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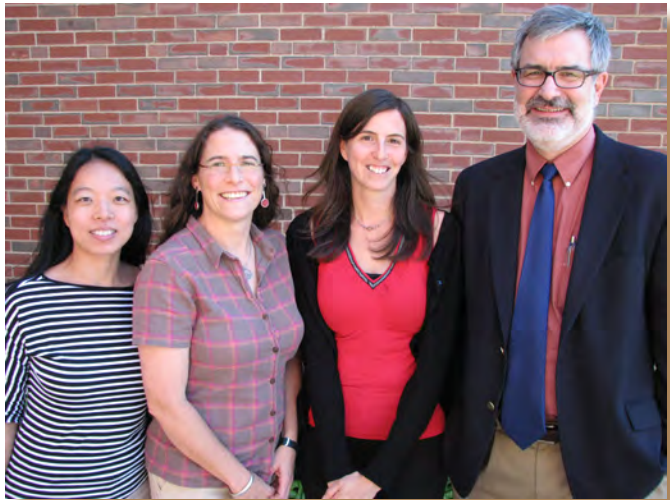


GREETINGS FROM (OUTGOING) DEPARTMENT HEAD
MARK LECKIE

This newsletter is long overdue, but I hope you enjoy reading about all the truly exciting things going on around the department. Here's a quick update from the Department of Geosciences.

Four new faculty have joined the Department of Geosciences in the past two years: 1) Commonwealth Honors College Assistant Professor **Isla Castañeda** is a biogeochemist who uses biomarkers (molecular fossils) and other proxies to study past climate change, 2) UMass Extension Assistant Professor in Water and Climate **Christine Hatch** is a specialist in surface water-groundwater interactions, 3) Assistant Professor **Haiying Gao** is a seismologist who primarily studies subduction zone processes, and 4) UMass Extension Associate Professor in Environmental Geophysics **Bill Clement** is a specialist in near-surface geophysics.

The past two years has also been a period of great loss for the department. Emeritus Professor **Oswald Farquhar** passed away in May 2012. He joined the UMass faculty in 1957 and retired in 1985. Former UMass Chancellor and Commonwealth Professor of Geophysics **Randolph "Bill" Bromery** passed away in February 2013. Please see the remembrance for Bill in this Newsletter. National Academy of Sciences Member and University Distinguished Professor **Lynn Margulis** passed away unexpectedly in November 2011. Please see the remembrance for Lynn in this Newsletter. **Steve Goodwin**, Dean of the College of Natural Sciences, and I served as Master of Ceremonies for **"Celebrating a Life of Science: In Memory of Lynn Margulis"** March 2012 in the Campus Center; there were more than 200 participants from all over the world. **Celeste Asikainen** and the **Margulis Lab** organized a second day of presentations and remembrances in Morrill Science Center; ~100 people participated.



Our four newest faculty members: L - R, Haiying Gao, Christine Hatch, Isla Castañeda, and Bill Clement.

In 2011-2012, we conducted a **periodic Academic Quality and Development (AQAD) review** that included preparing a self-study and 5-year strategic plan, and hosting an external AQAD review committee in April 2012. The department is strong, the faculty are very research-active, and we have a great vision for the future. However, we have a number of challenges, including the rising costs of graduate student support and rebuilding the department where there have been cumulative faculty losses over the years, while continuing to grow our vital research revenues and hire in directions that anticipate the changing landscape in the broader geosciences. In one sign of the times, the **Environmental Science program**, with its nearly 300 majors, became a two-department program between Geosciences and Environmental Conservation in 2013; **Richard Yuretich** is the Co-Director and numerous Geosciences faculty serve as academic advisors for Environmental Science majors. The Department of Geosciences currently has about 90 majors between Geology, Geography, and Earth Systems, and about 75 graduate students. We have one of the highest satisfaction ratings on campus based on senior exit surveys.

GEOSCIENCES REMEMBERS RANDOLPH “BILL” BROMERY

by Peter Robinson, Tony Morse, Don Wise, and Steve Haggerty

The Department of Geosciences and the University of Massachusetts mourn the death of Randolph Wilson Bromery on February 26, 2013. The former Commonwealth Professor of Geophysics, Department Chair, and Chancellor of the UMass Amherst campus was the epitome of a gentleman scholar. **Randolph “Bill” Bromery** was born January 18, 1926 in Cumberland, Maryland. Bill enlisted at age 17 in the U.S. Army Air Corps and served with the segregated Tuskegee Airmen during World War II. He received his BS with a double degree in mathematics and physics, and graduated cum laude from Howard University in 1954. He earned his MS in geology and geophysics from American University, and PhD in geology and oceanography from Johns Hopkins University. Bill was an Airborne Exploration Geophysicist and a Supervisory Research Geophysicist with the U.S. Geological Survey from 1948 to 1967 when he joined the Department of Geology and Geography. He held numerous positions at the University of Massachusetts from 1969 to 1992: Chairman of the Department of Geology and Geography; the first Vice Chancellor for Student Affairs; first African-American Chancellor of the Amherst Campus (1971-1979); Executive Vice President of the University of Massachusetts System; and he retired



as Commonwealth Professor of Geophysics in 1992. While at the university, Bill worked diligently to expand educational opportunities for black students in the 1970s and later led campus efforts to acquire the papers of W.E.B. Du Bois. Bill went on to lead Westfield State, Springfield College, and Roxbury Community College, retiring in 2003. He also served as Chancellor of the Board of Regents for Higher Education under Governors Dukakis and Weld.

Over his career, Bill traveled over much of the world as a consulting geophysicist for petroleum companies and for other organizations. He served on numerous boards, including: Exxon Corporation; Chemical Banking Corporation; NYNEX Corporation; John Hancock Mutual Life Insurance Company; Mount Holyoke College; and Johns Hopkins University. He was the founding member of the University of Massachusetts at Amherst Foundation and served as chair of the Advisory committee to the Newman Center at the University of Massachusetts. He served as the first African-American President of the Geological Society of America in 1989, and was the recipient of many prestigious awards, including nine honorary doctorates from colleges and universities around the world. In 1997, he was honored by the National Academy of Sciences as one of the nation's Outstanding Black Scientists and his portrait hangs in the Hall of the National Academy of Sciences in Washington, D.C. President George W. Bush appointed Bill to membership on the President's Committee on The National Medal of Science.

In 1965 **Peter Robinson** was being recruited to join the faculty at Johns Hopkins University, to replace Cliff Hopson, who had

moved to Santa Barbara. Bill Bromery, then a PhD student there, was working on the geophysics of the Baltimore Gneiss domes, a subject close to PR's heart. In the end Johns Hopkins did not persuade PR to move from Massachusetts into a lower latitude and urban environment; had they been successful, PR probably would have served on Bill's dissertation committee. According to Peter Robinson: "I am not completely aware of the final composition of Bill's committee, but am pretty sure it included Ernst Cloos and J.D.H. Donnay. Bill always spoke with reverence about Donnay, a very dedicated, no-nonsense crystallographer, apparently with a heart of gold."

In January 1966, **Oswald Farquhar** organized an economic geology conference at UMass. Most of the Department faculty attended all or part of this meeting. One of the speakers was Bill Bromery, who was helping to run the U.S. Geological Survey's program of aeromagnetic surveys. Bill got into this field in part because of his flying experience during WWII. According to Peter Robinson, both **George McGill** and PR had words with Bill about what he was doing, and perhaps even discussed collectively about the need to add geophysics to the faculty stable. These contacts put UMass "on the map" for Bill, and also provided an opportunity to promote him to Department Head H.T.U. Smith. For PR, having Bill on the faculty was a great treat and an opportunity to use geophysics in the study of the local gneiss domes, resulting in PhD theses by **Jack Kick**, **David J. Hall**, and **Farrukh Ahmad**.

Because of Bill's interest in rock magnetism, he once traveled to Imperial College London, and there got to know **Steve Haggerty**, then completing his PhD on the magnetic properties of Icelandic lavas. There is no doubt that this meeting and Bill's realization of the importance of Steve's work on rock and mineral magnetism, was what eventually led to Steve coming to UMass (after a short stay at the Geophysical Laboratory in Washington). After Bill's short time as Department Head, when he moved on to become Vice-Chancellor and then Chancellor, we had the opportunity to hire **Laurie Brown**, then a student of paleomagnetism and rock magnetism as well as general geophysics. This then instituted a new and fruitful era!

