



The Champlain Thrust
News from the
Department of Geology, UVM
2014/2015
Department News



Greetings from the Chair: Greetings from UVM Geology! Andrea is on a much-deserved sabbatical leave this semester so I'm filling in as Interim Chair. Although the "adminitrivia" is the same there seem to be new ways to do it online so by the time I figure it out, Andrea will be back. Regardless of who is at the helm, it has been a busy and successful year. I summarize some "highlights" here. In addition to their summaries in this newsletter, information about faculty activities can be found on individual's websites. See [Faculty](#) listing

(<http://www.uvm.edu/~geology/?Page=faculty/faculty.php&SM=faculty-staffmenu.html>)

Our newest faculty members Assistant Professor Julia Perdrial and Research Assistant Professor Nicolas (Nico) Perdrial are in their second year here at UVM. Courses and research programs are up and running. Julia's taught geochemistry for geology and environmental science majors at both the introductory (135) and advanced (235) levels and is currently teaching a first year student seminar on climate change and upper level biogeochemistry. Julia's been writing proposals to fund her work on carbon, nutrient and pollutant storage in stream systems and has her first grad student this year. Nico helped us cover environmental geology and is currently teaching a new 100 level course, "geocomputing." Nico works on clay adsorption of lead and other elements.

Just to get all the financial stuff out of the way, on behalf of the Department I'd like to thank all of you who sent us donations this past year. No matter how small, they all help. We've used gifts to support student travel to meetings, undergraduate research, and projects at the Perkins Geology Museum. Students are our biggest priority and we focus the gifts we receive on ensuring their success. Thank you in advance for your support. If you haven't done so, please consider a gift. To [donate online](http://alumni.uvm.edu/foundation/giving/) (<http://alumni.uvm.edu/foundation/giving/>) choose **Give a New Gift** or **Make a Pledge Payment** then scroll to *Other* under *Gift Information* and write UVM Geology Department. *All* of your funds go directly to students.

On to happier subjects. Once again, our emeriti professor extraordinaire (aka Jack) has managed to collect all the information needed to put this newsletter together. You can imagine that's like herding cats. As always, we have Gabriela, Robin and Srebrenka to thank for keeping our small, but buzzing Department running smoothly. There is really never a chance for our support trio to get bored, and without them the place would fall apart pretty quickly!

Now . . . the News

Our newest curricular offering actually came from the grad students. Alice Newman and Kathryn Dianiska decided that the undergrads doing their senior research needed some support through this process, so they came up with the idea of regular meetings of these folks with grad students. The SURGE program (Sessions in Undergraduate Research in Geology) was such a success the first couple of years that we have a new crop of grad students (Gina Accorsi John Gilbert, and Hannah Blatchford) carrying it on again this year. Undergraduates also learn how to ID potential graduate programs, find internships, jobs, and how to get a free slice of pizza.



Our other curricular news makes us all very happy. After a hiatus of a few years, we will be able to resume offering Regional Geology. Thanks to our current Arts and Sciences Dean, Antonio Benito-Cepeda, the College will contribute towards covering the instructional costs. Students will still pay the cost of going on the trip, as usual. The only addition is that they will have to register for one credit of Continuing Education. This will add some cost, which is not great, obviously, but there is a new discounted CE rate for UVM students, so that should help. I will be talking to the Department regarding establishment of a Regional Geology gift account, so we can accept donations to provide financial support for students to go on Regional. We believe that everyone should have the opportunity to go on one of those trips. Thanks to all of you that sent us letters about how much you enjoyed this particular course!

One more personnel update: Vermont State Geological Survey Director and UVM Geology M.S. alum Larry Becker announced his upcoming retirement. Larry guided the State Survey through financial hurdles, Hurricane Irene flooding of the Waterbury VGS office, ANR re-organization and a host of other issues. Larry will be missed, however he'll be working on science education issues in the State, so we're confident that the geosciences will be part of that discussion. Thanks for all you've done for Vermont geology, Larry.

Please keep in touch.

There is talk of a UVM Geology T shirt or baseball cap being produced this year, so drop us a line, geology@uvm.edu, and we'll let you know.

Live your life and be awesome!



Char, long-time former Chair, sits in for Andrea's sabbatical, and proving that two Chairs are better than one. Gabriela's crock-pot meatballs in the foreground are popular at department parties. Photo taken by Robin Hopps early at party, otherwise the crock-pot would be empty.

A New State Geological Map

A copy of the new state geological map that was unveiled at the State House, Montpelier, VT now hangs in the Perkins Geology Museum, thanks to the generous support of the **Lintilhac Foundation**. This map represents the culmination of many years' work by UVM faculty (Rolfe Stanley, Barry Doolan, Char Mehrstens) and many, many UVM Geology alumni (Agnew, Paul C.; Armstrong, Thomas R.; Aubrey, Will M.; Badger, Robert L.; Barton, Thelma (later publications, Thelma B.Thompson); Becker, Laurence (State Geologist); Borre, M.A. ; Brooks, K. ; Carter, Craig; M.Cherichetti, Lars; Condon, Rebecca; Copans, Benjamin; Cua, Athene K.; DelloRusso, Vincent ; Derman, Karen; DiPietro, Joseph A.; Dorsey, Rebecca J.; Earle, Hal; Eiben, David B.; Falta, Christine; Frank, Terry; Frederick, Jeffrey; Gale, Marjorie H. (earlier publication, Marjorie Hollis); Gale, Peter N.; Gillispie, Richard; Goldberg, Jonathan; Hadley, Ann C.H.; Handy, J.; Haydock, Samuel R; Hengstenburg, Carey; Hoar, Robert S.; Holt, Jeffrey; King, Sarah; Krauss, Jerome F.; Lapp, Eric T.; Mallard, Laura D.; Martin, Delbert. C.; McHone, J.Gregory ; Mock, Timothy D.; Montane, Paul; O'Loughlin, Sharon B.; Pascale, Lelia; Prah, Crispin J.; Pingree, Rodney;Prewitt, J.; Rosencrantz, Eric; Roy, Dana L.; Ryan, Jeremy; Sarkesian, Arthur; Schoonmaker, Adam; Sonenburg, D.; Talcott, J.; Tauvers, Peter R.; Taylor, S.; Thompson, Peter J. Walsh, Gregory; Warren, Marian J.)

Additional information at: <http://www.uvm.edu/geology/?Page=news/VTbedrock.html>
www.anr.state.vt.us/dec/geo/vgs.htm,
stategeologists.blogspot.com/.../ceremonies-for-release-of-vermont.html
www.usgs.gov/newsroom/article.asp?ID=3167



Presentation of VT State Geologic Map, April 11, 2012, at the State House, Montpelier, VT. Barry Doolan, Char Mehrstens, Marjorie Gale, Larry Becker and Gov. Shumlin (plus others).



