



## **The Champlain Thrust** **News from the** **Department of Geology, UVM** **2009/2010**

### *Department News*



#### **Greetings from the Chair (still Char!!):**

Greetings from the corner office of Delehanty Hall. After two sequential fall semester sabbaticals, I am back Chairing full time. It will be my last as Chair, however. I decided, thanks to the sabbatical, that there is much life after administration, so I decided to step down after July 1<sup>st</sup> and return full time to teaching and research. The Department is in the midst of an internal search for the next victim. This past year was difficult on everyone, as UVM was not immune to the economic stresses we all face. Across campus, budgets were further slashed and

staff positions threatened. Geology came through it, but stress levels were high. Other, happier news: Provost John Hughes, a mineralogist before taking on administrative work, stepped down and is currently on a one year administrative leave before he will join us as a faculty member. The Department is thrilled that Laura Webb and Keith Klepeis were successful in their application to the NSF curriculum and laboratory improvement program for funds to acquire instrumentation for Laura's new Field Methods in Geophysics class. We are really looking forward to adding that class to our course offerings! Greg Druschel, along with John Hughes, "hit the lottery" with an NSF major instrumentation program, receiving an award with which they will acquire XRD, XRF and other much-needed analytical gear. This should have a huge impact on not only research but classes such as Geochemistry and Earth Materials as well. Paul's cosmogenic lab is now fully operational and cranking out data again. Andrea has two new grad students and keeps "tinkering" in the stable isotope lab to keep 3 old mass specs functioning! Stephen led his always-popular Colorado Regional trip this past summer; photos are elsewhere in this newsletter. Jack and Barry continue to be involved emeriti, in between golf outings, that is. Barry and Sandy will return to Oaxaca, Mexico, during the summer to help run UVM's Overseas Program there. In addition to all the organization (=herding cats) involved in getting this newsletter out, Jack offers museum tours to the

numerous school groups coming through the Perkins Museum and he's working with geo work study students to revise the museum handouts. Gabriela, Robin and Srebrenka keep Geology running. Without them, the place would fall apart! For more information check out the following links: ***Faculty; Staff; Graduate Students; Activities/ Presentations/Awards***

I know belts are tight for everyone these days, but we could really use your help. The next time the UVM Alumni Affairs office calls or sends you a fundraising letter, don't hang up or recycle that envelope! Think about making a donation to support UVM Geology. This can be done either through the Development Office by earmarking it for the Geology Department or donations can be made directly to the department itself. If you would like your donation used for a specific purpose, that can also be indicated. All of your funds go directly to students. This really IS a case of "every penny helps." On behalf of everyone in the Department, thanks to all of you that have been making donations.

## Department Faculty



**Char Mehrten, Professor and Chair (Stratigraphy, Sedimentation, Carbonate Petrology):** Greetings all! I am back to teaching the Geo 001 class for the fall semester. The Dean's Office asked for more seats at the intro level, so they added a non-lab option to the class. I started the semester with nearly 280 students! I've always thought that the lab was the best part of Geo 1, so I'm not sure how those non-lab students feel about the class, but I guess I'll find out when course evaluations come in! Anyway, those extra students have nearly done me in...it's added hours to grading exams and taken hours out of the week to meet with students who want extra help. Well, it's keeping me out of trouble, I guess.

Research-wise, I have been to Patagonia with Keith twice now, helping with the data collection and analysis for his research project on the early stages of Andean orogenesis in Patagonia, Chile. The stratigraphy is really cool: kilometers of turbidites that record the change in provenance as uplift commences. I'm going back again this winter (the southern hemisphere summer field season!) to tie up loose ends. We presented preliminary results at GSA in October. Lauren Chrapowitzky is in her second year of grad work and has finished the field component of her project on the faunal succession in the Valcour Formation bryozoan-coral-algal reefs. I'm very excited about her data, which has been able to document differences in the faunal succession from up-slope and down-slope mounds. Other big news from the Chazy Formation: after years slogging through the Washington, DC bureaucracy, the National Park Service designated the Isle la Motte and Valcour Island exposures, a "National Natural Landmark." There was a ceremony this September up on Isle la Motte, and plaques were handed out, declarations read, etc, etc. I'm pretty pleased with all of this, having written the proposal and testified to the NPS Scientific Advisory Committee. Now, if I can only find the time to move forward with developing teacher resources for this site! Perhaps that will come, now that I'm stepping down as Chair.

Outside of geology, I finally finished the interior of my cabin in the Adirondacks and passed my building code inspection. Now I'm a legal occupant. I try to play as much bad golf as I can with Jack (who plays good golf!), and occasionally with Barry (who plays really good golf!). Please drop us a line to say "hi" and let us know what you are up to. It's wonderful to hear from you.

<http://www.uvm.edu/~cmehrten/>



**John M. Hughes, Professor (Mineralogy, Crystallography, Crystal Chemistry):**

Welcome from the new face in the department, and allow me to introduce myself. I came to UVM 3.5 years ago from Miami University, and served a three-year term as Provost and Senior Vice President. I stepped down on June 30, 2009, and am delighted to be undertaking my first sabbatical in 29 years in higher education; it has been a productive time so far.

