www.geo.mtu.edu](http://www.geo.mtu.edu)

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