**Perkins Museum of Geology, in Delehanty Hall,
houses the largest permanent installation of the 2011 State Geologic Map.**



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

My graduate student Ashliegh Belrose and I have been working hard on the sediment cores we collected from Missisquoi Bay and St. Albans Bay in winter 2013. Using geochemical tracers we successfully correlated the new cores with the ones collected by three of my previous graduate students. As I briefly mentioned in last year's newsletter, Ashliegh's cores extend the sediment record for these two shallow bays all the way back to the time when the Champlain Sea covered the area approximately 10,000 years ago. The Champlain Sea-Lake Champlain transition was accompanied by drastic changes in water level, and our analyses demonstrate that the two bays responded differently to these changes. The Saint Albans Bay record encompasses a 58 cm thick peat layer displaying evidence for a wetland occupying the bay during the earliest Lake Champlain phase. Based on the location of the peat in the core, we estimate a 7-8 m water level rise in the bay since 9600 Cal yBP. Around the same time, the Missisquoi Bay core shows proof of an erosional unconformity in the form of a 2 cm thick deposit of sub-angular shale pebbles and sand, possibly alluding to a partial drying of the Missisquoi Bay basin. Ashliegh is now in the processes of writing her Master's Thesis and will hopefully complete her study later this fall.

Colleagues and students from the UVM Rubenstein School of Environment and Natural Resources have been keeping my stable isotope lab busy with all the plant and animal samples they have collected from all over the world. Now that we are done analyzing Mysis (tiny Crustaceans) from Lake Champlain and wolves from Mongolia, we have been able to focus on a study that uses stable isotope analysis to estimate black bear diet in Vermont. A greater understanding of black bear diet will help wildlife professionals identify the relative importance of food items. It may also lead to insight into the consumption of human foods and guide management decisions aimed at reducing human-bear conflict. No rocks or muck involved, but still lots of fun!

Selected publications and abstracts (* Student):

*Belrose, A., and Lini, A., 2014, Paleolimnological study of Lake Champlain: Shallow bay sediment documents the transition from Champlain Sea to Lake Champlain. Geological Society of America *Abstracts with Programs*, Vol. 46, No. 2

Lini, A., Levine, S., and Ostrofsky, M., 2014, A Paleolimnological Assessment of Lake Champlain's Trophic Status. 38th Annual Meeting of the New England Association of Environmental Biologists, Burlington, Vermont, USA. Abstracts, p.18

*Dykstra, E.A., Lini, A., Murdoch, J.D., and Kilpatrick, C. W., 2014, Using Stable Isotope Analysis to Estimate Black Bear Diet in Vermont, University of Vermont Student Research Conference. April 16, 2014

Bierman, P.R., *Corbett, L.B., *Graly, J.A., Neumann, T., Lini, A., Crosby, B., and Rood, D.H., 2014, Preservation of a pre-glacial landscape under the center of the Greenland Ice Sheet, *Science*, Vol. 344 no. 6182 pp. 402-405



Paul Bierman, Professor (Geomorphology, Geohydrology, Isotope Geology Applied to Landscape Change):

It's been a busy year for Geomorphology at UVM. In January, we the Geomorphology textbook I've been working on with Dave Montgomery for the last 6 years finally published. The first hard copy showed up on my doorstep by UPS on December 24. What a holiday gift. The book is the first new introductory Geomorphology text published in the US in 20 years and was supported by the National Science Foundation. You can learn more at

<http://uvm.edu/geomorph/textbook>.

I've not done much fieldwork this year, instead, I've been trying to clean up lingering projects now the textbook is done. We have had lots of Greenland research come out including a paper in *SCIENCE* that reported on an ancient soil underlying the ice sheet. That paper earned the author team a spoof on the tonight show. We also have a paper identifying ancient land surfaces and applying our work to seismic hazards coming out any day now in *GSA Today* (September issue)

Family-wise, the kids are growing up fast. Marika is now taller than both of us and headed to High School. Quincy's in middle school and they are both still skiing and running competitively. We just returned from 3 weeks of summer, no winter, with them in Argentina where Marika was an exchange student.
Paul

pbierman@uvm.edu
uvm.edu/geomorph
uvm.edu/landscape

UVM Geology Dept. uvm.edu/~pbierman
Delehanty Hall
180 Colchester Avenue
Burlington, VT 05405

802-238-6826 (cell)

802-656-4411(v)

802-656-0045 (fax)



The Massey-Bierman's in Tierra del Fuego, Argentina this past July...getting in a little summer skiing. Girls are 14 and 11, parents are AARP eligible :)



John M. Hughes, Professor (Mineralogy, Crystallography, Crystal Chemistry): It has been a great year. I finished my term as President of the Mineralogical Society of America, which was rewarding and humbling. The term ended with the presentation of my MSA Presidential Address, and it was interesting to present a summary of career-long work on the mineral apatite, work that involved many, many colleagues. Work currently continues on apatite crystal chemistry, and it is as much fun now as it was when I did my first experiments many years ago. Other mineralogical studies are also ongoing, and this spring Jacob Menken successfully defended his thesis on thermal disorder in tourmaline, and current graduate student Gina Accorsi is undertaking an interesting study on the wolframite solid solution series and the role of the wolframite as a Conflict Mineral.

Susan and I spent our summer in Charleston, SC, catching up on writing and enjoying family visits. Our granddaughter, now almost three, loves the beach and will fearlessly head into the waves. Next summer, she will be joined by a little brother, who is scheduled to appear on Halloween. Gareth and Amy are busy preparing for his arrival. Our daughter Rebecca, who lives in Oakland, learned why one does not hang a picture over his or her bed during the recent earthquake in Napa Valley. She has felt smaller quakes before, but this one was interesting, she noted. We both agreed it is great to witness such natural phenomena, especially if one is not injured!

As I write this, it is the first day of classes, and I look forward to another year interacting with students; I have the best job in the world.

Note added in proof: Wylie Nickerson Hughes did indeed arrive right on time at Halloween, and he and family are doing fine. You may have seen his picture on *Inside the NFL*, where his Dad is a Producer; he got a shout out from Greg Gumble after his birth. His grandfather thinks he is pretty neat.



Proud grandparents Mimi and Papa
(aka Susan and John) with
Belle Halladay



Just getting ready to identify another new mineral.



Keith Klepeis, Professor, Structural Geology, Tectonics & Field Geology:

Greetings, This year is shaping up to be a thoroughly enjoyable one for me.

I've had the pleasure of working with some truly great students both inside and outside the classroom. **Malayika Cincotta, Laura Cuccio and Travis Dawson** all finished up their Senior research projects with me in May of 2014.

Malayika and Laura looked at the hydrogeology of two fractured bedrock aquifers in different areas of central Vermont. This project emerged from work begun with Jonathan Kim during a summer internship with the Vermont Geological Survey. Travis worked with me on fracture and fault patterns in the Clarendon Springs Formation at the Winooski River spillway in Essex Junction. All three presented the results of their research at Spring geology meetings (photo #1).