My research is in the study of the atomic arrangements of minerals, principally through single-crystal X-ray diffractometry. I have undertaken numerous crystal structure studies, examining minerals from around the world and the moon. Current projects include studies of the crystal chemistry of apatite and its effectiveness in storing substituent U and Th as a solid-state radioactive waste repository, the study of anion incompatibility in the ternary apatites, and tourmaline crystal chemistry. Although currently my data are collected with former colleagues in my laboratory at Miami University, with colleagues in Chemistry, Physics, and Microbiology & Molecular Genetics, we have a proposal in review to obtain a dual-source single-crystal diffractometer here at UVM, which would be delightful; it is an instrument that is sorely lacking from the instrumentation stable here.

I am pleased to be here in the Department, and realize what a gem this group of people really is. I look forward to getting to know alumni in the future.



**Paul Bierman, Professor (Geomorphology, Geohydrology, Isotope Geology Applied to Landscape Change):** Research and teaching related to Earth's dynamic surface is doing very well these days at UVM. We are all very excited to have moved into a brand new clean lab back in January, and after nearly a year of testing and method refinement, we are again processing samples from all over the world. Even from afar, you can see the lab live and on-line using our webcams - visit: <http://www.uvm.edu/cosmolab/?Page=cosmocam.html>

I've been working very closely with graduate students Lee Corbett and Luke Reusser to improve our extraction methods, minimizing chemical use and maximizing sample yields. Luke and Lee have some great data from some pretty exotic locations - the edge of the Greenland Ice Sheet and the north Island of New Zealand. The first New Zealand data will be featured in the January 2009 issue of *Geology* (look for it on a newsstand near you) with the Greenland data soon to follow we hope. Other students have been doing equally innovative and important work. Joseph Graly, also working on the Greenland project, has found ancient soil, entombed in the ice sheet while Eric Portenga and Charles Trodick are working out the erosion dynamics of one of the most geomorphically famous landscapes, the central Appalachian Mountains. Will Hackett, who just finished his MS at UVM, has been in demand as a speaker; his thesis demonstrated significant changes in precipitation and runoff for the Winooski River basin - quantification of our changing climate.

Jamie Russell, the staff member in charge of several digital archives we maintain, has made great progress with both. She's presided over a more than two-fold expansion of the Landscape Change Program archive. There are now over 30,000 images of Vermont landscapes on-line. Have a look and find your favorite town or picture of campus at: <http://uvm.edu/landscape>

Jamie's also been working hard on a new image archive designed to improve the teaching of Geomorphology and Physical Geography. We now have over 1000 images of landscapes from around the world on line and ready for downloading. We'd love more images, so please scour your archives and hard-drives and upload a few images on line at: <http://uvm.edu/geomorph/gallery>

The Landscape Change Program, a near decade old program, has been growing by leaps and bounds. This archive, dedicated to depicting the changing landscape of Vermont over time has over 30,000 images of Vermont throughout the last 150+ years. Under Jamie's supervision this past summer, 7 undergraduate interns expanded the archive by over 7,000 images in the past few months. Additionally, the archive changes and improves nearly every day with the addition of comments and corrections made by the public, so check in regularly with <http://www.uvm.edu/landscape> as you are sure to find something new.

Imaging Earth's Surface (<http://uvm.edu/geomorph/gallery>) is a new archive dedicated to providing imagery useful for teaching and learning about Geomorphology, the study of Earth's dynamic surface. This archive was started in the spring 2009 and it currently holds over 1,000 high-resolution, high-quality images of various geomorphologic features from around the world, contributed by people from around the world as well as public domain sites.

Lastly, with the exception of a week of fieldwork last summer along South Africa's southern coast (stunning), I've been doing lots of writing. Colleague Dave Montgomery and I are creating a new Geomorphology textbook, the rough draft of which is due at the end of this year. We've been working with Christine Massey on this endeavor. She's been coordinating the outreach component. You can learn more about the project and get involved (by sharing your own case studies as Vignettes, on-line e-media) at: <http://uvm.edu/geomorph/textbook>

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Paul and Christine with current and former UVMers on the Kirk Byran Fieldtrip, Columbia Gorge channeled Scablands in Oregon.



**Andrea Lini, Associate Professor (Stable isotopes, Limnology and Climate Change):** Greetings from the world of stable isotopes and lake mud!

Our research project on Lake Champlain paleolimnology has made good progress and we were able to secure another round of funding from NOAA to keep poking into Lake Champlain's sediments. Since the last newsletter, four new grad students have joined the UVM paleolimnology group: two in Geology (Andrew Koff and Johanna Palmer) and two in the Rubenstein School of Environment and Natural Resources (Helen Carr and Lindsay Schwarting). Andrew and Jo will focus on the geochemical and physical characteristics of the new cores we will be collecting this coming winter, whereas Helen and Lindsay will be busy modeling the effects of increased nutrient loads to the lake and studying microfossil remains. Looks like we have some very exciting months ahead of us!

