IN THIS ISSUE

Letter from the Chair - Page 2
Research Highlights:
  Molly Patterson - The Past is the Key to the Future - Page 3
  Dick Naslund - Modeling Differentiation Processes in Igneous Sills - Page 5
Steve Dickman Retirement - Page 7
Tim Lowenstein - Distinguished Professorship & Laurence L. Sloss Award - Page 8

Faculty News - Page 8
Happenings Around the Department
  Graduate Student Research Grants - Page 13
  Graduate Degree Completions - Page 14
Donors to Geological Sciences - Page 14
Freshman Research Immersion (FRI) program - Page 15

Record snow storm of 3/14/17
(Photo credit: Dave Tuttle)
Let’s skip the pleasantries and get right to the latest Departmental News. Congratulations are in order for Tom Kulp. We just got word that the provost is supporting Tom’s promotion to Associate Professor with tenure. Also, you will read about Molly Patterson’s paleoclimate research in this issue of the newsletter. The whole department is happy she joined us this year. She certainly brings new perspectives and new research areas (Antarctica anyone!). Yesterday I found out that, for the second year in a row, our department has won Harpur College’s teaching award in the category “best department”. This pleases me to no end because I have always thought that teaching has been a Departmental strong point. It’s nice to be correct about something. I think it is worth mentioning that about half of our faculty members participate in the Freshman Research Immersion initiative being supported by the University and a grant from the NSF. We have two post-doctoral educators associated with this program: Jon Schmitkons and Timothy de Smet. I mentioned this research initiative here last year and you will find more information about this program in this newsletter.

Jeff Barker is planning to retire at the end of this academic year. Jeff is part of the reason our Department stands out in undergraduate teaching surveys. Over the years he has done yeoman service in the more or less thankless task as the chair of the Department’s Undergraduate Committee. Tom Petruzzelli and Rick Jacyna, two stalwart members of our technical staff, retired this year. We have almost completed a search for a partial replacement. I have high hopes that we will also be given the go-ahead to hire some new faculty in the coming year. We have had a one third turnover in our faculty makeup over the past 6 years. It is really great to see the Department add new young talent.

I am especially pleased to tell everyone that the SUNY Board of Trustees appointed my friend and colleague Tim Lowenstein to the rank of Distinguished Professor: the highest honor conferred on SUNY faculty. This title is given only to a small number of faculty members across the SUNY system per year. If that weren’t enough, during the annual meeting of the Geological Society of America in September, Tim was awarded the Laurence L. Sloss Award by the Society’s Sedimentary Geology Division. This award is given annually to a sedimentary geologist whose career achievements contribute widely to the field of sedimentary geology and who has contributed significant service to GSA. I got to read the citation and a number of Tim’s former students were there as well. It was sweet. Finally, I would like to thank our alums for your continued support. It is your contributions that enable us to add extras to our teaching and research efforts.
I fell in love with upstate New York fourteen years ago, and could not be happier to now call it my permanent home. As an undergraduate at Colgate University, my interest in geology started by taking an oceanography class in the fall of my freshman year. About mid-way through the semester, the professor gave a lecture explaining how the principles and concepts we were learning in class related to her research efforts concerning paleoclimatic reconstructions of the Antarctic Ice Sheet. I distinctly remember sitting through that lecture, and not only deciding I would major in geology, but that was the day I became passionate about understanding the role the Antarctic Ice Sheet has had on Earth system processes.

As global mean temperatures have been rising at an unprecedented rate, greater than at any other time in the last 65 million years, observational measurements (thanks in part to organizations like NOAA and NASA) indicate the Southern Ocean has been warming and the southern hemisphere westerly winds have become invigorated and migrated southward. Major sectors of the Antarctic Ice Sheet sit on bedrock hundreds to thousands of meters below sea level, and the recent thinning of ice shelves and marine terminating glaciers has been linked to those processes occurring in the Southern Ocean. Paleoclimate research enables us to understand Earth system feedbacks on time scales longer than a few centuries and beyond the instrumental records. The integration of paleoclimate data with numerical climate and ice sheets models is ultimately used to better predict the future response of the Antarctic Ice Sheet and its down-stream influence on climate as a consequence of global warming.