Malayika and Laura looked at the hydrogeology of two fractured bedrock aquifers in different areas of central Vermont. This project emerged from work begun with Jonathan Kim during a summer internship with the Vermont Geological Survey. Travis worked with me on fracture and fault patterns in the Clarendon Springs Formation at the Winooski River spillway in Essex Junction. All three presented the results of their research at Spring geology meetings (photo #1).

I'm also very lucky to have a great new bunch of Seniors, who have working with me to better understand the famous Lone Rock Point locality in Burlington since the summer, 2014. Along with Jon Kim, **Christina Strathearn, Eleanor Johnson, Max Langworthy, Anne Gombosi, Ben Schachner** and I are attempting to unravel the structural history of this site and, in doing so, explain some new discoveries. One of these is the presence of a cluster of previously unknown faults that dissect and shuffle the Champlain thrust up and down by several hundred feet in the subsurface east of Lake Champlain and, in doing so, appear to greatly influence the local hydrogeology. We are making great progress, although with the onset of cold weather in early September it feels a bit like a race against time before November comes. With all this interest in field-based geology research, it looks like we will have another great presence at the northeastern section of GSA and at meetings of the Vermont Geological Society this year.

I've also heard from recent UVM graduates **Abigail Ruksznis** and **Douglas MacLeod**. Abi began a program at Stanford University last year and is working on a field project in Death Valley. **Doug** started a program at Idaho State University and is working on a high grade gneiss terrain of British Columbia. Both are doing very well and enjoying their graduate experiences.

Students in our graduate program are doing equally well. **Kathryn Dianiska, Alice Newman, and Mike Ingram** presented the results of their research in New Zealand at various

professional meetings in the U.S. and Canada this year, including at the national meeting in Denver, Colorado (photo #2). All three have landed new jobs in the geosciences. Kathryn will be working as a geologist for the Anadarko Petroleum Company in her home state of Texas.

Mike is working for EIV Technical Services as a Geologist/Construction Inspector here in Vermont where he works closely with engineers. He has been working on two interstate bridge rebuild projects (I-91 in Milton and I-89 in Windsor) and on watershed delineation for culvert rebuilds. Alice has been hired as a visiting instructor at Carleton College where she is teaching a course in Tectonics. I'm happy to report she successfully defended her thesis and is aiming to launch a new career in the mining industry next year. Two of my other graduate students, **Hannah Blatchford** and **John Gilbert**, just arrived at UVM and will be working on the tectonic evolution of a fragment of the ancient Gondwana supercontinent in New Zealand. It promises to be another busy but rewarding year!

I hope all of you are doing well and I hope to see many of you during the year.

With best wishes,

Keith

kklepeis@uvm.edu

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

(802) 656-0247

Selected Publications:

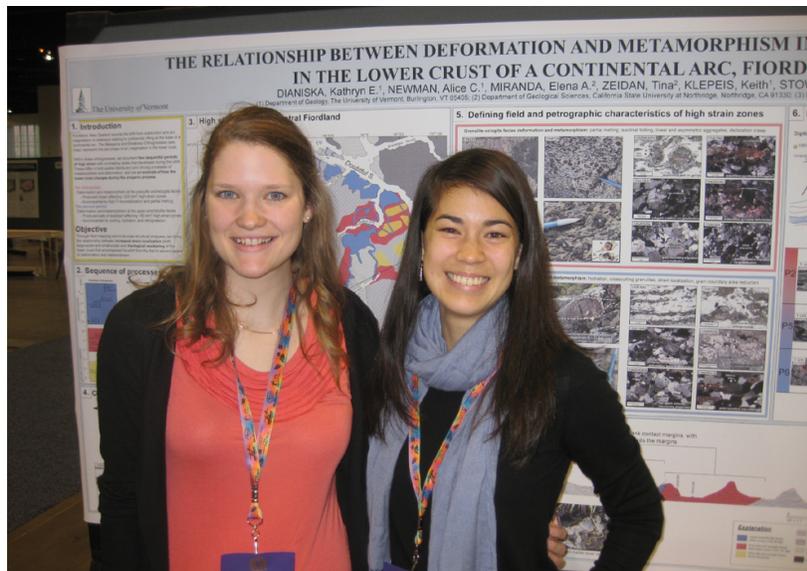
Webber, J.R., **Keith A. Klepeis**, Laura E. Webb, José Cembrano, Diego Morata, Gabriela Mora-Klepeis, Gloria Arancibia, (2015) Deformation and magma transport in a crystallizing plutonic complex, Coast Batholith, central Chile, *Geospheres*, submitted.

Betka, P. M., and **K.A. Klepeis**, 2013, Three-stage evolution of lower crustal gneiss domes at Breaksea Entrance, Fiordland, New Zealand, *Tectonics*, 32, doi:10.1002/tect.20068.

Kim J, Ryan P, **Klepeis K**, Gleeson T, North K, Bean J, Davis L, Filoon J (2014) Tectonic evolution of a Paleozoic thrust fault influences the hydrogeology of a fractured rock aquifer, northeastern Appalachian foreland. *Geofluids* 14: 266-290 DOI 10.1111/gfl.12076



Seniors Laura Cuccio (left) and Malayika Cincotta (right) presenting a poster of their Senior research at the northeastern section meeting of the Geological Society of America in Lancaster, Pennsylvania.



Graduate students Kathryn Dianiska (left) and Alice Newman (right) presenting a poster of their M.S. research at the national meeting of the Geological Society of America in Denver, Colorado. Kathryn and Alice founded the SURGE program (Sessions in Undergraduate Research in Geology)

SHORE
2013 SOUTH PACIFIC TOUR
PARTY
SHORE PARTY TO TUTOKO

Performing hits such as:
Welcome to Hawea • Measure Me, Maybe
Don't Cry for Me, Malaspina • Isocially In Love
The Dame Song • Do You Like Malaspina Coladas?
I Wanna Know (Which Way You Strike)

ML
keyboard/chisel

KK
guitar/juice harp

KD
vocals/tambourine

AN
vocals/saxophone

It's not all work and no play "down under"; from left Mike Ingram, keyboard and chisel; Keith Klepeis, guitar and juice hard; Kathryn Dianiska , vocals and tambourine; and Alice Newman, vocals and sax



