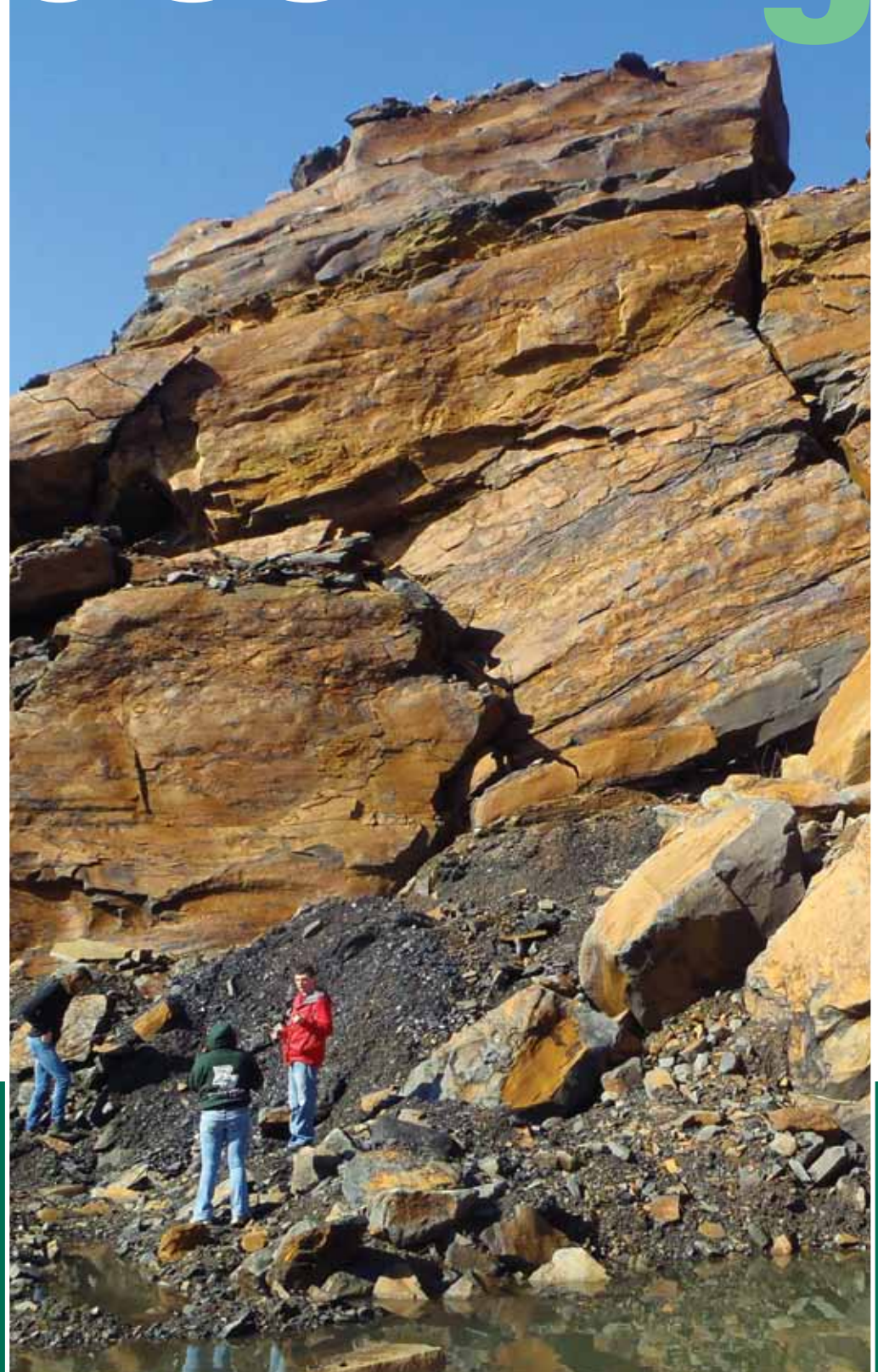


# Geo•Bing

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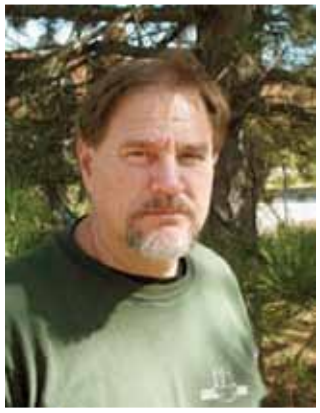
► **Students on field trip  
to Scranton, Pa.  
(Photo: Ben Campanaro)**



**BINGHAMTON**  
UNIVERSITY  
STATE UNIVERSITY OF NEW YORK

Harpur College  
of Arts and Sciences

# Letter from the Chair



Richard V. Demicco — Chair

**“Microbes matter in the Earth sciences and we are all glad that we now have this important, growing field of research covered in the department.”**

I hope that everyone will have a chance to read about Tom Kulp’s research in this issue. Microbes matter in the Earth sciences and we are all glad that we now have this important, growing field of research covered in the department. With any luck, we will soon be adding a new faculty member in basin analysis as well. As you may remember, the department has a goal of ultimately being able to endow a permanent chair in John Bridge’s name. The fund was established by a generous gift from Matt Telfer, CEO of Border to Border Explorations in Austin, Texas. I plan to throw the fundraising effort into high gear soon and many of you can expect to hear from me. But if you do not want to wait, please feel free to contribute to the John S. Bridge Energy Resources Chair – Geology, Account 103919501, through the Binghamton University Foundation. It is worth reminding everyone that the department rarely finds out about contributions to the general University Fund and those contributions won’t generally be acknowledged on the Alumni Giving Page in the newsletter. Contributions specific to the Department of Geological Science should be made out to the General Geology Fund, Account 10796. Contributions specifically for the John Bridge Chair or the Geology Fund directly help the department.