As a graduate student at Southern Illinois University (SIU) in Carbondale (Go Salukis!) my M.S. thesis focused on reconstructing environmental changes along the Antarctic Ice Sheet margin during the Neogene. Specifically, I identified micro-fossil foraminiferal assemblages from a continental shelf drill core record recovered from the Southern McMurdo Sound region of Antarctica in order to provide insight on ice-proximity estimates, as specific taxa live in distinct environmental conditions. I identified major fluctuations in both productivity and episodes of significant freshwater input during the Early to mid-Miocene (23-14 Ma). These findings were included in a synthesis demonstrating that during this time period the coastal climate along this margin of the East Antarctic Ice Sheet (EAIS) was highly variable. Summer land surface air temperature was at least 10°C warmer, tundra vegetation extended to locations 80 km inland, and the surface water temperatures in the Ross Sea were between 6-10°C during times in which the ice sheet retreated inland.
My graduate school experience at SIU introduced me to the close and long-lasting international collaboration between U.S. and New Zealand scientists for the past 50+ years. With a growing interest in sedimentology and understanding ice sheet dynamics there really was no other place I would have rather done a Ph.D. than at the Antarctic Research Centre at Victoria University of Wellington, New Zealand. My Ph.D. research focused on reconstructing Antarctic Ice Sheet variations since the Early Pliocene (~4.3 Ma) and assessing its downstream influence on both global sea-level and deep ocean circulation. Understanding Earth system feedbacks during the Early to mid-Pliocene (~4.3 to 3.0 Ma) has been a major focus of paleoclimate research as this time period offers the most accessible recent period in Earth’s history in which atmospheric CO2 concentrations were similar to present day levels (~400 ppm), and globally average surface temperatures were 2-3°C warmer, in line with estimates for the end of the century. Thus, this time period offers a potential analogue for Earth’s future climate conditions near the end of the century and beyond. During my Ph.D. I examined marine sediment records recovered off the ice sheet margin by the International Ocean Drilling Program (IODP) in order to interpret the sedimentological processes operating at the oceanic margin of the largest marine-based sector of the EAIS during the Pliocene. Significant findings from this work demonstrated the natural response of the ice sheet to orbital scale changes in insolation received by the sun is closely coupled with surface ocean and sea-ice feedbacks. Pliocene eustatic sea level estimates from geochemical proxies and paleoshorelines imply sea level was ~22 meters higher than present day. Wanganui Basin on the North Island of New Zealand contains one of the best-dated Pliocene shallow-marine sedimentary strata exposures in the world recording unconformity-bound sequences (cyclothems) of glacio-eustatic changes in sea level. As part of a pilot study, I mapped and sampled a central portion of the Waganui Basin along the Turakina River Valley defining the offshore representation of continuous sequences of Pliocene sea level change. A major finding from this research included the identification of sea level changes paced at the same periodicity of ice sheet variability from the IODP ice marginal records. This project has since served as the basis for carrying out larger land-based drilling in the region. The development of sea ice in the Southern Ocean is fundamental towards the production of cold deep waters that form along the margin and circulate through the global ocean delivering salt, gases, nutrients and heat to the various ocean basins. By examining Ocean Drilling Program (ODP) sediment cores recovered off the east coast of New Zealand (the predecessor to IODP), I developed geochemical records that imply a reorganization of the deep ocean occurred in phases with major evolutionary changes in the extent and duration of sea ice around the Antarctic margin. Recognizing the far-field teleconnections between Antarctica and the deep ocean has been guiding my research interests in the Northwest Pacific, the terminus of deep ocean overturning.

As a post-doc at UMass Amherst I worked with a research group reconstructing an Arctic Pliocene climate history from Lake records. This experience introduced me to a number of biogeochemical proxies used to reconstruct sea surface temperature and dust flux in response to changes in atmospheric circulation patterns. I am very excited to incorporate these methods in my research at Binghamton University.