Char Mehrtens, Professor (Stratigraphy, Sedimentation, Carbonate

Petrology): Hi all! It's a good thing that Jack agrees to do the newsletter every year as it forces me to sit down and think about what has gone on in the past year. It always makes me feel better to remember what happened (and it's my annual check on my memory health!). Work things: Grad student Ryan Brink (SUNY Potsdam) should have defended by the time you read this! Ryan has been working on a comparison between the newly identified early Middle Cambrian Altona Formation in upstate NY and our local Monkton. Ryan

completed detailed strat section measurements, sampled and conducted a modal analysis. Unsurprisingly, the petrography implicates Adirondack source rock but the stratigraphy was more interesting. The Altona is a high energy deposit (shoreface) which records some interesting sea level and sediment supply changes. Undergrad Brendan Auth worked with Ryan and me last spring to make a detailed bedrock map of the Monkton exposures in the Colchester area. These represent the deepest water Monkton in Vermont. Brendan plans to continue the project by examining the sandstone petrography. The other work activity, and the reason I didn't recruit a new grad student is my preoccupation in the summer '14 with writing a textbook for the introductory earth system class I teach (Geol 001 with an earth system science focus). It was an interesting process and I'm pleased that I got the first edition to the publisher and theoretically it will be out in time for me to use this spring. Then the edits start, but I won't think about that right now! Final work thing: the research project in Egypt that I've been involved in continues to struggle due to the unstable political situation there. We were able to publish the results of one part of the study this year and former grad student Steven Gohlke's UVM M.S. Thesis is now in a manuscript soon to be submitted. For the sake of our Egyptian geology colleagues we hope that life can return to normal in Egypt but instead, things appear to be deteriorating. Fun things: Jack and Ruthie Drake continue to be good golf buddies. Occasionally, I torment Barry Doolan with my golf game (Jack can hang in there with "almost a golf pro" Doolan, but not me!). I spent my summer at my cabin in the Adirondacks writing the textbook, but there were periodic breaks to go paddle my new ultralight solo canoe. Jack and I also finished the last leg of the 90 mile canoe route from Old Forge to Saranac Lake village. Please keep sending news of your activities. It is ALWAYS great to hear from everyone.

Publications

Tewksbury, B. J., Hogan, J. P., Kattenhorn, S. A., Mehrtens, C. J., & Tarabees, E. A. ,2014, Polygonal faults in chalk; insights from extensive exposures of the Khoman Formation, western desert, Egypt. *Geology (Boulder)*, 42(6), 479-482.

B. J. Tewksbury, E. A. Tarabees, C. J. Mehrtens, J. A. Wolpert, L. L. DeGennaro, G. S. Dennison-Leonard, T.J McLean, 2014, Extensive syncline network in Eocene limestone of the western desert, Egypt: Regional folding? Collapsed paleokarst? Mobilization of underlying shale? *Geol. Soc. Am. Abstr with Progr.*

Tewksbury, B. J., Hogan, J. P., Mehrtens, C. J. ,2014, Using online video conferencing and file sharing to run multi-institutional seminars and to bring guest speakers to the classroom. *Geol Soc. Am. Abstr. with Progr.*



10/2014

Canoeing the last leg of the 90 miler



Laura Webb, Assistant Professor (Igneous petrology and Geochronology)
Hello alumni and friends of UVM Geology,

Another year has rapidly passed since our last newsletter and I am very happy to report that I was tenured and promoted to Associate Professor. I am also pleased to share that we have begun producing some very nice data in the new $^{40}\text{Ar}/^{39}\text{Ar}$ geochronology lab. Some of our results from Chile will be on parade this fall at the Geological Society of America Fall Meeting in Vancouver. We still have some development work to do in the lab, but anticipate opening our doors to the geoscience community by next fall. So if you are hankering some geologic age control and any of the wonderful things Vermont has to offer, you know where to come. In the meantime, we will continue with some pilot projects, including the MS thesis project of Sam Lagor. Sam is looking at the relationship between deformation and magmatism in the Connecticut Valley Trough. I'm still active in my Mongolia and Papua New Guinea research, but we are ramping up on the myriad of problems yet to tackle here in New England.

This past summer I took some time to explore some Vermont fishing holes. I didn't catch many fish but I did find some amazing outcrops that I'd like to revisit with some students. I also enjoyed going a bit farther afield with my mom and sister and spent two weeks in Italy and Germany with our German sister (former foreign exchange student) and her family. I may have suffered slightly from "cathedral neck", but the wine and cheese and spectacular scenery were consumed with great enjoyment. So much so, I am already conspiring with colleagues regarding possible projects in Italy.

Warm regards,
Laura



Laura and her husband, Erich, enjoying an all too brief visit to the San Juan Islands.



Laura Webb (right) with sister, Jeanne, and mom, Elaine, in Orvieto, Italy this past summer.



Sam Lagor, Geology MS student, examines deformed granitic dikes along the western margin of the Knox Mountain pluton in Vermont.

Publications:

Webb, L.E., Baldwin, S.L. and Fitzgerald, P.G., *in press*, The Early–Middle Miocene subduction complex of the Louisiade Archipelago, southern margin of the Woodlark Rift. *Geophysics, Geochemistry, Geosystems*.

Heumann, M.J., Johnson, C.L., **Webb, L.E.**, Taylor, J.P., Jalbaa, U., and Minjin, C., 2014, Total and incremental left-lateral displacement across the East Gobi Fault Zone, southern Mongolia: implications for timing and modes of polyphase intracontinental deformation, *Earth and Planetary Science Letters*, v. 392, p. 1-15, doi: 10.1016/j.epsl.2014.01.016.

Conference abstracts:

Webb, L.E., **Klepeis, K.A.**, Jones, D.A., Webber, J.R., Cembrano, J., Morata, D., Mora-Klepeis, G., and Arancibia, G., 2014, Thermochronologic Constraints on the Late Paleozoic and Early Mesozoic Tectonic Evolution of Coastal Central Chile (33.5 S), Geological Society of America Annual Meeting, Vancouver, October, 2014.

Lagor, S., and **Webb, L.E.**, 2014, The relationship between magmatism, deformation, and metamorphism during the Acadian Orogeny: a case study from the Knox Mountain Pluton, Green Mountains, Vermont, Geological Society of America Annual Meeting, Vancouver, October, 2014.

Baldwin, S.L., Bermúdez, M., Fitzgerald, P.G., and **Webb, L.E.**, 2014, Integrative thermochronology, petrology and modelling reveal the 4-D evolution of active plate boundary zones, 14th International Conference on Thermochronology, September 2014, Chamonix, France.



Stephen Wright, Senior Lecturer (Glacial geology, Geomorphology, Environmental Geology):

I've had a relatively quiet year with no new projects underway and no Regional Geology field excursions. Molly Conroy and I presented two posters at the NE GSA meeting in Lancaster, which summarized much of my work in Bolton Notch and included Molly's GPR profiles of subsurface structures in the large delta at the south end of the notch.

Several field highlights of the last year were the NEIGC field trips to the Katahdin region last October during some spectacular fall weather, a field trip to the Baltimore Mafic Complex, and the Friends of the Pleistocene field trips in early June in the Finger Lakes region of New York. In addition to the drumlins and flutes the Finger Lakes region is famous for, we visited a stratigraphic section where a layer of well-preserved leaves occurs beneath the regional till (see below photo). The leaves were striking both because I never find anything like that in exposures here and because these leaves were radiocarbon dead and likely were preserved from the last interglacial period.