I want to thank everyone who has so generously provided financial support. It really makes a difference.

My stint as department chair will soon be over. Joe Graney will be writing the Letter from the Chair in the future. I am also going to be on sabbatical next year. Please do not worry about me, though. Tim and I have signed a contract to deliver a textbook on chemical sediments to Cambridge University Press, so I have plenty to do. Karen has an upcoming art show and we look forward to some travel and fun after her show wraps up. John and Heather Bridge visited us in Florida over the winter break. Heather and Karen did art while John and I did what we always do — sat around enjoying a cold beverage on the beach. John seems to be enjoying retirement. The Bridges spend a few months in the U.S. and a few months in the U.K.

Finally, I am deeply saddened to have to report the very recent passing of Herman Roberson. Details of a memorial service are not available as we go to press, nor have we had time to assemble a fitting tribute for Herman for this issue of the alumni newsletter. He could be feisty, and his voice rose from time to time, but Herm was a good friend and really cared about the department and the University. We all will miss him. ●

## Geo-Bing Newsletter

Editor: David M. Jenkins

*Geo-Bing* is published periodically by the Department of Geological Sciences and Environmental Studies at Binghamton University



# John Bridge, 2011 Sorby Medalist

Faculty, friends, students and alumni gathered on the evening of April 16 at McGirk's Irish Pub in Chenango Bridge to celebrate with John Bridge on his receiving the Sorby Medal. This is the highest award given by the International Association of Sedimentologists and was awarded to John at the 18th International Sedimentological Congress in Mendoza, Argentina, for "distinction in sedimentology." Prof. Rudy Slingerland from Penn State was present that evening to provide background on John's distinguished career and some personal anecdotes, and to present him with a special memento.

## Chair in Energy Resources and Sedimentary Basin Analysis

In recognition of the long tradition of sedimentology at Binghamton University, going back to Prof. Glenn G. Bartle, and to underscore the importance of John's contributions to this discipline, Bob Demicco announced the establishment of the John S. Bridge Energy Resources Chair in Geology at this gala event. This chair has received a very generous donation from alumnus Matt Telfer, CEO of Border to Border Exploration, LLC, to initiate funding for the position. While Bob is seeking support from other corporate



John Bridge and Suzanne Leclair (Photo provided by Suzanne Leclair)

donors, I would like to urge all of us to consider making a contribution towards funding this first chair in the department to help ensure Binghamton remains at the forefront of academic research in

sedimentology. Donations can be made by check payable to the Binghamton University Foundation and designated to the John S. Bridge Energy Resources Chair – Geology, Account #103919501. ●



# Geomicrobiology: Research at the Interface

I am very pleased to take this opportunity to introduce myself as the Department of Geological Sciences and Environmental Studies' new faculty hire in the field of geomicrobiology.

Geomicrobiology is a relatively young, rapidly expanding and highly multidisciplinary field that incorporates aspects of biology, geology and environmental chemistry. It explores the very significant role that microorganisms play in many disparate but interrelated geological and environmental processes. Geomicrobiologists study a broad range of topics that include the biogeochemical cycling of elements, the chemical co-evolution of life with the atmosphere and hydrosphere, rock weathering, the fate and transport of toxins in the environment, and bioremediation strategies to manage anthropogenic and natural contamination of water, soil and biomes. Prior to joining the faculty in this department, I worked for nine years

as a research microbiologist with the U.S. Geological Survey. A topic of particular emphasis in my previous and ongoing research has been organisms that live in "extreme" environments of salinity, pH, temperature or toxicity.



By Thomas R. Kulp

These extremophilic microbes may be a modern terrestrial analog to some of the earliest organisms that evolved on Earth, and they provide insight into the types of life that we might expect to exist on other planetary bodies. I have also been particularly interested in microorganisms that use arsenic (As) in their metabolic processes.

This includes bacteria that use arsenate [As(V)] oxyanions as terminal electron acceptors for anaerobic respiration (i.e., microbes that "breathe" arsenate) as well as photosynthetic bacteria that use reduced arsenite [As(III)] as an electron donor to drive anoxygenic photosynthesis (Oremland et al., 2005; Kulp et al., 2008). I am currently turning my attention to a new redox-sensitive toxic element, antimony (Sb).

Antimony is a toxic element of emerging concern in many parts of the world, and is listed as a pollutant of priority interest by the USEPA and the EU. Antimony persists in the environment as antimonite and antimonite oxyanions [Sb(V) and Sb(III)], but, unlike microbe-As interactions, the geomicrobiology of Sb is still largely undefined. I have documented bacterially mediated reduction of Sb(V) to Sb(III) in anoxic sediments from two different freshwater settings: (i) a Sb- and As-contaminated mine tailings site located near Yellow Pine, Idaho (Figure 1) and (ii) a low Sb and As lake in the San Francisco Bay Area. My results from anaerobic sediment microcosm experiments (Figure 2) demonstrate for the first time that microbiological communities capable of the dissimilatory reduction of high concentrations of Sb(V) are ubiquitous in the environment, and may exert a profound effect on the mobility and toxicity of Sb in contaminated settings. These preliminary results set the stage for more in-depth investigations into the processes and cellular mechanisms by which dissimilatory Sb(V) reduction proceeds in nature.