In January I will be participating as a sedimentologist on an International Ocean Discovery Program (IODP) research cruise to the Ross Sea region of Antarctica. This will be the second time I have traveled to the Southern Ocean, and I could not be more excited! The central theme driving this scientific effort lies in improving our understanding of the sensitivity of the Antarctic Ice Sheet mass balance during warmer-than-present climates (i.e., the Pliocene). I look forward to building a well-rounded paleoclimate lab group at Binghamton University that is capable of carrying out sedimentological, micropaleontological and biogeochemical analysis. I am excited to be a part of this community and meet our alumni.
For many years my students and I have been studying the processes responsible for chemical differentiation in igneous sills. We started with the Basistoppen sill in the Skaergaard area of East Greenland over 30 years ago, and have continued with the study of sills in other parts of the world, including Antarctica, New Jersey, and Arctic Canada. Sills, which are emplaced as extensive horizontal magma sheets, provide an interesting natural laboratory for the study of magmatic processes. Owing to their overall morphology, they cool primarily at their upper and lower contacts, so side-wall cooling can be ignored. As a result, their heat-loss can be treated as a one-dimensional vertical problem, and their differentiation can be modeled by examining compositional changes along vertical profiles sampled from the floor contact to the roof contact. Sills cool relatively rapidly relative to larger 3-dimensional plutons, so they tend to preserve element zoning profiles in their fractionated minerals. In larger plutons these profiles are generally homogenized during slow cooling. Original grain sizes are also much better preserved in sills, than in larger, more-slowly cooled plutons where recrystallization, in many cases, results in a coarsening of grain-sizes. Sills, in general, contain only weak modal layering, so that hand-size samples represent average rock compositions. In larger plutons, modal layering often results in extreme compositional variations over short vertical distances, so that average rock compositions are hard to estimate. We have had a long-term project to study the crystallization and differentiation history of the 300m thick Palisades sill in South-Eastern NY and North-Eastern NJ. We have recently completed analyses of whole rock trace element abundances in this sill using the new ICP-MS to add to our previous data on the major and minor elements in whole rocks and minerals.
My student Brad Sporleder is now running computer models to determine the distribution of crystals and interstitial liquid preserved in the final solidification products. These models will hopefully help us to understand the processes that occurred during solidification of this strongly differentiated body. This study will be the basis for Brad’s PhD dissertation.

For the last few years our main efforts have been directed towards a series of differentiated sills exposed on Victoria Island in Arctic Canada at 72°N latitude. These sills are a really interesting group. A big debate among igneous petrologists at the present time involves the processes that cause differentiation (vertical compositional changes) in sills. One group has suggested that all compositional changes in sills are the result of the redistribution of phenocrysts brought in with the original magma, while another group (that includes my students and me) believes that sills can differentiate by both the redistribution of original phenocrysts, and by crystallization that occurs during the cooling of the sill, after it has been emplaced (called In-Situ crystallization). Even among those that suggest In-Situ crystallization is possible, most would suggest that this can only occur in thicker sills like the Palisades, and some have suggested a minimum thickness of 100m to see the effects of post emplacement In-Situ crystallization. We are studying a series of sills ranging from 20 to 50 m in thickness that are strongly differentiated from bottom to top. We see both the effects of the accumulation of original olivine phenocrysts on the floor of the sills, and the effects of post emplacement, In-Situ crystallization. Our detailed computer models require the redistribution of original olivine and minor augite phenocrysts, followed by the In-Situ crystallization of plagioclase and augite. Analytical work on this project is being funded by the National Science Foundation, while the field work was funded by the Canadian Geological Survey. Two students, Kathryn Steigerwaldt in 2013 and Jeffery Carpenter in 2016, have completed master’s theses in connection with this project, and a third student, James Haddad, is working on a PhD project involving detailed computer modeling in these sills.

A plot of Mg# vs. Height in a 46 m sill on Victoria Island, showing the extreme composition changes from Mg-rich to Mg poor. The increasing Mg# near the base is the result of the accumulation of initial olivine phenocrysts, the decrease in Mg# in the upper part of the sill is the result of the In-Situ crystallization of plagioclase and augite.

A Pearce Element Plot showing the trends that would result from the removal of plagioclase, augite, orthopyroxene, and olivine. The upper oval from the lowest-most part of the sill clearly shows an olivine dominated trend, while the lower oval from the upper part of the sill shows a trend dominated by plagioclase and augite.
Steve Dickman Retirement Dinner

After nearly 40 years of teaching and service to the university, Steve Dickman retired at the end of the Spring, 2016, semester. To mark the occasion a dinner was held in his honor at Remlik’s restaurant in Binghamton on June 11, 2016. In addition to great food, a special poem was written and delivered by Bill MacDonald which captures just a small sense of Steve’s research interests and long career in geophysics. The poem is reproduced here, with permission from the author. Best of luck in your new role as Professor Emeritus!