Bill Bromery was also key to bringing **Don Wise** and **Tony Morse**, both from Franklin and Marshall, and **John Hubert**, from Missouri, to campus. According to PR, "Don almost upset the applecart by staging a snowball attack with former F&M students on Tony, at the beginning of his visiting lecture. One of the fun moments with Bill was when we held opposite ends of clothesline to demonstrate seismic S-waves in an introductory lecture in Morrill Auditorium!"

Tony Morse adds another F&M-Bromery-Haggerty connection: "With John Moss and others at Franklin and Marshall College and because of the close relationship between Moss and Reds Wolman at Hopkins, we got Bill Bromery to visit F&M for a day. He



Randolph W. Bromery

(Ph.D., Johns Hopkins, 1968)
Commonwealth Professor

Exploration Geophysics,
Groundwater Geophysics

was grateful for a glimpse at another successful academic program, and while he admired us he suggested that he might have other ambitions elsewhere. And that turned out to be UMass. Then at Pete's instigation I was recruited to UMass by Bill. I professed a preference for petrology rather than mineralogy, and urged that they hire Haggerty as well. So Bill phoned Steve and returned to me, and I said 'May I call Steve too? And he said, 'Sure.' So I called Steve and found out that we had each said, 'I'll come if he does,' and that was that. So instead of our hiring Bill at F&M, Bill hired two of us from F&M and one from the Geophysical Laboratory. Wheeling and dealing to build a Department was never done simpler."

Bill's scientific achievements grew out of his role in the 1940s and '50s USGS aeromagnetic surveys, flying back and forth, line after line, across vast areas of the US. Among the initial reasons he got the job was his former experience as a pilot and the decreased probability that he would get air-sick while cooped up with the recording magnetometers. Ultimately his task involved reduc-

ing those criss-crossed lines into maps of magnetic intensity tied to ground data. Detailed interpretation of the interrelationships between those magnetic patterns and regional geology in the Central Appalachians was the basis of his PhD thesis, the expertise behind F&M's attempt to recruit him to its faculty. Although satellite observations have begun to supersede aeromagnetic maps for the study of magnetism in the deepest part of the crust, aeromagnetic maps for a half-century were a critical component in understanding of a complex region and continue to be important, especially with better control from satellite navigation. In later years, this mental ink between regional geophysics and underlying geology supplemented by a lot of common sense was the basis of his successful advising on large-scale projects throughout the world.

In addition to helping to build a strong Geology program in the late 60s, Bill was very instrumental in bringing jazz to UMass, in part by recruiting such jazz greats as Max Roach, Yuseff Latiffe and others. He was a dedicated saxophonist and lifelong student of jazz.

Bill Bromery is survived by his wife of sixty-five years, Cecile (Trescott) Bromery; one sister, Bettyjane; one brother, Robert; five children: Keith; Dennis; David; Christopher; and Carol Ann; eleven grandchildren; and three great grandchildren.

There are several wonderful interviews with Bill Bromery on YouTube:

<http://www.youtube.com/watch?v=43aMQiG7q7E>

<http://www.youtube.com/watch?v=YuQgEjFic7g>

<http://www.youtube.com/watch?v=w21l7Hfks2U>

<http://www.youtube.com/watch?v=b88LGYRVGK8>

In lieu of an Alumni Reunion Weekend, the Department of Geosciences is hosting a

Climate Science Convocation and Symposium

Homecoming Weekend – October 18-19, 2013

Friday October 18th, 4 pm. The **special convocation** to award Honorary Doctoral degrees to three of the world's leading climate scientists: **Professor Andre Berger** – *“For seminal contributions to climate science through his studies of the astronomical theory of paleoclimates, and his pioneering use of climate models of intermediate complexity to understand past climate history”*,

Dr. Dominique Raynaud – *“For his fundamental studies of atmospheric gas concentrations in polar ice cores, which have changed our understanding of both natural and anthropogenic climate change”*, and **Dr. Warren Washington** – *“For his pioneering research using climate models to understand the climate system and the roles of natural and anthropogenic factors in climate change”*.

Saturday October 19th, 9 am to 4 pm. The **Climate Science Symposium** will feature talks by our Honorees, as well as faculty and others associated with the **UMass Climate System Research Center** and the **USGS NE**

Climate Science Center housed in the
Department of Geosciences.

Then 4-6 PM Laboratory open house and Grand Opening of the **Geosciences Rausch Mineral Gallery**

- **Come and see all the exciting and cutting edge science happening at UMass!**

- Don't forget Multiband Pops Concert Friday night, Oct. 18

- And, UMass home hockey game Saturday night, Oct. 19 and Alumni Tailgate Party

ALUMNI WELCOME: Please plan a trip back to Amherst; we look forward to seeing you!

Questions or need additional information? See our Department website (www.geo.umass.edu) or email **Julie Brigham-Grette** (juliebg@geo.umass.edu)

LYNN MARGULIS: A GEOSCIENTIST REMEMBERED

by Jim MacAllister and Mark Leckie

Every scientific idea passes through three stages. First, it is ridiculed. Second, it is violently opposed or claimed to be of only minor importance. Third, it is accepted as self-evident – attributed to William Whewell

-Lynn Margulis spent her life battling the certainty of neo-darwinists, the proponents of mainstream evolutionary biology based on the Modern Synthesis (the statistical linking of Mendel's genetics with Darwin's gradual natural selection) and the gene-centered notions of evolution popularized by Richard Dawkins in his many books beginning with *The Selfish Gene*.

Lynn was adamant about her ideas. Her style was combative and flamboyant, but when it came to science, she had a great deal of humility and an open mind. Lynn understood that knowledge – even empirical observation and measurement – is subjective, relative, temporal and corrigible. Science was the best evidence and even science facts could change over time. In her last interview for *Discover* magazine, Lynn said, "I am critical of evolutionary biology that is based on population genetics. I call it zoocentrism. They block out four-fifths of the information in biology [by ignoring the other four major groups of life that represent the vast diversity of life on Earth] and all of the information in geology."¹

Lynn Margulis was a systems thinker with a curiosity about nature that crossed an extraordinary number of disciplinary boundaries. A trained zoologist and geneticist, she was a geoscientist in the tradition of Alexander von Humboldt, Darwin (a geologist), and Vladimir Vernadsky. She had a deep-time (geological) perspective on evolution that informed her that an animal model for biological evolution omitted the most important 3000 million years of the story on a world that is still overwhelmingly microbial.

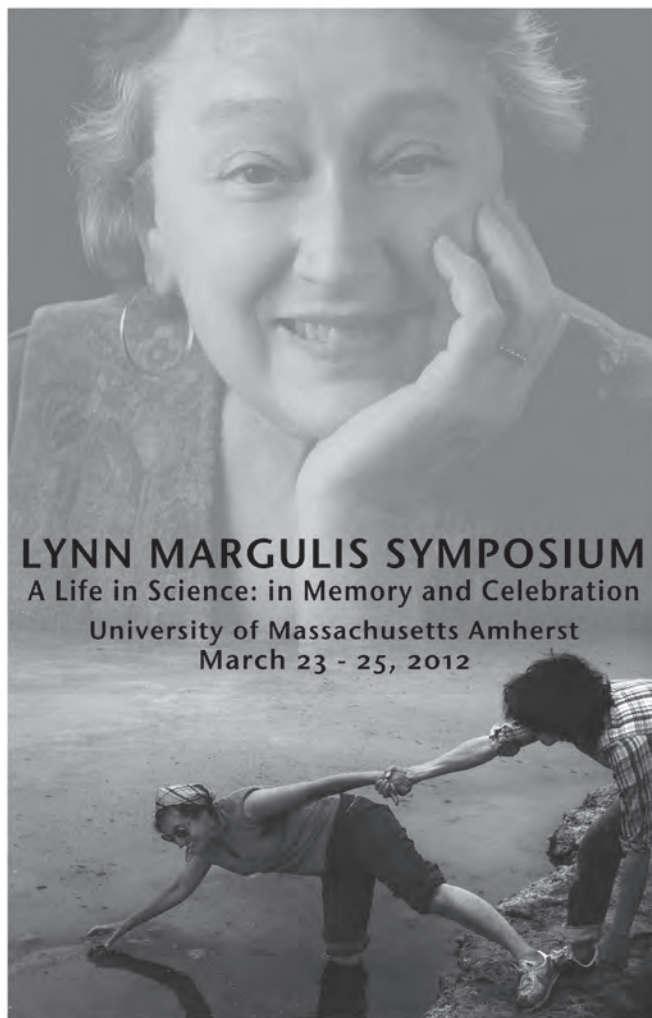
At the age of 29, she had published a paper, *On the origin of mitosing cells*,² in which she proposed the "crazy idea" that *mitochondria* and *chloroplasts*, organelles of nucleated cells, had once been free-living bacteria that had merged with ancient microbes by *symbiogenesis*. Evolutionary biologists ridiculed and dismissed her paper, but in time, the evidence became convincing and the idea was begrudgingly accepted.