I also continue to study biogeochemical arsenic cycling in As-impacted aquatic environments. I have ongoing research with Prof. Jiin-Shuh Jean at National Cheng Kung University to study geomicrobiological processes that affect As mobility and toxicity in drinking water aquifers and aquicultural fish ponds located in Tainan County, southern Taiwan (Figure 3). This region has historically been the endemic area for Blackfoot Disease, a peripheral vascular disease that caused widespread cancer, gangrene and limb amputations among the local population during the 1940s through the 1960s. Occurrence of Blackfoot Disease has been linked to naturally high concentrations of arsenic and As-humic matter complexes in drinking water obtained from aquifers in this region (Lu et al., 2004). I am also beginning

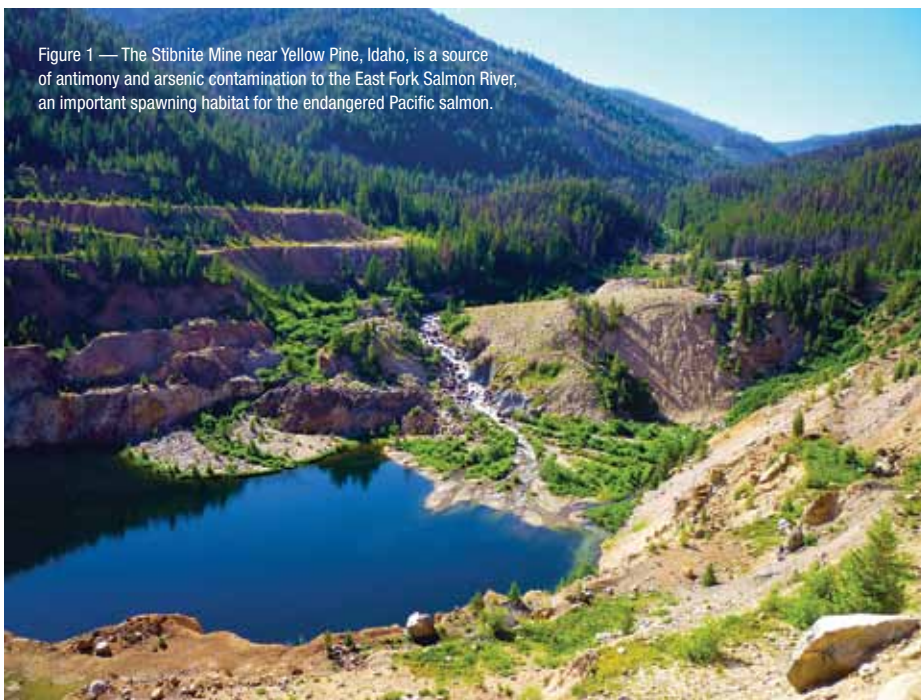


Figure 1 — The Stibnite Mine near Yellow Pine, Idaho, is a source of antimony and arsenic contamination to the East Fork Salmon River, an important spawning habitat for the endangered Pacific salmon.





Tom Kulp (left) and Prof. Jiin-Shuh Jean collecting sediment core samples from an As-rich aquacultural pond used to raise commercial tilapia in the blackfoot disease endemic region of southwestern Taiwan.

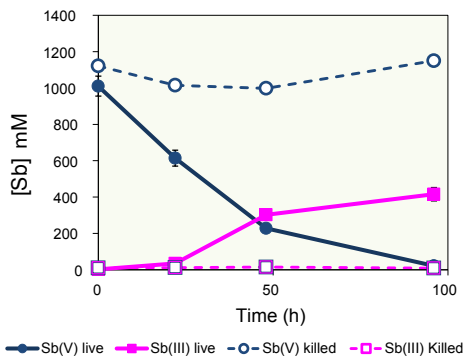


Figure 2 — Microbiological reduction of Sb(V) to Sb(III) in anoxic microcosms of stream sediment from an As- and Sb-contaminated mine site in Idaho. Live sediments (solid symbols) reduced a 1 mM Sb(V) amendment to Sb(III) within 100 hours of incubation, while no activity was observed in heat-sterilized control sediments (open symbols). Partial recovery of reduced Sb(V) as aqueous Sb(III) was due to the precipitation of insoluble Sb(III)-sulfide compounds that formed during the experiment.

a new collaborative study with researchers from the USGS and Duquesne University in Pittsburgh to identify microbiological processes affecting As mobilization from a coal fly-ash disposal site in western Pennsylvania. That study is funded by the Electric Power Research Institute (EPRI).

In addition to my geomicrobiological studies related to toxic trace metalloids, I am also interested in food web systematics and ecosystem behavior of these elements. I am currently collaborating with USGS biologists on a study to investigate the tendency for As, Sb and Se to bioaccumulate or diminish across food web trophic levels in freshwater ecosystems around the contaminated Idaho mine site mentioned above. I have largely passed the reigns for this investigation to Meghan Dovick, a MS graduate student in

the department who is conducting this work as her dissertation project. Meghan has made some rather startling discoveries concerning the high degree to which Western Toad and Columbia Spotted Frog tadpoles appear to bio-concentrate As in their bodies at this site (up to 2.5 parts per thousand, dry weight!) and we are planning further experiments this spring to investigate the implications of this As accumulation to the tadpoles' survivorship and to the broader regional food web. ●

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# Joe Graney's Research and Teaching Efforts Are



Joseph Graney

Well, that lead-in probably caught your attention! Joe Graney's students describe his present research and teaching interests as being BLAH . . . as in Biosphere-Lithosphere-Atmosphere-Hydrosphere interactions. Perhaps the following paragraphs will help describe why several of his ongoing efforts are indeed BLAH.