As I already reported in the last newsletter, the sediments at the bottom of Lake Champlain are rich in information about the lake and its basin. In the upper half-meter or so, we find records of the lake's response to European American settlement and 250 years of changing land use and commerce. With 4-year funding from the USGS Water Centers Program and NOAA, and the support of many collaborators, 11 cores from different regions of Lake Champlain have been collected, extending back thousands of years in some places. Here is an updated summary of the findings:

- During the warm and dry eras of the Holocene Climatic Optimum and Medieval Warm Period, the lake was more productive, suggesting that a warmer lake may also be a more eutrophic lake.
  - Most of Lake Champlain was oligotrophic before European American settlers arrived in 18th century, although a few shallow regions (e.g., Missisquoi Bay) were mesotrophic.
  - Extensive deforestation (up to 80% of Vermont) in the 18th and 19th century noticeably increased sediment and nutrient inputs to the lake, but resulted in only modest eutrophication. Subsequent rapid eutrophication was a feature of the 20th century.
  - St. Albans Bay became fully eutrophic between 1900-1940. The underlying cause was diversion of industrial and municipal sewage from St. Albans City into the lake.
  - Missisquoi Bay was the last lake segment to change trophic state. Bridge construction in 1936 had no impact on the lake's mesotrophic condition. Only in the 1970s did nutrient input and algal biomass increase, up to 9 times pre-settlement levels.
  - All sites studied have undergone some eutrophication, mostly since 1950.
- We currently (Nov 2008) have an exhibit illustrating the power of lake sediment research at the ECHO Lake Aquarium and Science Center located at the Burlington waterfront.

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[http://www.uvm.edu/~geology/?Page=faculty\\_staff/lini.html&SM=faculty\\_staff\\_menu.html](http://www.uvm.edu/~geology/?Page=faculty_staff/lini.html&SM=faculty_staff_menu.html)



Greetings!

I have been very pleased to see many of you at meetings and on field trips this past year. It continues to be an interesting and exciting time in UVM's Geology Department. We have been running lots of new field trips in our courses (I've completely revamped Field Geology again!) and launched new research projects. My main research project these days is in southernmost Patagonia. UVM grad student Janelle McAtamney will be finishing up her Masters on the transition from rifting to compression in the Andes in May, 2010. UVM alum Paul Betka is working on his PhD with Prof. Sharon Mosher at the University of Texas at Austin and I. Together, we have run about five science expeditions to some of the largest and wildest fjords in Patagonia, including the Beagle Channel (where Charles Darwin almost lost his ship by a calving glacier) and the western Straits of Magellan. Char Mehrtens has joined the team and is providing much needed expertise in the sedimentology of a back arc foreland basin in the Andes. She has participated in the last two cruises and will probably be on an upcoming cruise in 2010. Together we are looking at how the opening and closing of a rift basin can create an orogenic belt deep inside a continent, very far from the nearest plate boundary. Patagonia is a wild place where we use old fishing boats, the occasional yacht and "puddle jumper" plane to access the rocks in wilderness areas. Back home in Vermont, I am continuing my work with UVM undergraduate students in field mapping and applied geology with a Vermont focus. This year Robbie Charnock finished up a great project on the geology of the Knox Mountains plutons area, in Marchfield and Peachum along with Dr. Jon Kim at the Vermont Geological Survey. We presented his results at the Northeastern Section meeting of the Geological Society of America in Portland, Maine last March. Last summer Hal Earle began a project looking at fault-fold relationships in Charlotte. Hal is the ninth UVM student to do a Vermont research and field mapping project with Jon and I. Most of the students that do this internship and field mapping project have taken Field Geology (GEOL 101) with me. We will probably be at Northeast GSA so I hope to see some of you there.

My best to everyone,  
Keith



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Field work in Patagonia, Chile, January 2009



**Greg Druschel, Assistant Professor (Aqueous Geochemistry, Mineralogy, Sulfur Biogeochemistry):**

Hello everyone – The Microbial Geochemistry lab has been busy lately – several new projects are going on and we are continuing work on Lake Champlain redox chemistry-nutrient links, sulfur cycling in hydrothermal systems, caves, and meromitic lakes, and wetland research. Lydia Smith (BS '07, MS '09) has wrapped up two very interesting field seasons in Missisquoi Bay investigating nutrient speciation and redox cycling over diel and seasonal scales, new MS student Jessica Sperling (MS '10) has started some exciting work investigating the iron isotope dynamics of the Fe-S system, and several undergraduate students (Ed Greiner, Christine Leonard, Ian Donovan, Marissa Saccente, Emily Matys) have been working on projects including hydrothermal reservoir chemistry, phosphate immobilization, iron sulfide oxidation, elemental sulfur cycling, and cyanobacterial bloom chemistry. Harry Oduro (MS '08) finished his thesis investigating iron sulfur molecular clusters and their role in iron sulfide mineral oxidation pathways and start a Ph.D. at the University of Maryland. Harry and several of his new colleagues at UMD joined us last month for some collaborative research at Green Lake near Syracuse in October (and dinner at the Dinosaur barbeque of course!). Aside from SCUBA diving through algal blooms in the lake with Lydia, I have also traveled for new research projects in British Columbia, Italy, and Croatia where we are investigating sulfur cycling and carbonate mineralization involving different microbial communities. We have published several new papers this year, including 2 with Harry Oduro, 1 with Danielle Eastman (BS '07), and a couple I have with colleagues from other locales.