Her work with NASA and her collaboration with James Lovelock on the Earth's planetary physiology, the Gaia Hypothesis, took in nature from the microcosm to the macrocosm.

Over 30 million types of extant organisms, descendant from common ancestors and embedded in the biosphere, that directly and indirectly interact with one another and with the environment's chemical constituents, form a biotic-planetary regulatory system. They produce and remove gases, ions, metals, and organic compounds through their metabolism, growth and reproduction. These interactions in aqueous solution led to modulation of the Earth's surface temperature, acidity-alkalinity, and the chemically reactive gases of the atmosphere and hydrosphere.

As she put it, "We are all symbionts on a symbiotic planet, and Gaia is symbiosis seen from space." Her *Environmental Evolution class* was the first course in what has come to be called Earth Systems Science. Lynn understood that evolution was a reciprocal process: life changed the environment and the changed environment forced life to change. Evolution was not only larger than biology or geology, it was the overarching context for any study of nature.

Until now, the ideas championed by Lynn Margulis, her international colleagues and predecessors were included in text-



LYNN MARGULIS SYMPOSIUM
A Life in Science: in Memory and Celebration
University of Massachusetts Amherst
March 23 - 25, 2012

http://www.geo.umass.edu/margulis_symposium.html

From the symposium celebrating Lynn's life and science.

books, but most often in sidebars set aside from the main copy. These boxed marginalia can be understood to mean that these things are of minor importance, rare or occurred long ago. However, a paradigm shift called the New Biology is underway and Lynn Margulis is acknowledged as the "master architect for re-thinking biology in terms of interacting consortia."³ Manifestos of the New Biology have appeared in the *Quarterly Review of Biology*⁴ and the *Proceedings of the National Academy of Science (PNAS)*.⁵ In his book, *Evolution: A View from the 21st-Century*, James A. Shapiro, an expert in bacterial genetics and a professor in the Department of Biochemistry and Molecular Biology at University of Chicago endorses Lynn's idea of a web of life: "Contrary to traditional theories, it is now well documented that all prokaryotes [bacterial cells] and many eukaryotes [nucleated cells and organisms] acquire novel genomic segments and biochemical functions from other, often unrelated cells [symbiogenesis] rather than exclusively by vertical inheritance from progenitors."

In the opening lecture of the 2013 International Union of Physiological Sciences (IUPS) Conference, Oxford Professor of Physiology and Systems Biology Denis Noble, stated categorically that, "All of the rules and assumptions of the Modern Synthesis

have been broken.”⁶

During her life, Lynn would bristle at being called an *evolutionary biologist*. She referred to herself as an “evolutionist” but she would have enjoyed the irony when Ecuador’s Universidad San Francisco de Quito (USFQ) named its new center for *evolutionary biology* on the island of San Cristobal in the Galapagos in her honor.

Lynn came to UMass Amherst from Boston University in 1988 and was originally in the Biology department, but in the mid-nineties moved to Geosciences and thoroughly enjoyed her new home. Lynn was a strong, visible, and positive influence on the science of paleobiology and the evolution of life on our planet. She had a deep appreciation of geology. Her research was steeped in Earth history and its symbiotic relationship with life itself.

University Distinguished Professor Lynn Margulis was one of the most nationally and internationally visible, respected, and acclaimed faculty members at the University of Massachusetts. In 2009, Lynn was awarded the Darwin-Wallace Medal from the Linnean Society of London, which recognizes her profound influence on the field of evolutionary biology through her original work on the endosymbiotic theory for the evolution of eukaryotic cells. This recognition marked the pinnacle of her highly productive and storied career, which had included election to the National Academy of Sciences (1983), recipient of the National Medal of Science (1999) presented to her by President Bill Clinton, and the award of 20 honorary degrees (*Honoris Causa*) since 1989.

Despite an incredible travel and guest lecture schedule, Lynn devoted considerable effort teaching her popular Environmental Evolution course for senior undergraduate and graduate students. This course explored the effect of the origin and evolution of life on Earth history and our planet’s biotic and chemical evolution. She had been teaching this course continuously since 1973.

Lynn Margulis fundamentally enriched the reputation of the University of Massachusetts throughout the world. Lynn brought her own unique brand of high-energy biogeoscience to a wide range of UMass students. She inspired all who interacted with her to consider the evolution of early organisms and the biosphere in a new light, to challenge what we think we know about biology and the evolution of life, and to view Earth history through the lens of biotic evolution. We miss her contagious energy, enthusiasm, and curiosity, her sharp intellect, and joyful presence in the department. We are proud and honored to have had Professor Lynn Margulis as a member of the Department of Geosciences.

See Lynn’s 2004 interview at Rutgers:

- http://youtu.be/b8xqu_TIQPU
- <http://youtu.be/KOjKZdW8HSY>
- <http://youtu.be/VaAkrnoXA0M>

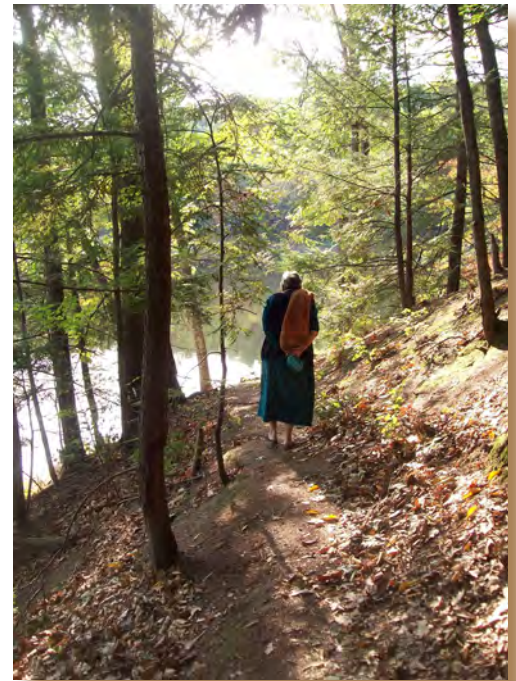
1. Teresi D (2011) *Discover Interview: Lynn Margulis*. Discover magazine, April 32(3):66-71

2. Sagan (Margulis) L (1967) *On the origin of mitosing cells*. Journal of Theoretical Biology. Mar; 14(3):255-74

3, 4. Gilbert S, Sapp J, and Tauber A (2011) *A Symbiotic View of Life: We Have Never Been Individuals*. The Quarterly Review of Biology. Dec 87(4):325-341.

5. McFall-Ngai M et al (2012) *Animals in a bacterial world, a new imperative for the life sciences*. Proceedings of the National Academy of Science (USA) Feb. 110 (9):3229-3236.

6. Noble D (2013) *Physiology moves back onto centre stage: a new synthesis with evolutionary biology*. (video) International Congress of the International Union of Physiological Sciences, Birmingham, UK <<http://www.youtube.com/watch?v=MzD1daWq4ng>>



Lynn Margulis on the path to her swimming/research spot at Puffers Pond in September 2010. Photo by Massamo Pajoro, an Italian colleague of Lynn’s.



In January 2013, **Nicole Pietraszkiewicz** retired after 22 years with the Department of Geosciences. Thank you, Nicole!!

We are pleased to announce the addition of **Linda Moore** as our new Accountant. Linda is a graduate of the department with a Geology degree. Welcome back, Linda!



Find us on Facebook! Search for the **UMass Geosciences** page on Facebook to see what people in the department have been up to, and stay informed about recent activities and upcoming events.

Also be sure to visit the Geosciences department webpage at <http://www.geo.umass.edu> for more news and updates, and check out <http://blogs.umass.edu/geoblog/> to read the Geosciences department blog on the UMass Amherst website.