Joe and two of his colleagues from Biological Sciences at Binghamton University (John Titus and Weixing Zhu) have now received three stages of funding from the Wallace Foundation to study the impacts of near-roadway emissions on adjacent ecosystems. The near roadway emissions are related to aerosols (gases and particles) directly emitted by motor vehicles as well as related processes such as road salting and surface abrasion. Joe is interested in the spatial gradients produced as trace metals are emitted, transported and deposited during these processes. Weixing is focused on nitrogen biogeochemical cycling, particularly in soil microbial communities, and John Titus is interested in how the plant communities are responding to the salt-pH-hydrology gradients. The PhD project of Jon Schmitkons (one of Joe's students) is coupling these research approaches into a cohesive package. The project also involves mitigation efforts involving study of constructed wetlands (on and off campus) to assess how metals in dissolved and particulate forms move through, or are sequestered by, wetland ecosystems.

Joe is also working on a project in the Alberta Oil Sands Region using lichens as a passive biomonitor to assess impacts from oil sands mining and processing on

adjacent ecosystems. Joe readily admits that he is not a "lichenologist," but has enjoyed learning about the complex symbiotic interplay between the algae and fungi comprising lichen species. This project involves collaboration with colleagues from the U.S. EPA, the University of Minnesota and the University of Michigan, and is being supported by the Wood Buffalo Environmental Association. The WBEA is a good example of how funds from energy resource companies can be channeled to nonprofit organizations to fund research projects to third parties in the form of independent assessments. Joe believes such a funding model could be adapted in many areas to help address citizen concerns through applied geoscience research.

Joe is also involved in a collaborative project with researchers from Bucknell and the University of Pittsburgh that has received funding from the Colcom Foundation to explore watershed scale hydrology projects related to extraction of natural gas from the Marcellus Formation in western and northern Pennsylvania watersheds. Joe is interested in coupling geochemical tools to investigate surface and groundwater interactions. Joe notes that these methods to investigate watershed hydrology could be applied anywhere; the natural gas extraction just happens to be in Binghamton's backyard. Jason Johnson (one of Joe's PhD students) is leading the research efforts and is working with personnel from the Susquehanna River Basin Commission (SRBC) in the use of real-time water-quality measurement sondes to monitor watershed processes. Joe and Jason are very pleased that several Geology Department alumni (Tim

# BLAH...

Eriksen, Dawn Washo and Steve Catalfamo) are providing groundwater testing and site investigation expertise to assist in the project.

In other watershed-related efforts, one of Joe's new graduate students, Mikki Smith, is assisting the Upper Susquehanna Coalition (USC) in evaluating the Chesapeake Bay Watershed model as a means to forecast nitrogen, phosphorus and sediment loads to the bay through changes in land-use practices. These interactions with the USC have supported many geology and biology graduate students at Binghamton, and one of Joe's former graduate students, Erin (Wood) Herd, is a watershed specialist with the USC. Further evidence that Joe's efforts are indeed BLAH-oriented: (i) he is the associate director of the Center for Integrated Watershed Studies at Binghamton, which includes faculty and students from the biology, geography and geology programs; (ii) he is also the lead instructor for Environmental Studies 201, the second-semester course in a sequence for students who are interested in majoring in the multidisciplinary Environmental Studies Program. Quite often, students who choose the Natural Resources focal area have a dual major in geological sciences.

Joe also wanted to acknowledge a significant donation of water-quality analysis equipment from AES Incorporated that has helped to upgrade the analytical capabilities for cation and anion analysis in the geochemistry labs at the University. In the near future, Joe hopes to be able to upgrade the field equipment needed to train students

for hydrogeology and environmental careers. Addressing this and other student training needs will be one Joe's goals as the next department chair. Joe anticipates that his wife Dawn will use her more refined skill set to keep him organized and on task over the next several years! ●

▼ Joe Graney with a giant Michelin® tire made in South Carolina (price tag: \$60,000 each tire)





# Flooding in September 2011



Hurricane Irene last August 27-28 caused widespread damage in eastern New York, but was largely a “non-event” here in Binghamton. What it did, however, was give us a head start in saturating the ground before the arrival of tropical storm Lee two weeks later. On September 7-9, Lee came in and stalled over the Southern Tier, pretty much over Binghamton. This area received record rainfall (10 inches in two days) and the Susquehanna River reached historical heights (17 feet over the flood stage at the Vestal gauging station). This was greater than the 2006 flood. Classes were cancelled for Thursday and Friday, September 8 and 9, while Broome County was under a state of emergency. The Events Center and West Gym were made available as rescue centers for people who had to be evacuated from their homes. The sites were operated by the Red Cross and by numerous volunteers from campus. Binghamton University was spared, but flood damage to the surrounding area was extensive. Classes resumed on Monday, September 12, but the work of cleaning up homes and businesses



Top left: Route 17 near the Westover area (Johnson City), looking west. Top right: Rescue effort at the corner of Vestal Parkway and S. Washington Street, near the Number 5 restaurant. Bottom: The Twin Orchards neighborhood, looking northeast, with Route 17 visible in the upper left. Photos by Tom Toton, provided by NYSEG.

in the surrounding areas had just begun. The Events Center continued as a shelter for evacuees for approximately two weeks, providing meals and beds for a total of

1,800 people. The aerial photos shown here were kindly provided by NYSEG and give you some idea of the extent of flooding in this area. ●



## Dick Andrus

My main interests continue to be in teaching, with an increased focus on sustainability issues. I'm focusing especially on what conditions are necessary for sustainability to develop and what barriers our current industrialized system creates to make these so difficult to achieve. Of considerable importance also is what can be done to deal with these barriers and what strategies might be effective in making what seems to be an inevitable transition to a less energy-intensive and more decentralized world.