I continue to teach Earth Materials, Geochemistry, Geomicrobiology, and Regional Geology (the latter of which went to central Italy again this year), and advise the geoclub/SGE chapter. We did a recent field trip this semester to the Sterling Hill Mine in northern NJ, arguably the world's best place to collect fluorescent minerals and a fascinating area geologically (yes, in New Jersey!). We collected a number of fluorescent minerals (including willemite, manganese-rich calcite, sphalerite, and hydrozincite) both underground and at night using portable UV lights.

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**Stephen Wright, Senior Lecturer (Glacial geology, Geomorphology, Environmental Geology)** Another busy fall is winding down and the late fall weather and short days are playing havoc with the last month of field trips for both the Environmental Geology class and the Vermont Field Geology class. I spent the first part of the summer (late May/early June) leading another Regional Geology field trip to Colorado. I had the opportunity to take students to several new field sites I found during a solo trip I made to the area during the previous summer, including exposures of the Pikes Peak granite at the Pinnacles west of Pikes Peak, several sites in the Sangre de Cristo Range including the Orient hematite mine along the western border fault, superb glacial landforms, Pennsylvanian conglomerates, and structures within the core of the range. I also arranged an underground coal mine tour at Oxbow Mining's Elk Creek Mine in Somerset, Colorado where we were able to observe a long-wall mining machine in operation. The trip was noteworthy for the very unusual weather we encountered: It rained or snowed (or both) on us almost every day and stayed cold most days, even in some of the normally very dry and hot parts of Colorado. Nevertheless the spirits of the group remained high, even if we couldn't get to all of the high-altitude sites I hoped we could visit. Another notable part of the Colorado trip was that I sprained my ankle (first time in my life!) in a glacial cirque far from camp during the last week of the trip. I managed to keep active for the remainder of the trip, but had to spend the rest of June with my foot in the air. I spent the forced sit-down time writing a field guide for a New England Intercollegiate Geological Conference (NEIGC) field trip I led to glacial sites in north-central Vermont, including the Shattuck Mountain channels and potholes during the conference meeting in September. Field trip guidebooks are available from the geology department at Norwich University, in Northfield, Vermont.

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**Laura Webb, Assistant Professor (Thermochronology and Tectonics)** Hello alumni and friends of UVM Geology:

This is my second year in the department and I've still got boxes to unpack. Needless to say, things have been very busy, especially with course development. On this front, I am pleased to report that a grant to purchase geophysical equipment (e.g., ground penetrating radar, electromagnetic profiler) was funded by the National Science Foundation's Division of Undergraduate Education Course Curriculum and Laboratory Improvement Program. This equipment will be used in a new geophysics course and also in undergraduate research. We are exploring a collaborative model with the Vermont Geological Survey and Norwich University that will engage students with the application of exploration geophysics to real world problems related to water, slope stability, etc. in Vermont. I am also teaching courses that revolve around the general themes of my research including tectonics, petrology, microstructural analysis, and geochronology. I continue to remain active in field-based research in southeastern Papua New Guinea and southeastern Mongolia. Two UVM students joined me in a Gobi field season this summer: Merrill Stypula (first year Masters student) and Graham Hagen-Peter (Senior geology major). Kyle Ashley, a first year Masters student, is helping me start a project closer to home. We are investing the application of the new titanium-in-quartz thermobarometer to unraveling the conditions associated with the complex history of fabric development in the Strafford Dome region of Vermont. What a luxury to live so close to such cool rocks! I am also the new advisor to the Geology Club. The students have just created a group page on Facebook ("UVM Geology Club") that you are welcome to visit or join if you are interested in upcoming events and news. I hope to see some of you at upcoming meetings or online.

Best regards,  
Laura

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Merril Stypula (MS student), Graham Hagen-Peter (Senior Geology major) and Onon and Baaska (Mongolian MS students) survived another day of field work at Tavan Har in the Gobi, SE Mongolia. Summer 2009



## Graduate Students



**Luke Reusser:** I am currently a doctoral student in the School for Natural resources and the Geology Department at the University of Vermont, having completed my masters in the Geology Department. Many of the projects I am working on for this degree include estimating drainage basin-scale erosion rates along both the east and west coasts of North America, as well as along the east coast of the North Island of New Zealand. The aim of my research is to understand better the relative influence of tectonics and human land use on rates and styles of landscape change.

Prior to my current research, I completed a Masters Degree here at UVM considering the rate and timing of fluvial incision through bedrock along several large rivers draining the central Appalachian Mountain Belt. I earned my Bachelors degree from Skidmore College where I studied both Geology and Studio Art. Besides playing with rocks, I occupy myself with the usual hiking, camping, traveling etc, and I also enjoy growing a good garden.

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**Lee Corbett:** Hello from UVM's brand new cosmogenic laboratory facility! After a painfully long wait, Paul, Luke, and I have spent much of the past year getting the new lab up to speed. And what a lab it is! We're almost at 100%, and are just doing some final tweaking on methods. Check out our lab web page ([www.uvm.edu/cosmolab](http://www.uvm.edu/cosmolab)) for more information and live webcam feeds.