Steve wonder’d why the world goes ‘round, and why the oceans go up and down. So off he went, to Californ-I-A, where Prof Verhoogen showed him the way, how to calculate the to and fro, as moon and sun made the waters go.

Then back to the East he went again, with brand new PhD in hand. At SUNY Bing he made his mark, and worked quite late, way past dark.

The fantastic attraction of water and mass, held his attention to the very last. Now he looks forward to a new way of life, with Barb to remind him he still has a wife. But the best thing of all, he knows you’ll agree, is that he can sleep late now, even ‘til three.

- W. MacDonald, June 11, 2016

Barbara and Steve Dickman (Photo credit: R. Demicco)

(Left to right) Dick Naslund, Steve, Pete Knuepfer (Photo credit: D. Jenkins)
**AWARDS**

**Tim Lowenstein receives Distinguished Professorship and Larry Sloss Award**

Tim Lowenstein, known to many of us for his passion for running, past two important mile markers in 2016. First, in May of 2016, the SUNY Board of Trustees appointed Tim to the rank of Distinguished Professor, which is the highest honor conferred on SUNY faculty. This title is given only to a small number of faculty members per year to recognize “individuals who have achieved national or international prominence and a distinguished reputation within a chosen field.” Then on September 27 Tim was awarded the Laurence L. Sloss Award by the Sedimentary Geology Division of the Geological Society of America. This award is given annually to a sedimentary geologist “whose lifetime achievements best exemplify those of Larry Sloss — i.e., achievements that contribute widely to the field of sedimentary geology and through service to GSA”. We are all extremely proud of Tim’s recognition both by SUNY and by the Geological Society of America for his research that led to major breakthroughs encompassing, in the words of citationist Terry Jordan, “terrestrial microbial analogues to Martian life, secular changes in Phanerozoic seawater composition, Eocene atmospheric CO$_2$ content, the Messinian salt crisis, and Quaternary paleoclimate history of three continents.” There is little doubt that Tim’s research “run” is far from finished and that he has much more to contribute to the geological sciences.

**Faculty News**

**Jeff Barker**

It’s time for me to ease out of here; I retire at the end of this semester after 30 years on the faculty. Carol and I plan to stay in the area and we seem to be busier than ever with music. We’re going to take a trip to Iceland in August; seems like a fine alternative to preparing for Fall classes. I look forward to watching the department grow and develop. It is important to bring in young, energetic new faculty at a pace greater than our rate of retirement. If you like, you may make that suggestion to the new dean of Harpur College.
Joseph Graney

Joseph Graney is back in the classroom after spending Fall 2016 on sabbatical. Most of the “sabbatical” was spent on submitting papers for publication concerning ongoing work in the Alberta Oil Sands, as well as oversight of watershed research by undergraduate students Katie McCrcheon and Harold Jones in the Bunn Hill Watershed and Ryan Malia and Stephen Loonie in the Fuller Hollow Creek Watershed. The plans for the Living Building in the Nuthatch Hollow portion of Bunn Hill Creek are progressing. The Living Building will be an active learning environment that contains multi-user lab and classroom space for energy and ecosystem studies. Katie and Harold were working on baseline water quality and quantity assessments needed for water use and storage calculations for the building. Ryan and Stephen worked on baseline water assessments in Fuller Hollow Creek in preparation for the construction of a stormwater attenuation wetland near the entrance to campus. Site preparation work will begin in Summer 2017, and Geology, Biology and Environmental Studies students will assist in planting shrubs in Fall 2017 and perennials in Spring 2018. MS students Kristina Nelson and Dannielle Lord (co-advisor with Tom Kulp) defended their Marcellus Shales theses in Summer 2016. Kristina and Danielle worked on projects that simulated disposal of drill cuttings in landfills, and we are working on a joint publication to document their efforts. MS student David Saba is completing work on evaluating hydrologic responses in multi-land use watersheds using water quality monitoring sensors and presented some of his results at the Geological Society of America meeting in Pittsburgh in March 2017. Jon Schmitkons defended his PhD in Summer 2016. Jon is now the Research Educator for the new Biogeochemistry Freshman Research Immersion (FRI) Program that officially started in Fall 2016 at Binghamton University. I am the faculty lead on an NSF award for this project which includes Tom Kulp, Tim Lowenstein, and Weixing Zhu (from Biological Sciences) as the co-PIs. The goal of the program is to offer more first year Geological Sciences and Environmental Studies students with the opportunity to conduct interdisciplinary research (see photograph of the lab facilities for the FRI elsewhere in the newsletter). The new ICP-MS that occupies space in the trace metal lab on the second floor of Science 1 is now fully operational, and has “front end” HPLC and Laser Ablation capabilities. Feel free to stop by the lab for a demo while visiting campus!