Costa Rica continues to play a large role in my life, as the Tropical Forestry Initiative has become a second home. Once again, I'll be taking students there in July for a month-long immersion in tropical and restoration ecology.

I've been very involved also in developing several rather rundown houses in Binghamton into low-cost energy-efficient student housing. So far, we've done geothermal heat in one house and very intense insulation in both. The surrounding grounds are becoming a small urban farm, with vegetables, mushrooms, fruit trees, chickens and an attached solar greenhouse. It's a chance for me to put my money where my mouth is.

This also ties into my involvement in the community garden and urban farm efforts in Binghamton.

Research-wise, I've committed myself to several stints over the next two years working with several colleagues on the peatlands in southeast Alaska.

## Jeff Barker

It's been a very busy year, though little of that has to do with geophysics. I'm chairing a University committee charged with improving our students' perception of advising and mentoring. Part of that is educating students that they have a network of people with various roles, from their college's academic advising office to the undergraduate director of their major to their research advisor to their faculty master to the Career Development Center and other student-service offices to just about anyone who offers good advice on student academic success. One new piece of this network we're trying to implement is to recruit faculty to serve as mentors for first-year students. Another important aspect of this project is providing accurate, up-to-date information needed by everyone in a student's network to do a good job of advising

and mentoring. This boils down to a database issue, coupled to an appealing graphical user interface, accessible via Web portal or mobile phone app. Our timetable is to implement the advising/mentoring network for new students and transfers entering next fall. The software will certainly lag this, but we need to know what will be in place so everyone knows what to expect.

Simultaneously, the faculty masters are revisiting and rewriting the 1967 document that defined our residential collegiate structure. This "re-visioning" has been a long process involving focus groups of students, faculty and Residential Life staff, some big thinking about the purpose and implementation of our living and learning model on campus, and a significant amount of wordsmithing. We're just about done with the process and, while no radical changes are planned, we hope that this updated statement of purpose will help raise awareness on campus and involve more faculty in more meaningful ways in our students' lives outside the classroom.

After years of dealing with Parkinson's disease, my dad died earlier this year. His decline and eventual passing required a number of phone calls and a couple of trips to Tucson. Luckily, my two kids both live in Tucson and were a tremendous help. On the brighter side, I continue to play French horn in a variety of groups around the area. Carol and I have a woodwind quintet, the Mosaic Winds, which is doing quite well, with return gigs at places like the Walton theater, the Phelps mansion, libraries and nursing homes. Finally, saving the best for last, Carol and I will be getting married next September.

## Steve Dickman

The past 12 months stand out for two reasons. First is a conference I attended in April, the European Geoscience Union assembly in Vienna. It was excellent in so many ways, providing an opportunity to reconnect with colleagues in a professional but not impersonal setting — a strong contrast to the AGU meetings, whose fall venues in San Francisco have too much going on and whose alternate (spring) assemblies tend to be significantly under-attended. I could not believe how well attended the EGU sessions on Earth's rotation were — standing room only, even for my talk, with typically two to three times the attendance of a geodesy session at the San Francisco AGU meetings. Adding to the quality of the science was a beautiful early springtime in Vienna, and even better weather in Venice, which turned out to be only about six hours away by train and bus.

The second "milestone" of the year was my daughter's success in finally securing a permanent job in the Washington, DC, area! Who says the economy stinks?

With my "big" grant more or less behind me, it is now time to think of my textbook-in-progress. During my last sabbatical, I managed to complete a draft of about half of it, including a large number of stick-figure and line sketches thanks to my mastery of Word's 3-D Draw tool. My next sabbatical leave is scheduled for spring 2013, and I have already been gathering notes, images and ideas to add to the draft. Hopefully I will complete the second half by the end of that sabbatical, and then the world can see — and judge — my creation.



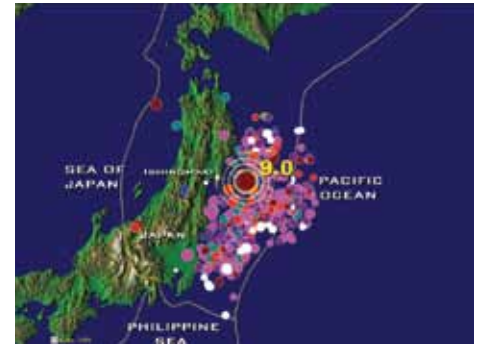
# Alan Jones (Adjunct) – Making the News

In the 1990s I was under contract to CBS News to use my seismic/eruption program on the air as part of their coverage of earthquakes. They lost interest in the past decade, but the magnitude 5.8 Virginia quake last August woke them up to their lack of resources. They have rehired me, along with the person I worked with back then. Enhancements have been made to the program so that it automatically spots a large event on a world map within a few minutes of the time of the earthquake. The newscaster can then zoom in to the locale. Historic earthquakes in the area can also be shown to compare with the current event. ●



Alan Jones in the *CBS Evening News* control room.

Right: Examples of what might have appeared on your TV screen if the program had been in use at the time of the Japan earthquake on March 11, 2011, and for the Sumatra event of December 26, 2004.