I've been working since January of 2008 on a project with Paul, Tom Neumann (now at NASA!) and Joseph. We spent the summer of 2008 flying around the western margin of the Greenland Ice Sheet in a helicopter, and are now busily preparing samples. The goal of our project is to investigate past interglacial periods in Greenland, and specifically to study whether the Greenland Ice Sheet has ever been smaller than it currently is. We got our first data in August, just in time for the GSA abstract deadline, and will be producing more data as often as we can get out to the particle accelerator at the Livermore National Laboratory in California. Stay tuned for some exciting results! Until then, keep track of our progress on our project web page ([www.uvm.edu/greenland](http://www.uvm.edu/greenland)).

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**Joseph Graly:** Work on my research is going well. We're starting to get results that show evidence of soil formation under the present Greenland Ice Sheet during past warm periods. I have also been working on a couple papers trying to understand how meteoric Beryllium-10 is distributed into soils. I continue to practice accordion, dance, and read in my copious free time.

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**Lauren Chrapowitzky:** I am a first year master's candidate here at UVM having graduated from St. Lawrence University with a BS in Geology this past spring. While at UVM I'll be working on the sedimentology, paleoecology, and paleoenvironments of the Valcour Formation (Middle Ordovician, Chazy Group) in Vermont and New York with Char Mehrstens. Char and I have been working on some spectacular outcrops this fall, trying to make the most of the remaining field season. As for the coming winter, I'm hoping for as much of the white stuff as possible so I can spend most of my free time skiing!

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**Charles Trodick:** I graduated in 2007 from Cornell College with as a double major in Geology, and Economics and Business. I spent 2007-08 at Vanderbilt University in Nashville, TN doing Master's work. During the summer of 2008, I transferred to UVM. I grew up on the Mississippi in Iowa, I spent last year in Nashville, and I moved to Burlington, VT in August of 2008. Currently, I am a first year graduate student working with Paul Bierman on a project involving the study of pre-human sediment fluxes down the Potomac River, near Washington, DC. I will be making at least two trips to the Potomac to gather samples for running in the Beryllium lab here at UVM. I will use this data along with previously gathered data to compare pre-human with modern sediment loads on the Potomac. Then I hope to come up with a recommendation to get our modern sediment loads back to the pre-human amounts. Outside of school, I enjoy biking, hiking, camping, socializing with friends and family, and many different sports including soccer, football, and baseball.

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**Eric Portenga:** I am a first year Masters Student originally hailing from Muskegon, MI. These next few years I am working with Paul Bierman, using cosmogenic nuclides to study bedrock erosion rates throughout the Appalachian Mountains. Before leaving the Great Lakes, I completed my undergraduate studies in Geological Sciences from the University of Michigan, where I worked as a lab assistant in the Biogeochemistry & Environmental Isotope Geochemistry Laboratory and in my spare time, I served as Public Relations Manager for the University of Michigan Men's Glee Club. I enjoy the

outdoors and am looking forward to skiing on actual mountains for the first time this winter!

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**Janelle McAtamney:** I am a second year MS student working on structural basin analysis in the Southern Andes. I am currently preparing to head south for my first field season in Patagonia to map the evolution of the inversion of the Magallanes Basin, with Keith Klepeis and Char Mehrtens. I graduated from Smith College with a BA in Geology and have since spent my time teaching horticulture in an alternative high school in Winooski, VT. I keep busy working on the rescue squad in Richmond, VT, fixing bikes for Bike Recycle Vermont, and climbing rocks that I might or might not be studying.

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**Drew Koff:** I am a first year graduate student at UVM working with Andrea Lini on his research on sediment cores in Lake Champlain. Researching the isotope signatures of Devonian Brachiopods while attending Colgate University has prepared me for work in Andrea's lab. Since graduating in 2004, I have worked as an environmental educator in Rhode Island, math teacher in the Berkshires, NOLS instructor in Wyoming and, most recently, purveyor of outdoor gear at the OGE in Burlington. I love all four seasons of outdoor adventures, from hiking and rock climbing to kayaking and skiing. I look forward to gaining a greater understanding of the local geology while spending lots of time in the field this fall.

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**Johanna (Jo) Palmer :** I just recently graduated from St. Lawrence University with majors in geology and anthropology. I am interested in many aspects of geology, including hydrology, geochemistry, isotopes, etc. I spent the last 3 summers doing an internship with the Stream Corridor Management Program with the SWCD, and really love water and how humans and water interact. I love traveling, and have spent time in New Zealand, Curacao, Costa Rica, Canadian Rockies, and in many areas of the US. For my project, I will be working in St. Albans Bay doing sediment core isotope work with Andrea. I'm excited to be here at UVM and am looking forward to the next 2 years !

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**Kyle Ashley**

Hello! I am Kyle Ashley, a first year graduate student here at UVM. I recently graduated in the Spring of 2009 from the State University of New York College at Potsdam, about a 10 minute drive from my hometown of Madrid. I am currently working on a project with Laura Webb in measuring the temperatures and pressures of deformational events of a traverse across the Strafford Dome in east-central Vermont. The thermobarometer that will be used is the measurement of titanium-in-quartz (TitaniQ). The project will also focus on modification of the technique to applications not previously used, such as measurement of quartz inclusions within garnet for various deformational events (e.g. crenulations). I am enjoying the project very much and cannot wait to further the project over the next year and a half.