On the home front, Dawn Graney (Joe’s wife) continues to offer on-line and in classroom courses in the Health Information Technology Program at SUNY-Broome. She also stays busy organizing webinars and conferences while managing to attend as many yoga classes as possible!

Dave Jenkins

Progress continues on our struggles to force chlorine (Cl) into calcium amphiboles and other minerals. The earlier work done by Al Chan and Ben Campanaro on Cl incorporation into ferro-paragasite is gradually working its way into publications, with Al’s work recently appearing in the special issue of the Canadian Mineralogist dedicated to Frank Hawthorne, and Ben’s work currently in review for the same journal. Bailey Mueller’s work on Cl incorporation into hastingsitic amphibole will soon appear in the European Journal of Mineralogy. Kaléo Almeida completed his MS thesis on the stability of the Cl-rich scapolite mineral called marialite and part of this work has been submitted to the American Mineralogist. Nanfei Cheng is making steady progress on looking at reactions modeling the blueschist-to eclogite-facies transition, which has implications for the release of volatiles and density changes to deep-crustal and subduction-zone settings. Undergraduates Mary Spencer and Jonathon Schneider are pursuing
research related to chondritic meteorites and an unusual Cl-rich feldspathoid called quadridavyne, respectively. Jared Matteucci started working this fall in the lab on a project intended to define the effect of Cl on the thermal stability of a OH-bearing mineral, something that is unknown.

The big event in our life this past year was the marriage of our middle son, Kenneth, to Liz Cooledge this past December. The wedding took place out in Palo Alto, California, near where they both live. Kenneth continues to work for Google and Liz is pursuing theological studies at Fuller Theological Seminary in California.

**Peter Knuepfer**

In June I am completing four years as President of the SUNY-wide University Faculty Senate, representing the faculty from the 34 State-operated and statutory colleges of SUNY, as well as serving on the SUNY Board of Trustees. The latter has included membership on the search committee for a new Chancellor of the SUNY System, a process that I expect will have been completed by the time you read this. Some of the more important and relevant initiatives in which I have been involved and/or led include development of open-access repositories for scholarly publications across the SUNY campuses, development of policies on diversity for SUNY campuses and expansion of applied learning (not just internships, but also including the field experiences that are so central to our discipline), and the implementation of seamless transfer for students across SUNY schools.

However, I am excited to be returning full-time to the department this fall, both to resume teaching and to re-engage in research. All has not been completely lost on the research front (though my schedule has left little room for conferences, etc.), as I continue to look into the degree to which flood frequency has been changing in recent decades. This work has led to invited talks at a flood resiliency summit in Binghamton and at the Central (Syracuse) and Hudson Valley (Albany) sections of the New York Association of Professional Geologists. Once I get out from under the near-constant travel that my SUNY work involves, I expect to systematically review flood-frequency changes in the Northeast US over the last century or so. This is a region where the frequency of intense storms has increased by at least 50% in the last 50 years, presumably a response to a changing climate. The key question from a flood management perspective is whether or not the potential for severe flooding has also changed, and thus whether or not flood-hazards assessments based on long-term averages under- (or over-) estimate future flood potential.

**Thomas Kulp**

I continue to research the microbiological cycling of toxic metalloids in the environment with a primary focus on the element antimony (Sb). This year I was awarded a research grant from the National Science Foundation that will support my Sb research over the next three years. The new NSF grant will allow me to take on a new MS student to work on that project in the Fall. I am currently advising two other MS students, Nick Starbuck and Franco Briaotta, who are working to finish their degrees this semester. I also am advising one Ph.D. student, Jishnu Adhikari, who is finishing his second year in my research group and making good progress on a study of geomicrobiological arsenic cycling in highly contaminated drinking water aquifers in India.
My wife, Leigh, took a hiatus from her career in the city planning field two years ago to pursue her Master’s Degree in Public Administration here at Binghamton University. She will finish her degree and graduate this Spring. My daughter Paige (third grade) and my son Gabe (pre-K) are both students in the Binghamton School District.