Bartle field trip, fall 2011. (Photo: Jie Lei)





## Dave Jenkins

Last spring semester I was on a chair's research leave, which means that I was given a break from teaching. While my colleague Dick Naslund graciously picked up my main teaching duty that semester (Earth Materials), I resolved to complete a task that has been in the back of my mind for a long time.

What was it? To put into manuscript form the work of four undergraduates and me on triple-chain silicates over a period of 15 years. It was actually quite fun to look over the reports, X-ray diffraction patterns, microprobe analyses and even the samples themselves that had been kept in the lab for just such a moment. The undergraduates were, in order of graduation year, Cyndee (Behrer) Kawa '98, Maria Fokin '01, Geoff Gilleaudeau '07 and Jackie Dibiase '10. Though not every experimental result was used, the vast majority of the hard work of these students was indeed used and the final manuscript turned out to be not bad. It was submitted to *Contributions to Mineralogy and Petrology* in July 2011 and has now been accepted for publication in March 2012. Undergraduate research continues in the hydrothermal lab, as Zachary Holmes and Gregory Salwen are busy working on projects related to calcite-dolomite solid solutions and on Mg-rich smectites, respectively. On the graduate research front, Nick Holsing is making good progress calibrating trace elements (notably Mg and Si) in diamond as a possible geothermometer/geobarometer, while Jie Lei has starting working on the crystal chemistry of amphiboles along the glaucophane-hornblende join.

On the home front, Andrew is now in 11th grade and driving, Kenneth moved to Mountain View, Calif., to work for Google, and William is back home with us as he takes undergraduate courses in computer science (non-matriculated) at Binghamton University in preparation for applying to graduate school. Jean is working on a book and has an associated website for blogging. As for me, well, I still don't have a cell phone. So, tell you what, just send me an e-mail at dmjenks@binghamton.edu. I would love to hear from you.

## Peter Knuepfer

I'm continuing in my roles as director of the Environmental Studies Program, as well as representing Binghamton faculty on the SUNY-wide Faculty Senate. The ES program is growing even more, and we're fortunate to be finishing a search for a new faculty member in environmental policy who



should be joining us in the fall semester. With well over 200 majors and 30+ minors, we've become one of the largest majors in Harpur College, so this new faculty member will be an important addition. Also, we share a visiting faculty member, Rich Shaker, with the Geography Department, and Carmen Carrion-Flores, another environmental economist, has been hired in the Economics Department.

The flood of September 2011 certainly was a significant event in our area — a record flood on top of the record flood of 2006. My students (mostly undergrads at this point) and I are investigating the frequency of prehistoric flooding in the upper Susquehanna River Basin. We focus principally on sediments deposited during large floods onto floodplains and into floodplain ponds or abandoned meanders. With coring planned for later this spring, we hope to recover a history of the largest floods over the last hundreds to (ideally) few thousands of years. This work will provide a far better context for understanding how rare the recent floods have been (largest in hundreds of years? common every hundred years?).

## Thomas Kulp

As we approach the midterm in my second semester with the Department of Geological Sciences and Environmental Studies, I am occupied with developing and teaching a new upper-level geomicrobiology course

designed to introduce our students to fundamental principles and basic laboratory methods in this discipline. I am also working hard to outfit the newly renovated laboratory space on the second floor of Science 1 with all of the necessary instrumentation and equipment to conduct a successful geomicrobiology research program. Currently I am advising one graduate student, Meghan Dovick, on a master's degree study of bioaccumulation and transfer of As and Sb between food web trophic levels in freshwater ecosystems around a highly contaminated gold and antimony mine site in central Idaho. I am actively working to recruit more graduate students and undergraduate researchers to support my various projects.

Of course, my new position here in the department marks a large transition for myself, my wife Leigh and our 3-year-old daughter Paige as we have relocated to Binghamton from the San Francisco Bay Area where we had lived for the past nine years. We were pleased to discover that houses here in town are quite a bit more affordable (to say the least) compared to the San Francisco market, and we purchased a nice place on Binghamton's West Side. My wife was fortunate enough to find a job in her field as a city planner with the city of Binghamton, and, as if all of this change weren't enough, we welcomed the birth of our second child (a son named Gabe) this past December. Needless to say, the past year or so has been a very eventful one, but we are glad to finally be settling down in our new jobs, new house and new community.

# Happenings around the Department

**R**oom 263 takes on new life as prototype for Science 1 — As mentioned in this and last year's newsletter, the old lab in room 263, which had also been a graduate student lounge and offices, has now been completely gutted and redesigned into a joint geochemical, analytical and isolated clean room facility. This project, which began as a refinishing of lab benches, was added to the current flurry of new building and lab rehabilitation across campus. The lab became earmarked as the

prototype lab for Science 1. After numerous meetings between geology faculty and planners in physical facilities, a lab design was agreed upon and the lab cleanout and demolition began in January 2010. Along with this project, new windows for the south-facing side of the building were installed. After about a year-and-a-half of work, the lab was turned over to the department last fall. Research and teaching projects of professors Graney, Kulp, Lowenstein and Naslund are all now being done in this lab. ●



Room 263 cleaned out.



Portion of room 263 after remodeling.

Photos: Dave Tuttle

## Graduate-degree completions

We congratulate the following graduate students who have completed their degrees in 2011:

### Lynette I. Vayo, MS

“Characterization of the Hydrogeology of the Bedrock Aquifer in Rural Vestal, N.Y.”