I am hoping to take an active part while a graduate student at UVM; especially in the classroom. I enjoy teaching at university level, and aspire to obtain a Ph.D. in geology after completing my MS at UVM. But that is still in the future, and I am just going to enjoy the time I am having at this university while I can!

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**Merril Stypula:** Greetings. I graduated with a bachelor's degree from Colorado College and made my way east to UVM in order to work with Laura Webb in tectonics, thermochronology and ARCGIS. My introduction to UVM was a field season last summer in Mongolia. A great experience.

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## Staff



**Robin Hopps:** February marks my third year as Administrative Assistant in the UVM Geology Department. I continue to enjoy working with Department students, staff, and faculty.

We have great workstudy students helping spruce up the Perkins Geology Museum itself as well as updating the handout materials the Department provides its visitors. Stop in and visit the Perkins Geology Museum, as well as people you know and meet those you don't yet know. We currently have 32 Geology majors, 16 minors and 11 graduate students.

<http://www.uvm.edu/perkins/>

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**Srebrenka Sehovic:** I'm the new Administrative Coordinator in the Geology Department. Courtney moved to Seattle after having her second baby. I started May 15th 2008 and I love working here. I feel so welcome by every single person in the Department.

I like the atmosphere and being around young people and watching them develop; I'm glad that I can help them if they need me. I am also a new grandmother. My grandson, Desmond, brings me joy on a daily basis. I'm fortunate that my daughter and her husband live nearby. My husband and I have two teenage girls living at home and a fourth daughter who is completing a master's degree in art in New York City. Life is

good.

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**Gabriela (Gaby) Mora-Klepeis, Senior Research Technician:** Greetings! I am happy to report that since the last newsletter two laboratory renovations have been completed in Delehanty Hall. One of them took place in the new Thermochronology Sample Preparation Laboratory. The second took place in the Radiogenic Isotopes Separation Laboratory.

In addition, thanks to the Dean's office, we recently acquired 22 new Macintosh computers. After removing all the software, we donated the old computers to the Winooski City Schools. Our old computers are now located in the elementary school and supplement several classrooms. We continue receiving personal collections that include fabulous rock, mineral and fossil specimens from all over the world. We are

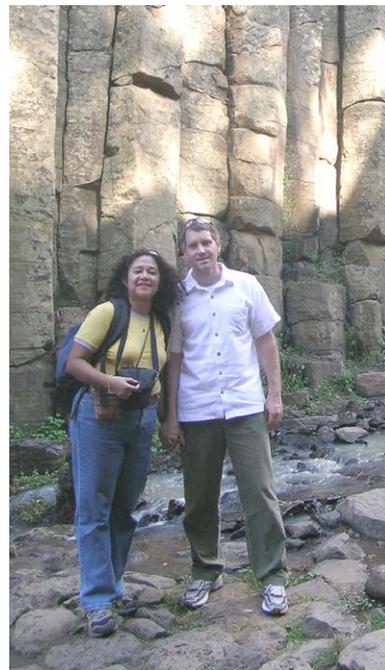
working to get the donated materials incorporated into our teaching collections and museum exhibits. As you can see, we are busy around here. If you are in the area, please stop by for a building tour, I'll be happy to show you around! Although we had a very rainy summer and outdoor activities were limited, I still was able to participate in my second triathlon competition. I rode the bike segment of The Great Race in St. Albans. Another fun activity this past summer was a riding trip in Maine with geology friends. Look closely, you may find some familiar faces!

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[www.uvm.edu/geology/geodept/geostaff/gmora/gmora.html](http://www.uvm.edu/geology/geodept/geostaff/gmora/gmora.html)



Barry, Sandy, Jack, Ruth and Gaby



Gaby and Keith at Hidalgo Basalts

## Recent Graduate Student Presentations

Reusser, L., Bierman, P., and Finkel, R., 2008, Estimating pre-disturbance rates of sediment generation and erosion with in situ and meteoric 10-Be: Waipaoa River Basin, New Zealand: Geological Society of America Abstracts with Programs, p. 299 [http://www.uvm.edu/cosmolab/papers/Reusser\\_2008\\_3863.pdf](http://www.uvm.edu/cosmolab/papers/Reusser_2008_3863.pdf)

Hackett, W.R., Bierman, P.R., Rizzo, D.M., and Besaw, L.E., 2008, Increasing precipitation and runoff over the last 70 years, the Winooski River Basin, Vermont: Geological Society of America Abstracts with Programs, p. 301-1 [http://www.uvm.edu/cosmolab/papers/Hackett\\_2008\\_3861.pdf](http://www.uvm.edu/cosmolab/papers/Hackett_2008_3861.pdf)

Betka, P., Klepeis, K.A., De Paoli, M., and Clarke, G. 2008, Three- Dimensional Finite Strain and Kinematics of Flow from a Lower Crustal Extensional Shear Zone: Fiordland, New Zealand: Geological Society of America Abstracts with Programs, p. 343.