Personally it's been a good year in that my son (Kit), after sustaining a hip injury from 4 years of rowing on the St Lawrence crew team, is back to his normal activities and once again leaving his father in the dust on nordic skis and bikes. After graduating from UVM two years ago, my daughter (Rebecca) finished her MS in dairy science at UNH this summer and is now back in Vermont working for Poulin Grain. One aspect of her research was working with cows fitted with trap doors into one of their stomachs!

Please stop by to say hello if you're in the area. Otherwise I'm sure I'll see some of you at the NE GSA meeting in Bretton Woods this coming March.

Email: Stephen.Wright@uvm.edu



Columnar jointing in rhyolite exposed on North Traveler Mountain, Baxter State Park, Maine.



Radiocarbon "dead" leaves and twigs from a section exposed in Great Gully, near Cayuga Lake



Julia Perdrial, Assistant Professor for Geochemistry. Hi there, this was my first full summer in Vermont and it turned out to be so much more pleasant than the 100+ degree summers in Arizona!

We spent some time exploring our new home around Burlington, the Adirondacks and the coast of Maine but writing and fieldwork kept me quite busy: I am lead author on a chapter of the first book on the Critical Zone (the zone spanning from the tops of the trees down to the actively cycled groundwater). Our chapter will explain soil biogeochemistry in this context and link molecular scale soil processes in to catchment (and global)-scale issues of the Anthropocene.

I'm also finishing up a paper on catchment scale carbon budgets that uses data of one of the NSF funded Critical Zone Observatories. My co-authors and I detected an important imbalance between catchment carbon input and outputs that we detail in a collaborative paper that includes numerous student authors. I'm particularly excited about this work since this is the first time that all major fluxes and reservoirs have been quantified at this scale.

I also had the great pleasure to work with two students this summer on a CAS funded project entitled carbon, nutrient and contaminant metal release from old vs. young near-stream sediments during flooding. For this project we went out into the Mad River Watershed and took soil samples, brought them back to the lab and began processing the samples.



i) Andy, my lab assistant, filters aqueous soil extracts. ii) Mae, an undergraduate student from Wooster College uses a bucket auger to retrieve soil samples, iii) we are bushwhacking in dense riparian vegetation.

We made great progress and fortunately can continue this project with the help of Alyson, my new MS student and Lauren, an environmental science major working with me this fall.

Coming up: I'll be at the AGU fall meeting this year where I'm chairing a session on "Critical Zone Research as an Incubator for Interdisciplinary, Cross-Site, Process-Oriented Science" and present preliminary results on the floodplain work I've done here in the NE this year.

Peer reviewed publications this year:

Perdrial JN, McIntosh JC, Harpold A, Brooks PD, Zapata-Rios X, Ray J, Meixner T, Kanduc T, Litvak M, Troch P, Chorover J (2014) Stream water carbon controls in seasonally snow-covered mountain catchments: impact of inter annual variability of water fluxes, catchment aspect and seasonal processes. *Biogeochemistry* 118(1-3): 273-290

Stielstra C, Brooks PD, Lohse KA, McIntosh JM, Chorover J, Barron-Gafford G, **Perdrial J.N.**, Barnard HR, Litvak M (under review) Climatic, Landscape, and Edaphic Controls on Soil Carbon Fluxes in Seasonally Snow Covered Forest Ecosystems. *Biogeochemistry*

Vázquez-Ortega A, **J.N. Perdrial**, A. Harpold, X. Zapata, C. Rasmussen, J. McIntosh, M. Schaap, J. Pelletier, P. Brooks, M. K. Amistadi, Chorover J (in review) Rare earth elements as reactive tracers of biogeochemical weathering in forested rhyolitic terrain. *Chemical Geology*

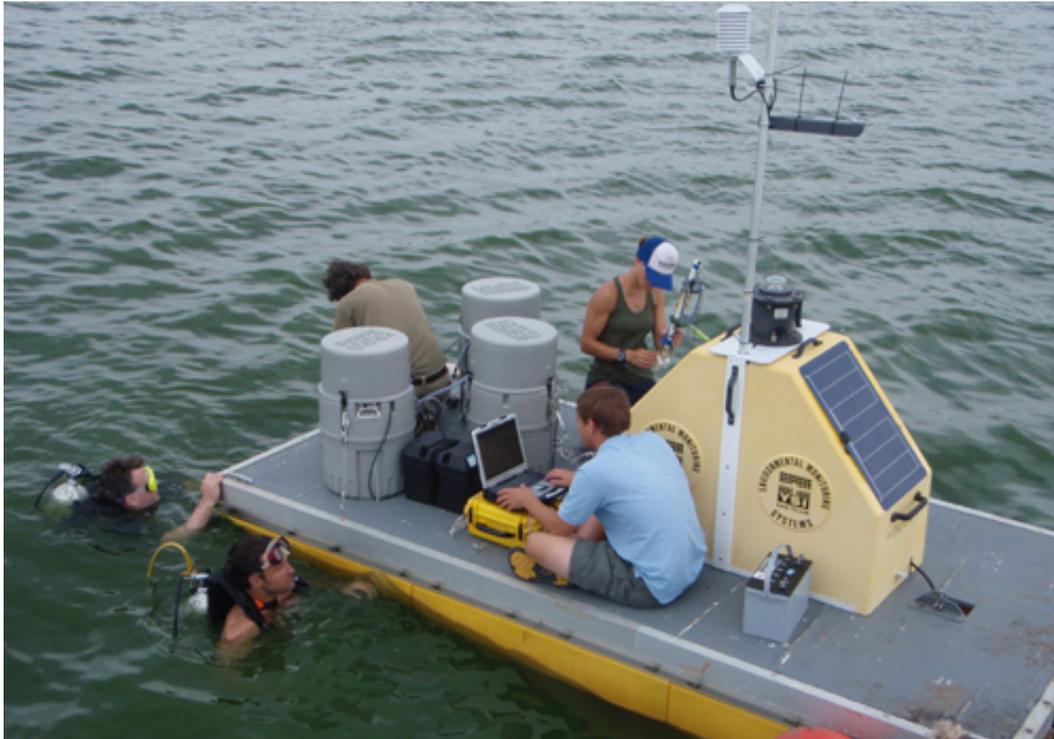
Email: Julia.perdrial@uvm.edu



Andrew Schroth, Research Assistant Professor (Low Temperature Geochemistry, Limnology and Oceanography)