### Hao Kuo-Chen, PhD

“Imaging Deep Structure under the Taiwan Orogen: Toward Tectonic Model Testing”



## Tim Lowenstein

Our group (Yaicha Winters, PhD; Elliot Jagniecki, PhD; Mike Timofeeff, research associate; new student John Murphy, MS; new student Sarah Feiner, PhD; and Nora Holt, undergrad) has had a pretty productive year. We continue to look at ancient microbes in halite and gypsum using microscopy, laser Raman spectroscopy, and ancient DNA. Yaicha Winters has found carotenoids, beautifully preserved, in halite well over 1 million years old. We have also found ancient DNA of halophilic archaea that matches the DNA from organisms cultured from Death Valley halite by Brian Schubert a few years ago. I am starting to really believe microbes can live in some sort of starvation survival state for thousands if not millions of years. Sarah Feiner is going to look at microbial communities in gypsum, beginning with fieldwork this June, to study the famous gypsum from the Messinian of Sicily. Elliot Jagneicki, with help from Dave Jenkins, has made great strides refining our understanding of the temperature and  $PCO_2$  at which some of the sodium carbonate minerals (trona, nahcolite, shortite) form. These results are giving us a better understanding of the  $CO_2$  in the atmosphere during the Eocene and the burial history of the Green River Formation of Wyoming and Colorado, including oil shales. John Murphy will be looking at the origin of the layering in carbonate rich laminites from the Green River.

The new geochemistry lab (which used to be the eyesore on the second floor of Science 1), with its separate geomicrobiology and instrumentation facilities, and the hiring of David Collins as our new instrument technician have really given our program a shot in the arm. We just applied to NSF for a new laser ablation ICP-MS instrument — so wish us luck.

Bob Demicco and I led a Bartle field trip to Big Bend National Park in Texas during spring break 2011, with a stop to see alumni Matt Telfer, Mary Vannicola and Ian Williamee in Austin. Big Bend is a little-known, pristine treasure on the border of Mexico, with igneous and sedimentary rocks to please everyone. This year we return to the Florida Keys over spring break — sweet. I made my second trip to Kenya last summer to the Magadi area of the East African Rift. We just received NSF and ICDP funding to drill a climate core at Lake Magadi, as part of a larger group to examine the relationship between climate change and hominid evolution. Many of the drill sites, including Magadi, are near some of the famous hominid localities.

Finally, on the home front, Sally and I are watching the transformation of our house as the renovations near completion, and the transformation of our children Maggie (third year, Penn Med), Scott (Global Strategy Group, Manhattan) and Kirby (junior art major at Brown) as they wander through their twenties.

## Bill MacDonald

I have been examining magnetofabrics of mafic dikes and sills of the Minto Inlet area of Victoria Island in the Canadian arctic islands, a project that Dick Naslund suggested I get involved in. That project involves three other graduate students of Naslund's, as well as the organizers at the Geological Survey of Canada for which I served as a volunteer. I have been to Ottawa several times for progress reports on that undertaking and attended the Geological Association of Canada annual meeting there last year. This year the GAC meeting is in Newfoundland, and I'll be giving a paper on the dike fabrics and emplacement mechanisms with my colleagues of the Geological Survey of Canada and SUNY. I am still revising a paper on my Nevada ignimbrite studies with colleague Currie Palmer of the University of Western Ontario. Last August I spent a week examining the Charlevoix impact structure along the St. Lawrence River northeast of Quebec city. That area proved to be a nice surprise, a mix of farming communities and artist colonies.

Whaleback anticline to the right and syncline in the background at Shamokin, Pa. (Photo: Matt Keaveney)



## Dick Naslund

After a busy fall, I am teaching Introductory Geology ("Planet Earth") again this spring, which I always enjoy because it forces me to keep up with current developments in geology. This year I am looking more into the geologic implications of alternative energy, geologic aspects of energy efficiency and the proposed gas development in the Marcellus Shale below the Southern Tier of New York and the Northern Tier of Pennsylvania.

After a number of years chasing ore deposits in Chile, I am back focusing on differentiated intrusive sills. I am working with colleagues at the Canadian Geological Survey on Victoria Island in the Canadian Arctic, and my students and I will be doing some detailed work on a series of extensively differentiated late Proterozoic sills associated with the Franklin Igneous event that affected much of Northern Canada. I am looking forward to using our new analytical laboratory, the new equipment we recently obtained, and the new equipment we are trying to get. We have a new sulphur analyser for measuring low levels of S in rock powders and a new "thermogravitational analyser" that measures the weight loss of a sample as you heat it, so that you not only find out the percentage of volatiles in your sample, but you can figure out the temperatures at which the minerals they were in broke down. We are hoping to get a new LA-ICP-MS to do spot analysis of trace elements in minerals in thin section. I haven't given up on "magmatic iron ores" and will continue to try to convert "nonbelievers" to our model for the origin of magnetite lava flows.

The kids are all doing well. Sterling is working at a local workshop, Skye is in graduate school at the University of Washington, Neelam is working at a cafe downtown, Kalindi is a freshman at Hartwick College in Oneonta, and Cambria is attending New York University's new international honors college in Abu Dhabi. My wife and I are looking forward to a visit to Abu Dhabi over spring break, and hope to do some scuba diving in Oman (as well as take a peek at the Oman ophiolite). We got back into scuba after a 20-year hiatus (five little kids will do that) when we visited Easter Island in 2010. I hope we will get a chance to see all of you in the near future at reunions or scientific meetings. If you have any igneous problems, questions, comments or new ideas, or if you just want to say hello, call or drop me a line at naslund@binghamton.edu.

The department gratefully acknowledges these individuals who have contributed to departmental accounts over the past year.

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### A note about giving to the department:

This donor list was compiled from information provided by the Binghamton University Foundation based on its records for January 2011 through December 2011. We sincerely apologize for any errors, omissions or inaccuracies!