GEOSCIENCES ALUMNI REUNION WEEKEND

by Mark Leckie

We held our first **Geosciences Alumni Reunion Weekend** on the UMass Amherst campus on October 14-16, 2011. It was a big success and a lot of fun in large part due to the energy, organization, and assistance from numerous people, particularly **Laurie**



Bill Bromery

Brown and **Piper Gaubatz**. Nearly 100 people attended the weekend event, which featured presentations of Distinguished Alumni Awards to **Art Goldstein** (Bridgewater State University) and **Al Hine** (University of South Florida) on Friday evening followed by "Safety Committee". An alumni symposium, "Life after Morrill", on Saturday morning focused on geosciences careers followed by "Emeritus Corner" featuring **Tony Morse** and **Peter Robinson**. A fabulous catered lunch was prepared by our own **Katherine and Don Sluter**, followed by an Open House and a whirlwind sampling of the hot science going on in the department by some of the faculty. After a social hour in the department, we gathered on the 10th floor of the Campus Center for a big meal prepared by the award-winning UMass Catering Services. At the dinner, **Piper Gaubatz** made presentations honoring our most recent Geography retirees, **Jim Hafner**, **Rud Platt**, and **Richard Wilkie**, followed by a dinner talk by **Don Wise**, in memorable style: "Boots to the Moon". **Bill Bromery** said a few words about the **Randolph and Cecile Bromery Graduate Fellowship and Undergraduate Scholarship programs** that we recently initiated, along with some great story telling as only Bill could do in his soft-spoken manner. The evening program ended with **Laurie Brown** presenting alum

Susan Soloyanis with a Distinguished Alumni Award. Susan got up and told some funny tales but then announced that her substantial personal bequeath to the Department of Geosciences will be in the form of a graduate student fellowship to be named in honor of her mentor: the **Laurie Brown Graduate Fellowship**. To close out this wonderful gathering,



Susan Soloyanis and Laurie Brown



Chorus of alums: Valerie Congdon, Tom Weddle, Mike Retelle, Bill Ranson, Susan Soloyanis, Bran Potter, and Mike Hozik.



Don Wise

alum **Bran Potter** (University of the South) led a group of alums in a sing-along. An optional field trip on Sunday rounded out a great couple of days. **Tom McCrory** wrote a very nice summary of the weekend's activities, which I'm sure he would be happy to share. We plan to organize another reunion in the near future – stay tuned.

A call for pictures in advance of the Reunion landed some great images that we shared in a slide show prior to the Saturday night dinner. We have established an **Alumni tab** on our Geosciences webpage to **share your favorite photos**: <http://www.geo.umass.edu/alumni>. If you would like to add pictures to this gallery, please send them to Mark Leckie (mleckie@geo.umass.edu) and they will be posted (and archived for the next reunion).

THE NEW NORTHEAST CLIMATE SCIENCE CENTER (NE CSC)

by Addie Holland

A new organization is co-located with the **Climate System Research Center** in Morrill, and established in March 2012, The **Northeast Climate Science Center (NE CSC)** is a federal-academic partnership between the U.S. Geological Survey and a consortium of seven academic institutions, hosted by UMass Amherst. The mission of the NE CSC is to provide scientific information, tools, and techniques that managers and other parties interested in land, water, wildlife and cultural resources can use to anticipate, monitor,

and adapt to climate change in the Northeast region. To accomplish these goals, NE CSC academic consortium and federal staff conduct research and direct competitive research funds toward projects that are driven by stakeholder needs. A primary goal is

to train early career scientists in stakeholder engagement and user-driven research techniques. Several NE CSC Graduate and Postdoctoral Fellows now sit alongside CSRC students – a truly interdisciplinary climate center! Read more at: necsc.umass.edu.



(OUTGOING) DEPARTMENT HEAD LETTER, CONT'D.

Major renovations in the department are nearly completed: 1) the Environmental Geochemistry lab, next to Morrill Auditorium has been transformed into a **new 60-chair classroom** for the department, 2) the **Climate System Research Center** has moved back to Morrill Science Center from Hasbrouck where it was located for ~15 years, while the 101 teaching lab has temporarily moved across the street to Hasbrouck, 3) Room 161 in Morrill 4 South, where glacial and structural geology were taught for years, and our former home for Friday afternoon lectures and "Safety Committee", has become a **new shared geochemistry instrument facility**, and 4) the old Climate Center space in Hasbrouck ('the Round Room') has been transformed into a great **teaching space for the Geography Program**. The **Front Office** was painted in late 2013 and new furniture was purchased; **Martha Beckwith** spearheaded the last such overhaul in 1985. The **Rausch Mineral Gallery** will open to the public in October 2013 in newly renovated space in Room 243 (shared with the Department Head Office). The **Rausch Mineral Collection** was donated to the Department from family of UMass Chemistry Professor Marvin Rausch (see <http://www.umass.edu/umhome/feature-story/article/181>); Mike Williams worked closely with the Rausch family to make this happen. The **Acid Neutralization Pipe Project** began during the summer of 2012 and has lasted 16 months. All water pipes in Morrill 2 were replaced, and potable and non-potable lines were separated. This caused considerable disruption to many faculty, staff, and students as the project tore into ceilings and cinder block walls, room by room. Despite all the disruption that repairs and renovations have caused, the Department of Geosciences has undergone some dramatic changes and vast improvements to our facilities in recent years! Please stop by for a visit.

In the 'great news' department, **Laurie Brown** was selected as a University Distinguished Lecturer for 2012-2013 academic year, and in March 2013, she gave a great public lecture and received the Chancellor's Medal, the highest campus honor. **Rob DeConto** was selected as a College of Natural Sciences (CNS) Outstanding

Research Award for 2012-2013; Rob was also selected as a UMass Spotlight Scholar and featured on UMass home page for December 2011 – January 2012. **Sheila Seaman** won a CNS Outstanding Teacher Award for 2013-2014, **Richard Yuretich** won a CNS Outstanding Service/Outreach Award, and **John Sweeney** was selected for a CNS Outstanding Staff Award. Since our last Newsletter, **Michele Cooke**, **Rob DeConto**, and **Sheila Seaman** were promoted to Full Professor; **David Boutt** and **Qian Yu** were tenured and promoted to Associate Professor. Congratulations to all!

If you have not already checked us out online, please see our completely overhauled **Geosciences website** (<http://www.geo.umass.edu>); a special thanks to **Addie Holland**, **Don Sluter**, and **George Drake** for making it happen. You can also follow us on Facebook.

My nearly 4-year term as Department Head has ended. I'm pleased to announce that **Julie Brigham-Grette** took the helm on September 1, 2013. The department will be in great hands under Julie's leadership! I want to thank publically our Geosciences staff (**Marsha Howe**, **Lorna Stinchfield**, **Linda Moore**, **Laura Bishop**, **Jenn Nikonczyk**, **John Sweeney**, and **Pete Dawson**) for being the glue that keeps this ship afloat, and my **Geosciences faculty** colleagues for their support during my term as Head, and good humor through the lengthy construction process. Thanks, too, to **George Drake**, **Tom Carpenter**, and **Chris Hoogendyk**, who maintain our network and servers. Lastly, a special thanks to **Heather Clark** (MSc, 2012) for assembling this Newsletter (her fourth) from her remote outpost in Boulder, CO where she works for the Geological Society of America.

As always, *we appreciate YOUR continued interest in what we're doing and your support in helping us deliver the best educational experiences and research opportunities to all of our students*. Please do stop by and say hello if you are passing through Amherst, and let us give you a tour of all the great changes that have occurred in recent years.

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TIDMARSH FARM PROJECT (FORMER CRANBERRY BOG)

by David Boutt

Since the spring of 2012, **David Boutt** has been investigating the hydro-dynamics between ground water and surface water at Tidmarsh farms, a former Cranberry Bog in the village of Manomet in Plymouth, MA. Tidmarsh farms is a 577 acre wetland complex

that was in cranberry production for over 100 years, producing up to 1% of Ocean Spray's crop during max production. The site is now planned to be restored back to a thriving and diverse wetland and become the cornerstone of a project entitled the Living

Observatory. The goal of the Living Observatory project is to afford public access to an outdoor parkland, a visitor center, and a dynamic website. This offers an opportunity for scientists to understand and track how quickly ground water dependent ecosystems respond to human and natural induced changes. Through the hard work of MS candidate **Danielle Hare** and UMass Geosciences colleagues (including Dr. **Bill Clement**) we are providing valuable information on subsurface distributions of peat underlying the site using ground-penetrating radar. Hare's MS thesis is specifically focused on spring development on the property and how the springs are controlled by subsurface structure and hydraulic properties. She recently completed a 5-week deployment of fiber optic cable to sense temperature distributions throughout drains on the site to constrain the distribution of springs.



Above: Tidmarsh farms, a former cranberry bog in the village of Manomet in Plymouth, MA.



Right: MS candidate Danielle Hare.