Hello! I am a new Research Assistant Professor, and I am excited to be a part of UVM and the Department of Geology in particular. I come to the department after 5 years at U.S. Geological Survey in Woods Hole, MA, where I was a postdoctoral scholar and then a research geologist. Since I began working within the department, I have felt immediately at home due to the friendly faculty, staff and students here at UVM. My primary area of expertise is in low temperature geochemistry and environmental mineralogy, but I also have teaching and research interests in soil science, hydrology and hydrogeology. I am particularly interested in the transport, fate and speciation of metals in surface waters, soils and sediments. I have come to UVM to lead a team of Vermont-based scientists and students in an NSF EPSCoR-funded research effort that aims to better understand nutrient dynamics and algal blooms in Lake Champlain and its watershed, generally in the context of climate change and adaptive management. Our team has been extremely busy establishing an exciting network of sites for time series sample collection (water, sediment and biomass) and sensor deployment on Lake Champlain's Missisquoi Bay and at select sites within the Missisquoi and Winooski watersheds. Over the next few months, we will be conducting laboratory analyses of these samples as well as processing and interpreting data collected over the field season, while also establishing a winter sampling plan. We will continue to collect data from these sites over the next 4 years in an effort to better characterize and quantify inter and intra annual variability within the system and, more importantly, understand the environmental parameters that control nutrient/algal dynamics within the system. I also have active projects in Alaska studying trace metal speciation and cycling in watersheds, dusts and coastal marine waters that I hope to involve UVM undergraduate and graduate students as soon as possible. In the future, I look forward to developing new projects in the montane watersheds and soils of the nearby Green and Adirondack ranges, as these were the systems that I studied as a graduate and undergraduate student of geochemistry. I am also

looking forward to teaching coursework in geochemistry and possibly other subjects through the Department of Geology. I am always keen to meet geologically-inclined alumni and current students! Please do not hesitate to shoot me an [e-mail](#) or stop by my office to chat!



Missisquoi Bay Microbiological Sampling Platform



Nico Perdrial: Greetings! It has now been one year that I join the department and so many things happened... It was a blasting full year! Vermont is a beautiful state, Burlington one of the most pleasant city I have lived in and the Geology department a fantastic place to work at. In last year's newsletter I was sharing my dread of the upcoming winter. It is now behind us and to be honest it wasn't that hard. Sure it is cold but I also discovered that it is a sunny time of the year. In fact I believe that preparation was key, not knowing what to expect I prepared for polar life and got pleasantly surprised that it was only "sub-polar". I also greatly enjoyed ice skating on the outdoor rink and "hiking" on Lake Champlain. With respect to research, I continued working on the behavior of uranium in soils during weathering with frequent trips to the Stanford synchrotron and cultivated and initiated collaborations throughout the US. I chaired a session on "Energy Resources: From Production to Environmental Impact" and presented my results at the Goldschmidt Conference in Sacramento last June. I also presented some uranium work at the American Geophysical Union meeting in San Francisco last December and was fortunate to see 5 papers that I authored or co-authored published in 2014. Starting this fall my MS student Jenny Bower and I are starting to investigate the mobility and speciation of legacy lead in Burlington soils. Our research goal is to understand the complex mechanism responsible for Pb mobility in soils to propose sustainable means of mitigation to the community. Last spring I taught Environmental Geology (GEOL055) to 30 great students. Stephen did an amazing job building that class and the labs that he provided me with are all beautifully built. It helped me also discovering more of Vermont geology and ongoing environmental issues. This fall I am teaching a new class: Geocomputing. I decided to offer that class after observing that although our students acquire a very strong knowledge in geoscience concepts and field studies they sometimes lack the analytical skills necessary to thrive as professionals. So far it has been very fun to teach that more than full class.

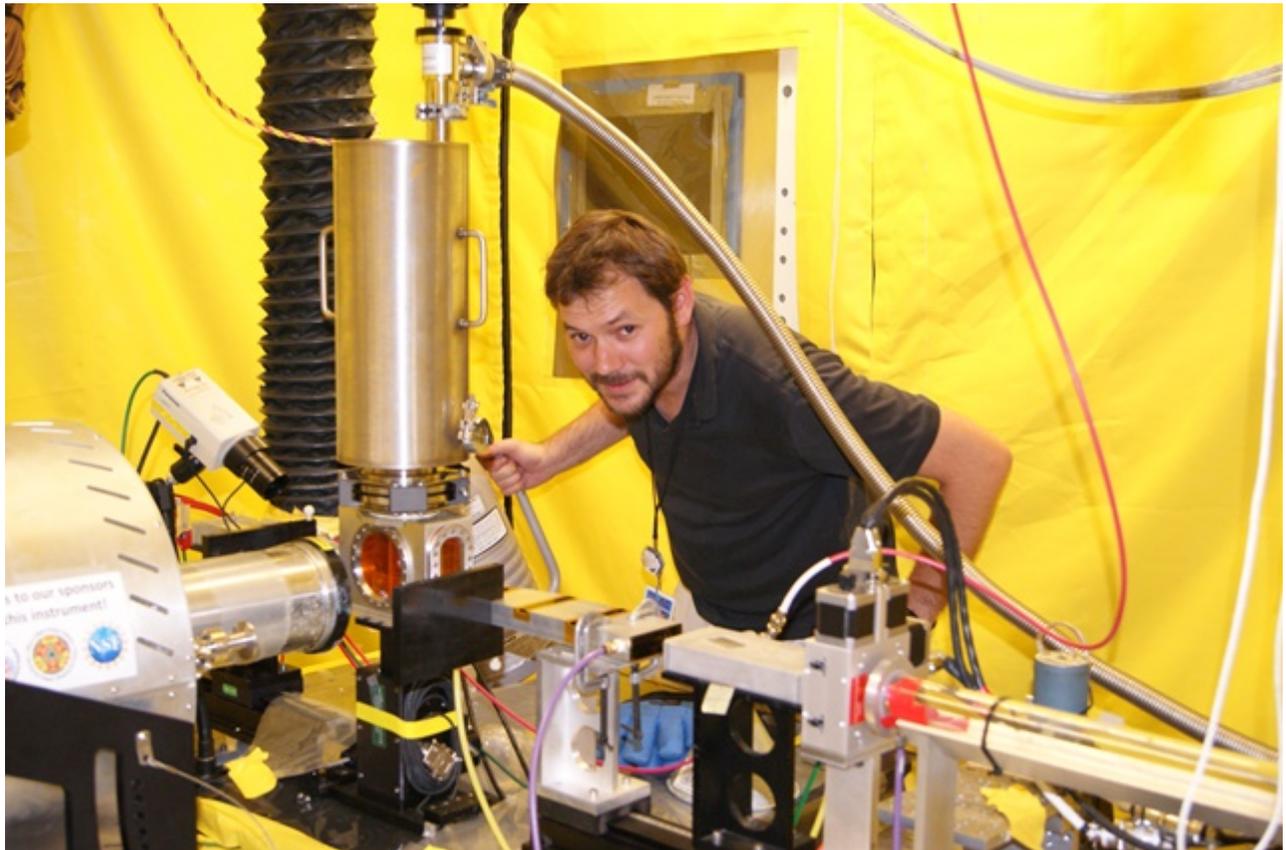
Selected Publications:

- Perdrial N.**, Thompson A., O'Day P., Steefel C.I and Chorover J. (2014) – Mineral transformation controls speciation and pore-fluid transmission of contaminants in waste-weathered Hanford sediments. *Geochimica et Cosmochimica Acta*, 141, 487-507.
- Hayes S., Root R., **Perdrial N.**, Maier R. and Chorover J. (2014) - Surficial weathering of iron sulfide mine tailings under semi-arid climate. *Geochimica et Cosmochimica Acta*, 141, 240-257.
- Dontsova K., Zaharescu D., Henderson W., Verghese S., **Perdrial N.**, Hunt E. and Chorover J. (2014) – Impact of organic carbon on weathering and chemical denudation of granular basalt. *Geochimica et Cosmochimica Acta*, 139, 508-526.
- Kanematsu M., **Perdrial N.**, Um W., Chorover J. and O'Day P.A. (2014) – Influence of phosphate and silica on U(VI) precipitation from acidic and neutralized wastewaters. *Environmental Science and Technology*, 48, 6097-6106.
- Perdrial J.N.**, **Perdrial N.**, Porter C., Vazquez-Ortega A., Leedy J. and Chorover J. (2014) – Experimental assessment of fiberglass passive capillary wick sampler (PCap) suitability for inorganic soil solution constituents, *Soil Science Society of America Journal*, 78, 486-495.

Perdrial N., Vasquez-Ortega A., Reinoso-Maset E., O'Day P.A. and Chorover J., (2014) – Acid-weathering and uranium speciation: Reaction kinetics and phosphate addition.
Goldschmidt Conference, June 8-13, Sacramento, CA, USA.

Email: Nicolas.Perdrial@uvm.edu

Website: <http://nicolasperdrial.weebly.com/>



Nico checking out the beam on beamline 11-2 at the Stanford Synchrotron Radiation Lightsource last summer

Staff



Robin Hopps: Administrative Assistant: The UVM Geology Department continues to be a great department because of our outstanding students, faculty and staff. At present, the Department has 9 graduate students, 2 PhD students through Rubenstein School, 63 majors, 10 minors and 6 students with geology concentration. Stop by Delehanty Building to visit, as well as see the Perkins Museum. Please stay in touch by sending an email to geology@uvm.edu. You can also see the list of lectures for the Geology Seminar Series on the UVM Geology website at “[News and Events.](#)”

I enjoy my ten-month position in the office, as well as being out of the office from mid-June to mid-August for my landscaping business. In July we spent a week on the Cape and took full advantage of the Cape Cod National Seashore (National Park Service). In August we visited the diverse and beautiful 270-acre tidal shore frontage of Boothbay Harbor (ME) Botanical Gardens. At home, we had a great plum, blueberry, raspberry and mulberry harvest this year. Never a dull moment.

email: robin.hopps@uvm.edu visit <http://www.uvm.edu/perkins/>



Srebrenka Mrsic: Administrative Coordinator: have worked in the Geology Department as Administrative Department Coordinator since May 16th, 2008 and been in the US since 1997. After these 6 years at UVM I can tell that I am still very happy to be here especially in this department. It is a real pleasure to work with every single person in the Department. I am fortunate to be around young, educated people and watch them develop; it makes me feel really good and I am always glad to assist them when they need help.

Personally, I am so looking forward to May 17th, in 2015. I am so proud that my twin daughters are going to be UVM graduates like their two older sisters, and my grandson will start first grade.

Srebrenka

Email: srebrenka.mrsic@uvm.edu



Gabriela Mora-Klepeis, Senior Research Technician: Sometimes it is hard to believe that we moved to Delehanty Hall 10 years ago! We have a great facility that allows faculty and students do research on a great variety of topics. I am happy to report that thanks to the support from the Dean's office we were able to replace our computer laboratory facility this year. I spent part of the summer removing the old Macs and setting up 27 new iMacs. The College of Arts & Sciences IT group was in charge of installing all the software. I really appreciate the generosity of the College and the assistance of the IT group they are amazing! The new computer lab was ready just in time for the beginning of the new academic year. Last May I was invited to join Staff Council and I am now one of the two CAS representatives. On a personal note, I was able to do a team triathlon again with Jack Drake in early July. It was such a windy morning in St. Albans that the kayak portion of the event got cancelled for the safety of all athletes. That did not prevent us from having the traditional post-race celebration with Jack and Ruth at their Grand Isle cabin. In early August I had the opportunity to explore the Monterey and Big Sur areas in California. Although it was a family vacation I could not stop being a geologist. I enjoyed the spectacular rugged coastline as well as the sedimentary rock exposures during my coastal walks! Even though it has been another busy year, I always have time to show you our building, so please stop by, I'll be happy to give you a tour!

Email: Gmora@uvm.edu <http://www.uvm.edu/~geology/?Page=faculty/moraklepeis.php>



Mission in California



Snowshoeing in Vermont



Dan Jones, Research Technician: It has been a great year in the Geochronology Lab! We are now busy with some of our first samples, and have been producing meaningful data, so if anyone needs to know how old some rocks are...Outside of work, I spent a glorious three weeks this summer camping in Colorado, and am now looking forward to a crisp fall in the Green Mountains and a snowy winter!

Emeriti Faculty



Barry Doolan: Greetings to all Geology Alums.

Hello to all alums and friends. It has been a great year in retirement...travel, golf and bit of geology. Sandy and I spent some time in Charleston, SC enjoying sun, surf and golf. Heard from a few alums. Congratulations to Jeremy Hourigan on the birth of his first daughter this year; Hello from Laura Mallard who is doing well at Appalachian State in Boone NC.

Older daughter Kristan (UVM Geology '92) is doing well in nearby Bakersfield running Does Leap Farm (organic goat cheese and kiefer and more recently pork and goat sausage) with her family. Grandkids Zoe, Peter and Maddie continue to be a source of joy and inspiration for us. Kate and Ian and our granddaughter Maddie have also moved back north and now live in Portland, Maine. We are fortunate to have all of our family so close by.

We still live in Fletcher Vermont (since 1981) and welcome any visits you may make to Vermont. Just put in 27 Cambridge Road, Fletcher Vermont in your GPS. Looking forward to hearing from past grads. Drop an email or visit us in Fletcher when you're in the area. Best wishes to all



Barry and crew near Oaxaca, Mexico



Another year – another “Champlain Thrust”. But this one is especially nice to compile because I get to hear from so many of you. If you know of any other alums who didn’t receive the email request for info, please tell them to send it to me. I’ll be doing an update next fall with any new information.