Klepeis, K., Betka, P., Alvarez, J., Poblete, F., Thomson, S., Gehrels, G., and Clarke, G., 2008, Tectonic Evolution of a Doubly- Vergent, Thick-Skinned Fold and Thrust Belt in the Patagonian Andes: Southernmost South America, Geological Society of America Abstracts with Programs, p. 322.

## Presentations at 2009 GSA Meeting, Portland, Oregon

complete references in Geologic Society of America 2009 Annual Meeting, Portland Oregon  
Program and Abstracts

Bierman, Paul; Reusser, Lucas J.; Nichols, Kyle K.; Matmon, Ari; and Rood, Dylan:  
WHERE IS THE SEDIMENT COMING FROM AND WHERE IS IT GOING – A  
10Be EXAMINATION OF THE NORTHERN QUEENSLAND ESCARPMENT,  
AUSTRALIA

Smith, Lydia; Watzin, Mary; Hill, Jane; Cade-Menum, Barbara; Druschel, Gregory: NUTRIENT  
SPECIATION AND MOBILITY GOVERNED BY REDOX CHANGES IN IRON OXYHYDROXIDE  
MINERAL CONTROLLED BY SEDIMENT MICROORGANISMS IN SHALLOW, EUTROPHIC  
MISSISSQUOI BAY, LAKE CHAMPLAIN

Smith, Lydia G.; Bierman, Paul R.; Druschel, Gregory K.; Pearce, Andrea; Rizzo, Donna M.; Wemple,  
Beverley; and Watzin, Mary: AN INTERDISCIPLINARY APPROACH TO TEACHING WATERSHED  
FIELD SCIENCE

Portenga, Eric; Bierman, Paul R.; and Rizzo, Donna M: A GLOBAL SUMMARY AND ANALYSIS OF  
EXPOSED BEDROCK EROSION RATES ESTIMATED USING *IN SITU* 10BE

Trodick Charles; Bierman, Paul; Pavich, Milan; Reusser, Lucas J.; and Rood, Dylan:  
METEORIC 10Be CONCENTRATIONS IN THE POTOMAC RIVER BASIN

Graly, Joseph A.; Bierman, Paul; Neumann, Thomas; Corbett, Lee B.; Lini, Andrea; Reusser, Lucas J.;  
Finkel, Robert; and Rood, Dylan: RELICT SOIL ENTRAINMENT IN PLEISTOCENE ICE THROUGH  
OPENSYSTEM REGELATION: LATITUDINAL VARIATION IN THE WESTERN  
GREENLAND ICE SHEET

Reusser, Lucas J.; Bierman, Paul; and Montgomery, David R.:  
HOW WE VISUALIZE GEOMORPHOLOGY – A NEW APPROACH TO  
TEXTBOOK FIGURES

Hackett, William R.; Bierman, Paul; Rizzo, Donna M.; and Besaw, Lance E.:  
THE LAST 70 YEARS, THE WINOOSKI RIVER BASIN, NORTHERN VERMONT

Russel Jamie; Bierman, Paul R.; and Wright, Wesley: *IMAGING EARTH'S SURFACE* — A WEB-  
BASED ARCHIVE OF HIGH RESOLUTION GEOMORPHOLOGY IMAGERY

McAtamney, J.; Klepeis, K.; Mehrtens, C.; Thomson, S.N.: , THE TRANSITION FROM EXTENSIONAL  
RIFT BASIN TO COMPRESSIONAL RETRO-ARC FORELAND BASIN IN THE SOUTHERNMOST  
ANDES (54.5°S): NEW PROVENANCE DATA FROM BAHÍA BROOKES AND SENO OTWAY,.

Klepeis, K.; Betka, P.; Fanning, M.; Clarke, G.; Baldwin, S.: THE INITIATION OF OROGENESIS IN  
THE PATAGONIAN ANDES BY THE COMPRESSIONAL INVERSION OF THE EXTENSIONAL  
ROCAS VERDES BASIN,

Druschel, Gregory; Smith, Lydia; Watzin, Mary: DIURNAL AND SEASSONAL REDOX CHANGES IN  
LAKE SEDIMENTS: IMPLICATIONS FOR NUTRIENT FLUX AND CYANOBACTERIAL BLOOMS

Corbett, Lee; Bierman, Paul; Graly, Joseph; Neumann, Thomas; Rood, Dylan; Finkel, Robert: IN SITU  
COSMOGENIC Be10 ESTIMATES OF DEGLACIATION TIMING AND GLACIAL EROSION  
EFFICIENCY, WESTERN GREENLAND

Massey, Christine; Bierman, Paul ; Montgomery, David: FREE ON-LINE *VIGNETTES* SUPPLEMENT  
NEW GEOMORPHOLOGY TEXTBOOK AND ALLOW COURSE CUSTOMIZATION

## NEIGC 2009

Wright, S.F., 2009; ICE FLOW, SUBGLACIAL HYDROLOGY AND GLACIAL LAKE HISTORY IN  
NORTHERN VERMONT; in Westerman, D.S. and Lathrop, A.S. eds, New England Intercollegiate  
Geological Conference Guidebook No. 101, pp. 35–61.