NEW 1-YEAR PROFESSIONAL MS PROGRAM IN GEO-HYDROLOGY

by David Boutt

The department has recently initiated a 1-year Masters of Geoscience program with specialization in Geo-Hydrology. Why Geo-Hydrology? We feel that the field of water resources and hydrology more generally is an exciting place to start a career. For decades hydrogeologists have focused on the subsurface component of the hydrologic cycle and are a critical component of strong geosciences programs. The use of the term Geo-Hydrology accomplishes two-things. First, since we are geologists by training it puts Geo up front and with emphasis. Secondly and more importantly, Geo-Hydrology involves more than just ground water science; it is the broad emphasis on the relationship between geologic and climatologic factors that influence all components of the hydrologic cycle and related processes. We have assembled a relevant curriculum to solving hydrologic problems in the 21st century and are excited to be entering our second year of the program. In two semesters students take 3 courses in hydrology, 2 courses in geochemistry, 2 courses in geological science, and 1 course in tools/techniques in the geosciences, environmental conservation, and engineering departments. A year-end exam testing the students' ability to propose solutions to practical problems facing geo-hydrologists caps the 9-month program. We are keeping the program small (~3 students per semester) for the first few years and plan to grow the number of students as resources become available. Pass the word on this unique professional MS program.



to spend a day a month travelling around the state to assist with the tape-down water level measurements.

Left: Members of the UMass Hydrogeology program, MA State Geologist, USGS, MA DEP, visit a well in Colrain, MA to take water level measurement in August 2013. State Geologist Steve Mabee (right) flags a stake to assist in finding this well during winter snow conditions.

GEOTHERMAL RESEARCH AT UMASS

by Mike Rhodes and Steve Mabee

Mike Rhodes and **Steve Mabee** (State Geologist) are bringing their three-year research into the geothermal potential of Massachusetts (and Connecticut in collaboration with Margaret Thomas, Connecticut State Geologist) to fruition. This work is funded through the DOE sponsored "Geothermal Technologies Program: Geothermal Data, Development, Collection and Maintenance" in association with the Association of American State Geologists (AASG). The project is administered by the State Geologist's Office in Arizona, headed by UMass alum **Lee Alison**. The basic idea behind our research is that the abundant granites and gneiss bodies of Massachusetts and Connecticut will be hotter at depth than the surrounding metamorphic country rock and therefore a possible source of deep geothermal energy. This is because, in general, they contain more of the radioactive heat producing elements (K, U, Th). To date we have collected over 430 samples of the major granite/gneiss bodies in Massachusetts, and 290 in Connecticut, and analyzed them for these elements in the XRF laboratory. We have also measured their densities and their thermal conductivities. From this we calculate heat production, inferred heat flow and estimates of increase in temperature with depth. For the final stage we are compiling maps showing the location of the samples, their measured heat production, inferred surface heat flow, and estimates of temperatures at 3, 4 and 6 km depths. Most granites are thought to attain temperatures of around 100°C at around 4 km depth and some are even hotter. Our goal is to be able to identify favorable locations for geothermal exploration once the political

HYDROGEOLOGY PROGRAM TAKES ON 19 WELLS IN THE WESTERN MASSACHUSETTS CLIMATE RESPONSE NETWORK

by David Boutt

In collaboration with the Office of the State Geologist and the MA Department of Environmental Protection students and faculty in the hydrogeology program are now responsible for monthly monitoring of 19 climate response network wells in western Massachusetts. These wells, many of which have been active for over 50 years, are critical indicators for the subsurface response to climatic variability. Due to budget shortfalls the USGS and partners have faced decisions on whether to eliminate monitoring of these wells or find alternatives. Students in the Geo-Hydrology MS program and MS students in the hydrogeology program are volunteering

and economic climate turns more favorably towards alternative energy.

We also collected and measured thermal conductivity on 172 soil samples. These were collected by driving shallow cores in different surficial materials and then measuring the thermal conductivity in the lab under ambient, dry and saturated moisture conditions.

One of the goals of this DOE-sponsored research at the national level was to build and populate a national geothermal data base. In addition, to the contributions to the data base mentioned above we have also added to the data base 17 borehole temperature logs, 4 warm springs descriptions, 845 well temperature readings, 10 thermal response test results, and 20 temperature gradient measurements to the data base. Most of this information was derived from previous published sources. All of this data has been submitted to a central, publicly accessible, geothermal energy database for all 50 States, which can be accessed at (<http://www.stategeothermaldata.org>).

What Next?

There are two important steps that can be taken to test and refine our approach. One is to obtain heat flow measurements through relatively shallow drilling (> 600 ft). The other is to obtain an indication of the mass and depth of granite bodies with geothermal potential through either gravity or magneto-telluric surveys. Steve and I are exploring these avenues for future research.

NEIGC 2012

by Peter Robinson

The 104th meeting of the New England Intercollegiate Geological Conference was held October 12-14, 2012, based at the Sunapee Ski Resort, Sunapee, New Hampshire. It was held in memory of John B. Lyons and James B. Thompson, Jr., both key actors in study of the geology of New Hampshire and adjacent states. Thompson died in November 2011, Lyons some years earlier. The 'Guidebook to Field Trips in Western New Hampshire and Adjacent Vermont and Massachusetts' was edited by our own PhD graduate, **Peter J. Thompson**, also a former student of **John Lyons**, now at University of New Hampshire, ably assisted by Thelma Thompson.

Several of the excursions listed below were conducted by geologists with present or former connections to UMass Geosciences (names in bold). There was also wide participation by other faculty, other former students, and present graduate and undergraduate students not listed. Guidebook pages for each article are also listed.

TRIP A-3 Wentworth Dome, Rumney, west-central New Hampshire, a newly confirmed Oliverian gneiss dome on the east limb of the Bronson Hill anticlinorium, p. 51-81.

Leaders: MaryAnn Malinconico, Wally Bothner, **Peter Thompson** and **Peter Robinson**

TRIP A-4 A Transect through the base of the Bronson Hill anticlinorium in western New Hampshire, p. 83-103.

Leaders: **Gregory Walsh**, Peter Valley and Karri Sicard

TRIP B-1 Tropical Storm Irene and the White River Watershed of Vermont: Flood Magnitude and Geomorphic Impacts, p. 105-145.

Leaders: **George Springston**, Kristen Underwood, Keith Robinson, and Ned Swanberg

TRIP B-4 Geology of Skitchewaig Mountain, Vermont, and adjacent New Hampshire: A reprise of Jim Thompson's 1954 NEIGC trip and consequences for regional geology, p. 183-193.

Leaders: **Peter Thompson**, **Peter Robinson** and **Donald Wise**

TRIP C-3 **Bedrock geology of the Mount Grace quadrangle**, Massachusetts and adjacent New Hampshire: Meeting point for Connecticut Valley and Rangeley stratigraphy, fold nappes, thrust nappes, overturned gneiss domes of the Bronson Hill anticlinorium, and Acadian, Quaboagian, and Northfieldian deformation and metamorphism, p. 253-306.

Leader: **Peter Robinson**. The new color Mt. Grace Geologic Map and Sections produced by the Massachusetts Geological Survey were

displayed.

TRIP C-4 Acadian thrust faults in southwestern New Hampshire, p. 307-322.

Leader: **Peter Thompson**

Pete Robinson provides his own historical perspective concerning Trip B-4:

Jim Thompson was known in the wider world as a pioneer in metamorphic petrology. Less well known was his strong dedication to the geology of western New England, most particularly stratigraphy, structure and even paleontology, beginning in Vermont, but drawn through his intrigue with Skitchewaig Mountain into western New Hampshire. His 1954 interpretation of the geology of Skitchewaig Mountain and surroundings marked the beginning of the nappe theory in the region. It was modelled in Jim's mind by the Pennine Nappes of the Italian-Swiss Alps, and is now known to include both fold nappes and thrust nappes, as well as complex relations between nappes and major granitoid intrusions and metamorphism, some to be highlighted in other excursions of NEIGC 2012. Jim was fortunate to join forces with Marland Billings at Harvard, with his previous decades of pioneering efforts with his students to trace well characterized stratified rocks into regions of high-grade metamorphism, in some instances in cooperation with John Lyons and students at Dartmouth. One of the Dartmouth students and teaching assistants, Jim Ratté, completed a masters' thesis, also on Skitchewaig Mountain, about the same time as Jim's early work. I had the privilege to study geology under **all four** of the above, who played a pivotal role in my interests, and also participated, as a newly graduated Dartmouth student, on the 1954 excursion where I first met Doug Rankin, a lifelong friend and collaborator. In October 2012, I was the only one present who was on the original trip. **Don Wise** was on board as a result of having run a spring excursion for Field and Structure II over many years, along with me, **George McGill**, **Leo Hall** and **Mike Williams**, and having provided a superb illustration of the hinge region of the nappe that had assisted the understanding of many students.