**Tim Lowenstein**

Research comes and goes in cycles, and at this point our group is on an upswing, with many new projects on the horizon. We continue to work on the paleoenvironmental record interpreted from cores we drilled at Lake Magadi, Kenya, in 2014. Emma McNulty (PhD student) is working on the sedimentology and the evaporites and Kennie Leet (PhD student) has started on the famous “Magadi type cherts” which we are also attempting to date in conjunction with Shangde Luo of National Cheng-Kung University, Taiwan. We drilled a pilot core at Searles Lake, California, in January, 2017, down to 76 meters, which should give us a hydrochemical record back around 140,000 years. Down the road, we want to drill a core to bedrock, at 900 meters, which dates back to the Pliocene.

Our team is: Kristian Olson (new PhD student), Joe Janick (PhD 2016 and new assistant professor at Keystone College), Professor David McGee (MIT). The Laser Ablation ICP–MS instrument is now up and running and we are learning to analyze fluid inclusions in halite and gypsum, which will begin a new phase of study of ancient seawater with new PhD student Mebrahtu Weldeghebriel. At the fall GSA meeting in Denver I received the Laurence L. Sloss Award from the Sedimentary Geology Division- and the citation was read by Bob Demicco. Family update: Maggie lives in San Francisco, now a medical doctor, and she is moving to Philadelphia this summer to begin a Fellowship at the University of Pennsylvania. Scott is in New York City, where he has worked for Global Strategy Group for almost 7 years. He will leave Global soon to go back to school for his MBA. Kirby now lives in Scranton where she is launching her professional art career. Sally and I have 14 year old Lucy (a bag of bones now), who has trouble remembering where she is, and 2 cats.

Recently, I have been in contact or seen: Chris Brown, Kathy Benison, Brian Schubert, Jianren Li, Nora Holt, John Murphy, Elliot Jagniecki, Billy D’Andrea, Morgan Schaller, Sofia Andeskie, David Griffing, Eric Johnson, Meghan Dovick, Joe Janick, Chris Proce, Sin Senh, Walt Wagner, Lauren Dolginko… don’t get mad if I forgot you. Best wishes to all.

**Dick Naslund**

It has been an interesting year as we adjust to our new life without Cheryl. Sterling enjoys his job at Country Valley Industries, a local sheltered workshop, and Neelam is working as a teacher’s aide in the Oak Tree Program for autistic children. Skye is continuing with her PhD program in Medical Geography at the University of Washington, and Cambria is working over the internet on research projects with faculty at NYU-Abu Dhabi, while she applies to graduate schools for a PhD program in Sociology.

Kalindi is teaching English in Spain and trying to learn the Catalan language. Melanie remains in Boston with her husband and children. I continue to teach and do research on the differentiation of igneous sills, and the formation of magmatic ore deposits. Details of our latest research efforts on understanding the crystallization histories of igneous sills is outlined in another article of this newsletter. I am always happy to hear from you, or answer any petrology-related questions that you may have.

E-mail to Naslund@binghamton.edu
Greetings from the Science I basement underground, where BU geophysics is alive and well! We have plenty of news and updates, as the last year was particularly eventful in the geophysics world, with new students, new research directions and new equipment! The seismic laboratory is undergoing active renovations and I am very happy to report that we have made significant progress in re-establishing our earthquake monitoring capability.

A new broadband instrument was coupled with our seismic piers and a new recorder will allow us to stream continuous digital seismic signal to the broader regional network, making BNY the envy of all regional stations. This process is critical, as the East Coast remains poorly instrumented in terms of station density and data quality. In recent years, as induced seismicity is emerging as a by-product of unconventional oil and gas exploration, data from seismic stations close to active areas of hydrocarbon extractions are becoming invaluable. BNY sits less than 15 miles from the New York/Pennsylvania border, making it a prized possession of our department. We hope that we will be able to rely on our new BNY base station, as well as a temporary network of portable broadband instruments to investigate the seismic impact of hydrocarbon extraction activities in Northeastern Pennsylvania.