### RECENTLY COMPLETED M.S. THESES

Go to <http://www.uvm.edu/~geology/?Page=gradresearch.html&SM=oppmenu.html>  
in order to access copies of theses and progress reports

#### 2009

**Will Hackett** – Modeling of the hydrologic impacts of highway construction and climate change in  
Vermont

**Lydia Smith** – Organic phosphorus cycling, mobility and bioavailability for cyanobacteria in sediments of  
Missisquoi Bay, Lake Champlain

#### 2008

**Paul Betka** - Evolution and tectonic significance of ductile deformation in the middle and lower crust  
during contraction and extension in Cordilleran-style orogens.

**Jane Duxbury** - The determination of millennial scale erosion rates using cosmogenic analysis of  $^{10}\text{Be}$  in the Shenandoah National Park.

**Julie Rumrill** - Using GPS to assess the spatial and temporal variation of seasonal velocity changes on the Greenland ice sheet, near Swiss Camp Greenland.

**2007**

**Corey Coutu** - Using the fossil record as a vehicle for teaching evolution: A web based teaching module.

**Amanda Getsinger** - Coupling physical and chemical studies to assess TTG petrogenesis.

**Harry Oduro** - The formation, oxidation, and characterization of  $\text{FeS}(\text{aq})$  molecular clusters - decoupling iron sulfide mineral surface dissolution and oxidation reactions

**Colleen Sullivan** - In progress: Cosmogenic  $^{10}\text{Be}$  erosion history of the Blue Ridge Escarpment - A long-lived feature of the southern Appalachians

**2006**

**Heather Burgess** - Trophic status of Lake Champlain over 400 years of changing land use: a paleolimnological study.

**Bethany Zinni** - Effects of Ski-area Development on Hydrology and Water Quality at Mt. Mansfield

**Phoebe Judge** - Fault motions, earthquakes, and cookies: Stress states along the Alpine Fault, New Zealand.<sup>7</sup>

**Daniel King** - Shear zone processes in the mid to lower crust and the structural evolution of central Fiordland, New Zealand.

**Gregory Lorensen** -Application of in situ Au-amalgam microelectrodes in Yellowstone National Park to guide microbial sampling.

**HURRAY FOR THE LIBERAL ARTS!!**

**RECENT AWARD RECIPIENTS  
UNDERGRADUATE AWARD WINNERS!**

**NEW UNDERGRADUATE SCHOLARSHIP IN GEOLOGY!**

Thanks to a donation to UVM by Claire and Arthur Heiser, the Geology Department is able to offer the Joseph Tinker Award to an outstanding senior majoring in Geology. Mr. Tinker, the father of Mrs. Heiser, was a Vermont resident, farmer and amateur geologist. The first winner of the Tinker Award in 2008 was **Becky Hammer-Lester** of New York. The 2009 recipient was **Graham Hagen-Peter**.

Congratulations to **Robbie Charnock**, Charles G. Doll Award winner as outstanding graduating senior in Geology

Congratulations for successful Hawley Award applications to support undergraduate research to: **Sam Schultz, Kirsten Stokes and Graham Hagen-Peter**

The David P. Bucke award for the outstanding student in introductory Geology went to **Amanda Northrup**

### **COME SEE US AT THE FOLLOWING:**

***NATIONAL GSA Meeting:***

2010 Denver, CO 31 Oct. – 3 Nov.

***National AGU Meeting:***

2009 San Francisco, CA; December 2009; Check AGU website for specific dates

***NEGSA Meeting:***

2010 Baltimore, MD

***NEIGC 2010:*** Check <http://w3.salemstate.edu/~lhanson/NEIGC/> for information regarding dates and location

***Alumni/Reunion Weekend at UVM!!!!***

4-6 June 2010; check <http://alumni.uvm.edu/reunion> for more information

Make sure that you get in touch with us so we can show you around!!

***Visit our website for links to more department information and activities***

<http://www.uvm.edu/geology/> and <http://www.uvm.edu/perkins>

## **Regional Geology in recent years**



**2009 Regional geology students:** Matt Bansak, Ben Henry, Greg Parrish, Will Hackett (TA), Maggie McMillan, Tyler Vendituoli, Holly Crimmins, Mary Snyder, Mike Ingram, and Shane Snyder at the base of a weathered Tertiary lava flow near Del Norte, Colorado.



**Regional Geology, Italy, 2008**



**Regional Geology, Colorado, 2007:** Pat Niggel, Gary Peters, Pat Tobin, Corey Coutu (TA, partially hidden), Jessica Schechter, and Kirsten Stokes studying the contact relationships between Paleozoic carbonate rocks and Laramide intrusive rocks near Cumberland Pass, Colorado



**Regional Geology Class enjoying the good life in Italy  
Summer 2006**



**Regional Geology 2005 in front of the “Maroon Bells”  
near Aspen Colorado**



**Iceland Crew enjoying summer sun  
August 2004**



**Regional Geology 2003  
Enjoying the Maine coast**

**And now we conclude with a “blast from the past”  
Regional Geology 1986, Newfoundland (Can you identify these people?)**