AUGUST IN THE ARCTIC

In August 2013, **Ben Pelto** (MS w. Julie BG) and **Anthony Coletti** (PhD w. Alan Condron) set sail on the USCG Healy mission 13-02 from Barrow, Alaska, to study outer shelf sediments to investigate the origin of the Younger Dryas – a 1,200 year cold episode that began ~13,000 years ago. This return to glacial-like conditions occurred after the Bölling-Allerod and is one of the enigmas of the Pleistocene climate. It is proposed that a catastrophic flood of meltwater from glacial Lake Agassiz drained through the Mackenzie River into the Beaufort Sea eventually reaching the North Atlantic and triggering a slow-down of the Thermohaline Circulation. During the mission, the Healy encountered and crushed through large amounts of thick sea-ice west of Banks Island. Three types of cores were taken en-route: Giant Gravity Core, Jumbo Piston Core and a multicore, from 11 separate sites along the continental shelf of Alaska and part of Canada. Anthony and Ben were part of the coring team for three weeks, which consisted of cleaning, cutting

and transporting separate sections of each core in order to prepare them for archiving. Funding for this project is provided by NSF Polar Programs, in collaboration with Woods Hole Oceanographic Institution and Scripps Institution of Oceanography.



USCG mission 13-02 from Barrow, Alaska.

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Ray Bradley

The **Climate System Research Center** has moved from Hasbrouck Laboratory to newly renovated space on the first floor of Morrill II. The new center was opened in January 2013. It has a meeting room and is home to over two dozen faculty and students. The new space is shared with the new **Northeast Climate Science Center** (NE CSC). Here's some news from the Climate System Research Center: **Julie Brigham-Grette** and colleagues published a paper in the journal *Science* documenting climate changes over the past 3 million years derived from the longest sediment core ever collected on land in the Arctic. Their results show that with estimated atmospheric carbon dioxide similar to today's levels, the Arctic was very warm, with no ice sheets. **Ray Bradley** received an honorary Doctor of Science degree from Queen's University in Kingston, Ontario. The award, presented during a ceremony in June 2013, cited his "outstanding contributions to the studies of climate variability and environmental evolution". **Rob DeConto** and colleagues recently published a paper in the journal *Nature* that suggests thawing permafrost and subsequent releases of carbon dioxide fed a series of extreme warming events on Earth known as the Paleocene-Eocene Thermal Maximum about 55 million years ago. **Nicholas Balascio**, a postdoc working with Ray Bradley, recently published a paper on Holocene climate changes inferred from cores taken from lakes in southwest Greenland. He has accepted a position at Lamont-Doherty Earth Observatory, Columbia University in New York beginning Fall 2013. **Mike Rawlins**, along with coauthors Ray

Bradley and Henry Diaz, published a paper describing projected mid-century climate changes across the northeast US drawn from a suite of regional climate models. More recently he and colleagues published a study in the *Journal of Modeling Earth Systems* describing simulations of soil freeze/thaw dynamics across the terrestrial Arctic. **Alan Condron** recently published a paper in *Nature Geoscience* describing the influence of small powerful extratropical cyclones on the underlying ocean. **Doug Hardy** continues to maintain meteorological weather stations on Quelccaya Ice Cap in Peru and on Mt. Kilimanjaro in Africa. In July 2013 he and colleagues performed fieldwork at the Quelccaya ice cap site, spending 8 days at the summit. The automated weather station was raised and serviced and snow accumulation measured. **Rob D'Anjou** successfully defended his masters thesis. He, along with Ray Bradley, Nick Balascio, and Dave Finkelstein published a study in the *Proceedings of the National Academy of Sciences* in which they used biomarkers from prehistoric human feces to track settlement and other migration dynamics across Norway. **Fangxing Fan** has accepted a position with the Chinese Academy of Sciences. **Sam Davin** successfully defended his Masters thesis and will pursue his career in consulting, while **Greg DeWet** successfully defended his Masters thesis and will pursue a PhD degree at UMass beginning in September 2013. **Ambarish Karmalkar** was a post-doc with the CSRC and is now a postdoctoral researcher with the School of Geography and the Environment, University of Oxford, United Kingdom. **Liang Ning** joined the CSRC in September 2012 as a post-doc for the NE CSC, working with Ray Bradley; Liang's research is focused on the application of statistical models to characterize climate changes

at the regional scale.

David Boutt

Dr. David Boutt maintains an active research program encompassing a broad range of hydrogeologic problems in regions such as Chile, Nevada, Massachusetts, and Japan. He currently serves as the main advisor to 6 graduate students (3 MS and 3 PhD) working on projects involving fluid flow through fractured rock, heat transport by advecting ground water flow, and regional ground water flow.

Julie Brigham-Grette

Julie's research groups continue to focus on aspects of the climate history of the western Arctic and Beringia. Lake El'gygytyn, located in the middle of Chukotka, NE Arctic Russia, was successfully drilled in Spring 2009. Analytical work by the international team resulted in 2 papers in *Science* (Melles et al 2012; Brigham-Grette et al. 2013) that provided an overview of the continuous record back to 3.6 million years ago. This work continues within the department in collaboration with faculty including **Isla Castaneda**, **Steve Burns**, **Rob DeConto**, and **Dave Finkelstein** (now at Hobart and William Smith).



Julie Brigham-Grette waist-deep in work with STEM teachers.

The Lake E project has produced a number of graduate students. **Kenna Wilkie** (PhD 2012) defended her dissertation in spring 2012 with a focus on the first continuous Arctic leaf wax deuterium record of the past 140,000 yrs. Her work also involved the calibration of the leaf wax proxy with modern samples. She is now finishing a 2-year post-doc at University of Toronto. **Addie Holland** (MSc 2011) completed her Master's thesis on aspects of the biogeochemistry of the past 60,000 years in Lake E, testing ideas concerning levels of anoxia in the core. She continues to work in the Department as a science and outreach manager with the NE CSC when she is not working at award winning "Real Pickles". **Jeremy Wei** (MSc 2013) investigated the meaning of color spectrometry data in the cores over the period from about 280,000 to 430,000 yrs ago that showed a remarkable resemblance to the global marine isotopic record. He is now in a PhD program at Northern Illinois University (NIU) and headed for Antarctica. **Anthony Coletti** (MSc 2013) jumped right into GCM modeling studies providing the context for understanding warm interglacials in the Lake E record. He is now doing a Ph.D. with Research Professor Alan Condron here at UMass. **Robert D'Anjou** (MSc 2012 with Ray Bradley) and **Jeremy Wei** collaborated on a joint paper expanding on the biomarker proxy work for part of the middle Pleistocene. Collectively, the project has nearly 30 papers now published or *in press* as a special issue of the open access journal "Climate of the Past".

New NSF funding for the Lake E analytical work now propels additional biogeochemistry and modeling work across detailed intervals of the climate record. This work is being carried out by new students **Helen Habicht** (Albion College BSc) and **Ben Keisling** (St. Olaf College, both MSc/PhD candidates), along with **Chantelle Lonsdale** and **Greg de Wet** (both PhD candidates). We also welcome post-doctoral fellow **Jeff Salcup** (PhD, Brown 2013) to

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the project in November 2013. Outreach for the Lake E project involves bringing lake cores and environmental studies into middle and high school teachers. This year 4 teachers from New England and one from North Carolina learned about lacustrine records and developed curriculum with the Lake E team.

Another part of Julie et al.'s research group (collaboration with **Steve Petsch**, **Dave Finkelstein**, and **Isla Castañeda**) is focused on the paleoceanography and sea ice history of the Bering Strait. **Beth Caissie** (Ph.D, 2012) happily completed her dissertation developing paleosea ice proxies for the Bering Sea while also work on cores collected through her participation on IODP Leg 323 to the Bering Sea. Beth is now Assistant Professor of sedimentology at Iowa State University in Ames. **Ben Pelto** (MSc Candidate) is working on the sedimentology and geochemistry of 4 marine cores from the Bering and Chukchi seas while **James Kocis** (PhD candidate) continues his work developing biomarker proxies of sea ice and sea surface temperatures in the same cores. Jim and Beth are collaborating on a large suite of sea floor samples providing the training set for modern calibration of the paleoproxies; Beth has developed the diatom-based proxies while Jim is working on the biomarkers.

The Research Experience for Undergraduates (REU) on Svalbard continued with Julie's collaboration in 2011 with plans for continuation next summer 2014. The program is a successful partnership with Ross Powell (NIU) training students through study of tidewater glacier margins in Kongsfjord. Alternate years the program is also led by UMass alumni **Steve Roof** (Hampshire College; PhD 1992), and **Mike Retelle** (Bates College; PhD 1987), in collaboration with Al Werner (Mt Holyoke College). Since 2003, program has advanced the careers of over 68 undergraduates from the across the country.