In large-scale geophysics news, our group continues to actively pursue a research project focused on understanding tectonic mechanisms of subduction in Chile, where we are working closely with Professor Naslund to understand the relationship between geophysical observations and geochemical signatures of erupted lavas across the Chilean volcanic arc. In particular, we hope to undertake a targeted field expedition to sites at the northern and southern terminations of the volcanic arc in the Pampean “flat slab” region, where we intend to collect lava samples that can later be analyzed for their trace element signatures and volatile content. By comparing these data to previous geophysical findings, this project will offer a new framework for explaining regional tectonic mechanisms – and volcanic activity in particular – that have had profound effects on the local communities.

Finally, over the last year, the geophysics group established a close relationship with the recently founded Freshman Research Immersion (FRI) program, which seeks to involve early-career undergraduates in active research programs (described elsewhere in this letter).

This partnership allowed us to update our equipment pool with a modern reflection/refraction survey, ground-penetrating radar, a new magnetometer and an electromagnetic survey. And, of course, drones! Putting all of this equipment to good use, we are working with the FRI on a project that seeks to use remotely collected geophysical data to locate unexploded landmines in inaccessible high-altitude areas. Our first test-flights are coming to the Science I courtyard this May and I will be very excited to share our findings with you in next year’s newsletter, along with an update on all our other ongoing research projects!

Brandon Tufano (MS ’16) finalized his research into coupled flexural-dynamic subsidence modeling successfully defending his thesis and receiving positive reviews to a manuscript submitted to GSA Bulletin. Look for it later this year. He accepted a position with Roux Associates, Inc. last summer joining several other Bearcats there. Ethan Spiegel (MS ’16) successfully defended his thesis focused on the sedimentology and elemental chemistry of the Ordovician Trenton Group and Utica Shale in central NY. Ethan also entered the environmental consulting industry taking a position at EcolSciences, Inc. in New Jersey. Daniel Miserendino (MS expected ‘17)
took on the daunting task last summer to describe 1000 feet of “monotonous” black shale. Turns out the Utica Shale is anything but monotonous when described in fresh core at the centimeter scale. He is really turning our understanding of this shale on its head. Ryan Brembs (MS expected ’17) spent the summer living and working in Salt Lake City. He was supposed to spend about four weeks describing core from the lacustrine Green River Formation and collecting XRF data. The staff at the Utah Geological Survey appreciated his work so much they hired him for two months to work in their core lab.

The girls are getting bigger every day. Abby is a second grader who loves reading, singing, dancing, and playing with her friends. Erin is so ready to start kindergarten next year and do all the things her big sister does. Kuwanna is making great progress on her PhD research, and is planning one more field season in Colorado this summer. If you are ever in the Southern Tier stop by to say hello, and if you want to come talk to the department about your current research drop me an email to set up a Friday seminar (followed by Tea of course).

Many of our graduate students have been successful through the years in applying for, and being awarded, funding that goes specifically towards supporting their research needs such as field logistics support, analytical fees, and purchasing consumable supplies. We congratulate the following graduate students who were successful in obtaining funding:

Ryan Brembs:
- SEPM Foundation: $800
- Ryan Brembs was also employed by the Utah Geological Survey for the summer to work at their core facility. This provided him additional funding and time to work on his project based on core at the core facility.

Kuwanna Dyer-Pietras:
- Horst and Jessie von Bandat Memorial Grant (AAPG): $2,000
- SEPM Foundation: $1,000
- Rocky Mountain Association of Geologists Foundation: $5,000 (Project title: Cyclostratigraphy, argon geochronology, and strontium isotope geochemistry of the Eocene Green River Formation, Piceance Basin, Colorado).

Kennie Leet:
- GSA Student Grant: $1,875

Emma McNulty:
- AAPG
- GSA Student Grant

Daniel Miserendino:
- Sigma Alpha Mu: $3,500

Bethany Royce:
- AAPG Grants-in-Aid Fund: $2,000

Congratulations to all of our graduates on securing funding in support of their research!
Graduate Degree Completions

We congratulate the following graduate students who completed their degrees in 2016:

Meghan A. Dovick (PhD) Environmental and Microbiological Controls on the Transfer of Arsenic and Antimony Contamination Among Tadpoles and other Freshwater Organisms.

Joseph J. Janick (PhD) Chemical Sedimentation for the Last 30 ka of the Searles Lake Formation, Searles Lake, California.