Ruthie and I continue with our same general “game plan” with summers playing in the Burlington area and at our camp on the lake in South Hero (golf with Barry and Char, sailing, biking, canoeing, etc.); fall in Burlington, and up at UVM doing the Champlain Thrust plus sitting in on classes at UVM; winters in Carpinteria, a little town about 12 miles down the coast from Santa Barbara; and spring back here in Vermont getting all of my outdoor “toys” ready for summer activities. Life is good!! And it was great to hear from so many of you.

Best to you all.

Jack

Email: john.drake@uvm or jcdrakevt@gmail.com.



J&R relaxing at a B&B in VT



David Bucke: This has been another great year at the Bucke household. We continue mowing, weeding, and pond upkeep all of which, by the way, we enjoy. Donna is a terror on the z-mower. Our late winter getaway this year took us to Costa Rica - highly recommend it. We continue to be blessed with good health so we could again do our annual September/October "regional trip" via RV. (Why do they allow old geezers to drive these things?) We logged about 8000 miles which included stays at three of our favorite campgrounds: Holland Lake, a national forest site on a beautiful glacial lake tucked away in Montana south of Glacier National Park; Capitol Reef National Park in southern Utah; and Ft. Pickens, part of the Gulf Islands National Seashore, on the barrier island seaward of Pensacola, Florida. Our 2 older daughters, Kelly and Karen, joined us there for a week of gulf-side leisure, which included an amazing performance by the Blue Angels who are based right there in Pensacola. These travels always bring back fond memories of travels with good old Allen Hunt.

Donna & I extend our warm best wishes to all of you

Our new email address is: ddbucke@gmail.com

I think my UVM mail still works & flips into the gmail box -- but maybe not.

Graduate student information, research and activities can be found at
www.uvm.edu/geology/?Page=gradresearch.html&SM=oppmenu.html
and
www.uvm.edu/geology/?Page=enews/graduate_students.html

RECENTLY COMPLETED M.S. THESES

Go to **<http://www.uvm.edu/~geology/?Page=gradresearch.html&SM=oppmenu.html>**

2014

Ryan Brink- A petrological and provenance comparison of the late Lower Cambrian Monkton (Vermont) and the late Lower/early Middle Cambrian Altona Formations (Northern New York), along the Laurentian margin of Iapetus

Kathryn Dianiski - Structural evolution and deformation of the lower crust: Insights from microstructural analysis and geochronology of Vancouver Arm and Crooked Arm in Fiordland, New Zealand

Jacob Menken - Response of Tourmaline Atomic Arrangement to Thermal Treatments

Alice Newman - Understanding lower crustal deformational processes: A structural and kinematic analysis of Vancouver Arm and Breaksea Sound in Fiordland, New Zealand

Lucas (Luke) Reusser PhD: Quantifying Human Impacts on Natural Rates of Erosion Along Continental Margins

Ana Vang - The Geomorphic Effects of the Vermont Interstate System

2013

Patrick Dyess - Low-temperature TitanIQ thermobarometry of Taconian Cover-rocks of Rochester, VT [Read Patrick's Thesis](#) and/or [Appendices](#)

Angel A. García Jr. - Elemental Sulfur Nanoparticle Coarsening Kinetics and Changes in Raman and Voltammetric Signals [Read Angel's thesis](#)

Steven Gohlke- Insights into the origin of a zone of slipped deformation bands from the Seiyal Fault, Western Desert, Egypt

Alice Nelson - The Concentration of In Situ ¹⁰Be in Fluvial Sediments as a Tool for Deciphering 6 My of Greenland Ice Sheet History from a Marine Sediment Core

Megan Scott - The Tectonic Influence on the Depositional Environment of the Middle Ordovician Middlebury Formation [Read Megan's thesis](#)

2012

Christine Downs McNiff - The Characterization of Ductile Deformation in the Upper and Lower Plates of the Hinesburg Thrust Fault Through Detailed Geometric Analysis of Selected Outcrops.

Johanna Palmer -A Paleolimnological Study of Holocene Sediments in St. Albans Bay, Lake Champlain

Merril Stypula – U-Pb Zircon Dating of Metamorphic Tectonites from Tavan Har, Southeast Mongolia: Implications for the Role of Tectonic Inheritance in Intraplate Shear Zones

Jeff Webber – Advances in Rock Fabric Quantification and the Reconstruction of Progressive Dike Emplacement in the Coastal Batholith of Central Chile

THIS YEAR'S OUTSTANDING GRADUATE TEACHING ASSISTANT WENT TO

Alice Newman



HURRAY FOR THE LIBERAL ARTS!!



The graduating class of 2014:
Left to right: Laura Cuccio, Karina Heffernan, Stefan Christie,
Travis Dawson, Malayika Cincotta, Jacob Vincent and Molly



Travis Dawson receives the Outstanding Senior, Charlie Doll Award, pictured with Andrea Lini
and the
American Mineralogist's Outstanding Student Award, pictured with John Hughes

WINNERS of GEOLOGY DEPARTMENT PRIZES AND AWARDS ARE LISTED ON THE FOLLOWING WEB PAGE

<http://www.uvm.edu/geology/?Page=honors.html>

COME SEE US AT THE FOLLOWING:

2015 NATIONAL GSA Meeting:. Baltimore, MD, 1 – 4 Nov. 2015

2014 NORTHEAST SECTIONAL GSA Meeting: Bretton Woods, NH, 23 -25 March

NATIONAL AGU Meeting:

<http://www.agu.org/meetings>

NEIGC 2015: Check for information, dates and specific location at <http://www.salemstate.edu/~lhanson/NEIGC/>

Alumni/Reunion Weekend at UVM!!!! (Note that this coming year it is in the fall!)

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>

See the following pages for photos from Regional geology!!

Regional Geology in recent years

As Char has written, Regional Geology is now about to be reborn after a hiatus of several years. Below are several pictures from past trips so you can relive the experience. We will revive this program in the summer of 2016 and add to the photo collection! We hope that those of you who went on Regional found it to be great educational experience. Also (if you haven't already) please send an update on your activities to me (john.drake@uvm.edu with "newsletter 2015" in the subject line) for inclusion in the alumni section of the newsletter.

ALUMNI section of 2014 Champlain Thrust Newsletter



Regional Geology, 2012 on a "warm" summer day in Colorado



2011 Colorado Regional Geology class stymied by snow in the South Lottis Creek Valley. From left to right: Sam Hellman, Sam Kleh, Parker Richmond, Doug MacLeod, Abi Ruksznis, Ryan Stredny, Jo Palmer (TA), Hank Ainley, Sandra Cronauer, Abby O'Donnell, Emily Siegel, and Elizabeth (Ollie)



Regional Geology, Iceland, 2010



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.



**Italian Regional Geology,
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, Italy, 2006



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



Iceland Regional Geology Crew enjoying summer sun, August 2004



Regional Geology 2003 enjoying the Maine coast

Last but not least, a “blast from the past”



**Last but not least: Regional Geology from 1986!
Can you identify these people??
Contact John Drake <mailto:John.Drake@uvm.edu> with your
answers.**