Some alumni have asked why their contributions do not always appear on this yearly list of donors. The donors recognized in this newsletter are those who have specifically indicated that their contributions be given to the Geology Department. To ensure this, you will need to specify that your contribution go to the Geology Department or, even better, that it be directed to the Geology Fund account 10796. Your contributions to the Geology Fund help us with some of the basic operations around the department, such as funding the welcoming luncheon for incoming graduate students, supporting our visiting seminar speakers and helping us host alumni reunions on campus and at national meetings. We are extremely grateful for this support. Contributions should be sent to the Binghamton University Foundation, PO Box 6005, Binghamton, NY, 13902-6005, and please note that it is for the Geology Fund account 10796.

**Please join our website alumni list** Our alumni webpage, which recently changed to: [www.binghamton.edu/geology/people/alumni.html](http://www.binghamton.edu/geology/people/alumni.html), continues to be a popular place for alumni to post e-mail addresses, short updates of family and jobs or items of interest. We have found this to be a valuable resource for alumni wishing to contact others, and also for current students seeking information on career opportunities. You are welcome to submit new entries to our alumni list, or update information already on our website, by sending your entry to Bob Demicco at [demicco@binghamton.edu](mailto:demicco@binghamton.edu). We also encourage you to visit our newly designed website at [www.binghamton.edu/geology](http://www.binghamton.edu/geology), where a pdf file of this newsletter will be posted.





## Karen Salvage

Once again, I taught my Hydrogeology and Environmental Hydrology courses last fall and am teaching Water and Watersheds this spring. Given the large flood in the Binghamton area last fall, it was an interesting time to be talking with students about hydrology. The field lab for Environmental Hydrology on measuring stream flow was actually scheduled for the first day of the storm. The University cancelled classes and the water was much too high to safely measure the flow, but I offered to take the class out to the local stream to observe hydrology in action. Only two brave souls took me up on the offer. Imagine that! The amount of overland flow and the stream flow were amazing, as was the stream bank erosion that resulted. Hydrology aside, the impact of the flooding on the local community was devastating for many, and we had several geology majors whose homes or apartments were flooded.

I have been the undergraduate program director for a few years now. At last count, we have 45 geology majors, 18 pursuing a BA degree and 27 a BS. The split between men and women is almost 50-50 (23 men, 22 women), which is better than the national average of ~42%-58% female-male undergraduates in the physical sciences.<sup>1</sup> The undergraduates started a new Geology Club last fall, and they have organized field trips and most recently held a “Bad Geology Movie Night,” taking in Hollywood’s fine understanding of Earth science.

I would like to start a network of alumni who are willing to discuss career opportunities with our geology majors. I often get questions like, “What do geologists actually do every day when they work in the private sector?” and “Do I need to get a master’s degree to get a good job as a geologist?” My hope is that some of you would be willing to talk (by phone or e-mail) with a student about your current job, your first job, your thoughts on what the market is like for new geologists, etc. It would be great for the students to get insights from geologists outside of academia. If you are willing to participate, please contact me at [ksalvage@binghamton.edu](mailto:ksalvage@binghamton.edu).

My work on the NSF’s Critical Zone Observatory project with colleagues at Penn State continues. I am working on watershed-scale hydrologic modeling, which integrates surface water and groundwater flow, as well as soil moisture and evapotranspiration dynamics. Binghamton’s Center for Integrated Watershed Studies (CIWS) continues to be active. The center brings together faculty from a variety of disciplines who are involved in watershed-related work. Currently we have four graduate students pursuing a Certificate in Watershed Studies and Management offered by CIWS.

Some hydrogeology alumni news: One of my former graduate students, Jean Jolicoeur, is working for USAID as a water resource specialist in Afghanistan. Jean is working to develop a water management program in Helmand Province and build the capacity of the Afghan officials to maintain the program. I am impressed by his courage in taking on such a big task. Geo alum Sin Senh visited last fall for the Alumni Council meeting; he continues to thrive as a hydrogeologist and project manager for Roux

Associates. I recently heard from Yong Wang, another former graduate student, who is a hydrogeologist and project manager for Golder Associates in Alberta, Canada. He has his professional geologist license and seems to enjoy and be challenged by his work. My regards to all of the other hydrogeology/environmental geology alumni. Please keep in touch ([ksalvage@binghamton.edu](mailto:ksalvage@binghamton.edu)). It is always great to hear news of “life after Binghamton.”

<sup>1</sup> From the National Science Foundation’s report, “Women, Minorities, and Persons with Disabilities in Science and Engineering” (NSF 11-309), published in January 2012.

## Francis Wu

I continue to analyze the project data gained in the five-year NSF project. The subsurface structures we imaged under Taiwan have enough details such that we begin to explore the geological implications. It is really quite exciting. We will have a TAIGER summary meeting later this year in Taiwan, where we will gather all the project scientists and invited guests to ponder what it all means.

## IN MEMORIAM

### Thomas A. McElroy '77

**We are saddened to hear of the passing of Thomas A. McElroy, 62, of Port Royal, Juniata County, Pa. He received his bachelor of science from Harpur College in 1977 and went on to earn his master’s in geology at Amherst University, Amherst, Massachusetts.**

**Thomas worked 30 years for the Pennsylvania Geological Survey until he retired in 2010, and was a member of the Harrisburg Area Geological Society.**

**He is survived by his wife, Deirdre McElroy.**

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**New walkway outside Science 1 (Photo: D. Tuttle)**