Jonathan P. Schmitkons (PhD) Sources, Transport, Deposition, and Fate of Roadway Pollutants in the Binghamton, New York Urban Corridor.

Kaléo M. Almeida (MS) Stability Field of the Cl-rich Scapolite Marialite.

Jeffrey W. Carpenter (MS) Iron-bearing Skarns of the Uhuk Massif, Northwest Territories, Canada.

Danielle M. Lord (MS) Biological and Abiological Controls on Metal Mobilization from Shale Gas Drill Cuttings by Landfill Leachate.

Kristina E. Nelson (MS) Simulated Metal Release from Drill Cuttings Associated with Natural Gas Extraction from the Marcellus Shale.


Donors to Geological Science Accounts

The department gratefully acknowledges the following individuals and corporations who have contributed to Departmental accounts over the past year. Please note that this list was compiled from information provided by the Binghamton Foundation based on their records of January 1 through December 31, 2016. We sincerely apologize for any errors, omissions, or inaccuracies!
Freshmen Research Immersion Programs

**Biogeochemistry**
A team of five STEM faculty across the Geology, Biology and Environmental Studies disciplines (Joe Graney, Tom Kulp, Tim Lowenstein, Nancy Stamp, and Weixing Zhu) will use the multi-disciplinary field of biogeochemistry to engage students early in their college years in research applicable to Geoscience careers. The Freshman Research Immersion (FRI) will have a cohort of 25-30 biogeochemistry students each year. The students will complete a three course sequence: 1) a research methods course in the fall, 2) followed by training in analytical techniques in the spring that 3) culminates in completion of a research project the following fall. The photo shows some of the laboratory upgrades and equipment that will be used by the students. A research educator who is a Binghamton University Geoscience PhD-(Jon Schmitkons) is overseeing the courses and provides day to day mentoring and oversight for the students. NSF funding will allow the FRI students to engage in hands-on outdoor, field based components of their research projects during the summer between the spring and fall. Modern and ancient lake and ocean sediments, the atmosphere, watersheds and wetlands will provide field sites and samples for the biogeochemistry research. High school educators and several of their students will participate in summer workshops (beginning in Summer 2017) to learn about the program, and the FRI students plan to visit high schools and community colleges to recruit students. If your daughter or son might be interested in this opportunity let us know!

**Geospatial Remote Sensing**
The FRI Geospatial Remote Sensing (GRS) gives students the opportunity to work with faculty members (Tim de Smet, Carl Lipo, Alex Nikulin, Jeff Pietras, Matt Sanger) from Geology and Anthropology, and to directly engage students in state-of-the-art GRS research. The research stream helps students learn and better understand the role of GRS in their everyday life and academic research areas as diverse as geography, geology & geophysics, environmental studies, and anthropological archaeology. The new FRI-GRS research lab provides students with the opportunity to learn how to use a wide variety of computing and data acquisition resources including: ground-penetrating radar, magnetic gradiometry, resistivity, frequency-domain electromagnetic-induction, shallow seismic, unmanned aerial vehicles (fixed wing and quadcopter drones) with lidar and multispectral data acquisition capabilities; multiple Dell Precision desktops, laptops, and a data processing workstation; photogrammetry software (pix4D and Agisoft Photoscan Pro); matlab; ESRI’s ArcPRO; and much more. The stream is currently engaged in research on induced seismicity in Pennsylvania, unexploded ordnance (UXO) detection & remediation, forensic studies, and archaeology at Poverty Point UNESCO World Heritage site (Louisiana) and Queen Esther’s Village historic archaeology site (Pennsylvania, owned by The Archaeological Conservancy).
Ways of Giving to the Department

We are extremely grateful for your generous support throughout the years. Donations can be made to a number of accounts that can benefit the various educational and outreach efforts in this department, as reviewed in detail in the 2014 online newsletter (bit.ly/GeoBing2014). The one account that provides the most support for the operations of the department is the Geology Fund (account 10796), which helps with such activities as funding the welcoming luncheon for incoming graduate students, supporting our visiting seminar speakers, helping us host alumni reunions on campus and at national meetings, etc.

Contributions can be made online: www.giving.binghamton.edu/giving/

Please select “Other” for the account, and specify the account number or account name) or it can be sent to the Binghamton University Foundation, PO Box 6005, Binghamton, NY, 13902-6005.