STEM teachers working with Assistant Professor Isla Castañeda.

Laurie Brown

Recent activities include moving my office and pmag lab to the basement, where I am nicely ensconced next to **Tony Morse** (who is still going strong!). This is in preparation for the really BIG event coming up **at the end of December when I will retire** and join the ranks of George, Don, Tony, Pete, and John as "Emeritus". Luckily, I have lots of projects underway that will keep me busy when I no longer have to teach. One PhD student, **Kate Murdock**, graduated in May and is now busy teaching at Salem State as she looks for a permanent job. My current PhD student, **Jeff Webber**, spent much of the summer up in the Athabasca Terrane of northern Canada worrying about the complicated relationships between lower crustal rocks, magnetite, and resulting magnetic anomalies. I spent the summer in the lab wrestling with a collection of Neoproterozoic and early Paleozoic rocks from Nova Scotia in the hope of pinning Avalonia down during the breakup of Rodinia – I am afraid I am losing! Future plans include the continuation of my collaboration with **Suzanne McEnroe**, now at the Norwegian

Technical University in Trondheim, where I will get to spend the first month of my retirement. But, before that I will teach Paleomagnetism this fall for the last time – bittersweet, but fun.

Isla Castañeda

Several members of the UMass Biogeochemistry Laboratory recently attended the International Meeting of Organic Geochemistry (IMOG), which was held in mid-September in Tenerife, Spain. Isla Castañeda chaired one of the two paleoclimate sessions at the IMOG. PhD student **Jim Kocis** was awarded a talk, which is a notable accomplishment as most of the presentations at this meeting are posters. Jim is investigating the use of lipid-based proxies to examine sea ice concentration and sea surface temperature in the Bering and Chukchi Seas. He presented a new calibration he developed for an organic geochemical sea surface temperature proxy based on tetraether lipids produced by marine archaea for use in the polar oceans. Likewise, PhD student **Andrea Shilling** presented a poster on the first results of her dissertation research. Andrea is examining a 400-kyr marine sediment core collected from offshore Tanzania to investigate relationships between sea surface temperature variability in the western Indian Ocean and vegetation type and precipitation amount in East Africa. The paleoclimate history of this region is of interest because modern humans evolved in East Africa yet many outstanding questions exist regarding the climate and landscape (e.g., forest or savanna) in which our ancestors evolved.

Undergraduate **Ben Urann** was a 2013 Summer Student Fellow at Woods Hole Oceanographic Institution. His summer research experience began with a research cruise to the mid-Atlantic ridge aboard the R/V Knorr. This semester Ben will be completing his capstone honors research project "Biogeochemical Markers of Hurricane Irene Sediment Deposits Along the Connecticut River", which he has been working on for several semesters in the Biogeochem Lab. Ben was recently awarded a research grant from Commonwealth Honors College to complete this project.

After many months of ongoing construction, we are very pleased that renovations to the Biogeochemistry Lab are now complete! Major changes include the addition of a new instrument lab in room 161, which was formerly a classroom, and the addition of two more fume hoods in the main Biogeochemistry Lab. The lab renovations were completed just in time for the start of the new semester. We welcome new grad students Helen Habicht, Ben Keisling, and Dan Miller to the biogeochemistry lab.

Bill Clement

Bill Clement is a near-surface geophysicist. He comes to UMass Amherst from Boise State University in Boise, Idaho. At Boise State, he was an associate research professor with the Center for the Geophysical Investigation of the Shallow Subsurface, primarily using Ground Penetrating Radar to help determine water flow through the near-surface. Bill started teaching at UMass in January 2013 and will teach General Geophysics Fall 2013.

Agriculture and adequate water supplies are vital resources to Massachusetts. Near-surface geophysics provides many methods that can help protect these resources. As an Extension Faculty, Bill will conduct research that benefits Massachusetts and the region. Bill's duties also include outreach to the community.

Bill has looked at data from a fractured bedrock well in Central Massachusetts to determine the influence of tides on the recorded water level in conjunction with PhD student **Evan Ernst**.

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He is also collecting geophysical data to help several of **Dave Boutt's** students better understand water flow in their research areas. For example, Bill has helped collect Ground Penetrating Radar and Electrical Resistivity Tomography data to help restore a cranberry bog near Plymouth, MA to its natural state. In the future, Bill will collect and process geophysical data to extend geologic maps of Cape Cod offshore. He will also analyze seismic data to better mitigate landslide hazards in Massachusetts. Both of these projects are in conjunction with **Steve Mabee** and the Massachusetts Geological Survey.

Chris Condit

Chris Condit continues to enjoy instructing NASA's astronauts in field geology, something he's had the pleasure of doing since 2010. Last summer (2012) seven instructors each teamed up with an astronaut and or engineer (Chris had both) for a week long "Geology Boot Camp", involving field mapping at SP Crater and around Black Point flow, north of Flagstaff, and an all day visit to Meteor Crater, with the later part spent mapping it ejecta blankets on the eastern side.

Chris and Laurie headed to Denver and the SW for a month for the Rocky Mountain GSA meeting in Gunnison. Chris gave a poster on the mapping he and Marissa Mnich (now at Univ Buffalo starting her PhD) have been doing in the Springerville Volcanic Field, and their daughter, Cailey gave her first oral presentation on her dissertation research at CU in the Madison Range in SW Montana. They then headed down to Arizona for field work in SVE, and enjoyed some camping in New Mexico, rounding out their SW trip with 10 days spent around Boulder and in a friend's rustic cabin at Steamboat Springs. Chris will be heading to Taos, NM in October 2013 to help plan the week-long field exercise for the new eight-person 2013 Astronaut Class to be held in mid July, 2014.

Alan Condron

In December 2012 Alan Condron published an article in *PNAS* with Prof. Peter Winsor (UAF) about how meltwater floods triggered the Younger Dryas cold episode. This research was featured on NBC News, Fox News and The Daily Mail (UK), as well as on the UMass (In the Loop), and later a short interview with him was aired on Science Update, a radio show covering the latest discoveries in science. More recently, a paper he published with Prof. Ian Renfrew (UEA, UK) in *Nature Geoscience* about polar meso-scale cyclones was featured on NBC News, Our Amazing Planet, and in New Scientist magazine. Former UMass masters student **Anthony Coletti** will start work on his PhD with Dr. Alan Condron this fall to understand the link between freshwater forcing and abrupt climate change. Anthony will be using high-resolution climate models to discover whether changes in Arctic sea ice can



Chris at NASA's 2012 Geology Boot Camp Astronaut Training near SP Crater, Arizona describing how to use a Brunton to his student (six missions!) astronaut Mike Foale.

produce sudden shifts in climate. Anthony also spent the month of August aboard the USS Healy icebreaker in the Arctic ocean with colleagues from Scripps and Woods Hole Oceanographic Institute retrieving sediments cores that will tell us whether a massive flood discharged into the Arctic at the onset of the Younger Dryas cold period 13,000 years ago. Alan Condron spent two weeks this summer in Nyksund, northern Norway lecturing on the Advanced Climate Dynamics Course (ACDC) summer school. This annual event is organized by the University of Bergen in collaboration with University of Washington, MIT, and now UMass Amherst, and this year focused on understanding the climate of the last deglacial period.

Michele Cooke

The Geomechanics Research group has been working on a variety of investigations of fault evolution primarily using numerical and analog modeling tools. We continue to work on the effects of active fault geometry on deformation in southern California in order to better assess seismic hazards in the region. MS student **Laura Fattaruso**, PhD student **Justin Herbert**, non-degree student **Ohilda Difo** and undergraduate **Karl Grette** (son of Julie B-G) have been investigating different parts of the active fault system within southern California. For these projects we are all enjoying some wonderful collaborations with scientists at UC Davis, U Oregon, Western Washington U, UC Riverside as well as alum **Scott Marshall** at Appalachian State University. In January 2013, **Betsy Madden** (PhD Stanford) joined the Geomechanics group as a postdoctoral researcher. Betsy and MS/PhD student **Jess McBeck** are working on numerical models of the work budget of faults in order to better understand the growth of faults. Justin Herbert has been working on similar investigations with application to sandbox models of accretionary wedges. Justin and I are working with some colleagues outside of Paris and have greatly enjoyed the chance to visit and work in their lab. In our own physical modeling lab, we've installed a particle image velocimetry system that tracks pixels in successive photos and records incredible detail of the deformation in our physical models. MS student **Alex Hatem** has been investigating restraining bends along strike-slip faults within. We are very excited about the quantitative information that we can now collect and what we will learn about how faults evolve in analog materials. I'm writing this blurb from far north Queensland, Australia where I'm enjoying a 6-month sabbatical. When I'm not trying to keep up with all these great projects, I'm enjoying the tropical beaches, rainforest and reef with my family.

Haiying Gao

Broadly speaking, my scientific interests are to understand the dynamic processes at subduction zones with geophysical methods. Specifically, my research is focused on: (1) to further understand the tectonic, dynamic and magmatic processes in the Pacific Northwest; (2) to address how melt generates and migrates at the Cascades; (3) study the physical mechanisms of non-volcanic tremor and aseismic slip, as well as their relationship with regular earthquakes; (4) develop geophysical methods of how to fully extract, efficiently utilize and reliably interpret seismic information; and (5) accurately predict the amplitude of strong ground motion of large earthquakes and provide instantaneous warning of potential hazards to the society.

Piper Gaubatz

Piper Gaubatz' book, *The Chinese City* (with co-author

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Weiping Wu of Tufts University; Routledge Press) was published in August 2012. Early reviews identify this book as "...the most comprehensive and accessible account of changing Chinese cities so far." She gave a number of presentations on different aspects of Chinese cities this year, including an invited presentation - "Three Dimensions of Public Space in Chinese Cities: Squares, Streets and Swords" - at the Harvard Graduate School of Design, and keynote talks at the National Consortium for Teaching about Asia, Smith College's Kahn Institute, and Central Connecticut State University's Asia Day. In June she addressed a high-level Chinese government delegation (including mayors of 15 large Chinese cities) at the Yale School of Forestry and Environmental Studies' Environmental and Sustainable Leadership Program on future opportunities and challenges for Chinese cities.

Doug Hardy

My program of climate and glacier measurements continues at two tropical sites. On Kilimanjaro's Northern Ice Field (5,775 m) and the Quelccaya Ice Cap (5,680 m), automated weather stations record a full suite of variables including high-accuracy measurements compatible with those of the USCRN (US Climate Reference Network). At 13 and 10 years respectively, these are the world's longest high-elevation climate records from stations operating on glaciers. Mass balance is measured at a network of sites on Kilimanjaro glaciers, revealing ongoing ablation, and collaborative work continues with Margit Schwikowski (Paul Scherrer Institut, Switzerland) to establish robust dating of Kilimanjaro ice. On Quelccaya, accumulation studies complement climate measurements, and a geodetic survey in July 2013 will provide the first direct measurement of how ice volume is changing (collaborative with C. David Chadwell of Scripps and UCSD, and UMass GeoSci alum **Carsten Braun** of Westfield State University). An additional component of Quelccaya research will begin this fall in collaboration with former UMass postdoc **Mathias Vuille** (SUNY Albany), using stable isotopes, ice core data, and a forward modeling approach to better understand the South American summer monsoon. Geoscience collaborators include **Ray Bradley** and **Michael Rawlins**.

Christine Hatch

Dr. Christine Hatch is the Water Resources and Climate Change faculty liaison for the Extension program at the University of Massachusetts, Amherst since 2011, where she is Extension Assistant Professor in the Department of Geosciences. Dr. Hatch and collaborators have recently received a number of grants in support of managing watersheds in ways that allow rivers to function as whole, integrated systems (using process-based fluvial geomorphic assessment) at once sensitive to ecological continuity, flood prevention and community resilience. MS student **Noah Slovin** is working on the first of three projects: "RiverSmart Communities: Supporting ecologically restorative flood prevention and remediation in New England", and quantifying techniques for extracting fluvial geomorphologic parameters from LiDAR data for his thesis work. Much of Dr. Hatch's research focuses on using heat as a tracer and Distributed Temperature Sensing (DTS) to assess movement of water in hydrologic systems, with applications ranging from surface water - groundwater interactions, soils moisture surveys (NASA project, and advised UNR grad student project), solar radiation penetration of water columns, and thermal refugia mapping in stream systems. She is currently building a flume in collaboration with MS student **Jon Reeves** and investigators at the

USGS Silvio O. Conte Anadromous Fish Research Center to investigate the broader impacts of stream temperature under changing climate conditions. Prior to UMass, Dr. Hatch held a three-year postdoctoral research position with Dr. Scott Tyler's Hydrology group at the University of Nevada Reno. As a researcher in Dr. Andrew Fisher's Hydrogeology group at the University of California, Santa Cruz, Dr. Hatch pioneered a new method for interpretation of streambed thermal records to infer seepage rates. Dr. Hatch has a Ph.D. in Earth Sciences from the University of California (2007), Santa Cruz, and a Bachelor's degree in Geology from Amherst College (1998).

Mark Leckie

The micropaleontology lab is bustling with activity with projects from around the globe. Our diverse research activities are funded by NSF, the American Chemical Society Petroleum Research Fund, the Integrated Ocean Drilling Program (IODP), and several international oil companies. As a matter of fact, the hydrocarbon industry has taken increasing interest in our biostratigraphy-paleoceanography program. BP recently hired former MS student **Kendra Clark** and PhD student **Emily Browning**; both Kendra and Emily had internships with BP prior to completing their graduate degrees. PhD student **Khalifa Elderbak** has been working on Upper Cretaceous rocks and Oceanic Anoxic Event 2 from the US western interior; he will defend this fall. MS student **Serena Dameron** had a baby in February and is working on uppermost Cretaceous and Paleogene forams from the NW Pacific. MS/PhD student **Chris Lowery** has had two internships in Houston with BP and has worked on projects ranging from Miocene sea level on the northeast Australian margin to the Upper Cretaceous Eagle Ford Shale and Niobrara Formation from Texas and the western interior. PhD student **Andy Fraass** had the opportunity to sail with the Integrated Ocean Drilling Program in the Caribbean in 2012 and has worked on paleoceanographic research spanning the Oligocene/Miocene boundary to the Pliocene (Andy's wife Susanna had a baby in July). PhD student **Renata Moura** is sponsored by her employer Petrobras and is studying the Paleocene-Eocene biostratigraphy and paleoceanography of the Brazilian margin. PhD student **Linnae Rondeau** will look at modern forams off the Massachusetts coast as proxies for environmental changes, including the impact of big storms. **Elizabeth Freeman**, a senior from Wright State University, was an intern in the lab this past summer with support from a **Randolph and Cecile Bromery Undergraduate Scholarship**. Two new MS students arrived in the fall: **Amanda Parker** will work on a project from the Upper Cretaceous from the western interior, and **Ali Alibrahim** (sponsored by Saudi Aramco) will work on mid-Cretaceous deep-sea material from the northwest Australian margin. Former PhD student **Stephen Nathan** is now a tenure-track Assistant Professor at Eastern Connecticut State University. Former MS student **Nick Venti** completed a PhD at the University of Delaware and is back at UMass conducting research and getting papers out. Former MS student **Brooke (Olson) Carson** is still with Chevron but has relocated from Houston to the Pittsburg area. And finally, an alumni double-blast from the past: **Maxine Schmidt** is now the Head of the Science and Engineering Library at UMass, and **David Finkelstein**, following a brief 3-year stint back at UMass as our superstar geochemistry lab manager, has accepted a tenure-track position at Hobart and William Smith College. Did I mention that my tour of duty in the Front Office ends

FACULTY NEWS

August 31? I look forward to being back in the lab on a full-time basis!

Tony Morse

With James Scoates (UBC) and alum **Mike Hamilton** (U Toronto) I convened and helped lead a 4-day field conference with 20 scientists in the Kiglapait Intrusion, Labrador. We lived in tents; the weather was good, the rocks highly visible and well appreciated. Five-College representation was defined by **John Brady** from Smith College, **Mike Williams**, PhD student **Sean Regan**, and me. The impact of a large anorthosite block on the cumulate floor caused a ~1-foot fault in the crystal mush, defining a thin mushy zone above the solidified layered dunitic troctolites. Elsewhere, a 3-D boulder with extremely strong lamination of big (near 10 cm-long by 1-cm thick) plagioclase feldspars was locally interrupted by randomly oriented crystals with interstices of augite (from trapped liquid) inconsistent with compaction, an issue intensely disputed in layered intrusions. In the boulder showing these coarse laminated textures the exposed depositional surface (otherwise almost never seen) showed that the plagioclase crystals were ovoids rather than laths. The abundance of strikingly colored gabbro pegmatite lenses in troctolite suggested the local presence of volatiles causing the large grain size and the presence of augite and magnetite. One may conjecture that the gabbro pegmatites reflect the scavenging of water and F from the trapped liquid. I found that the distances and slopes in the intrusion had increased greatly since my original mapping a few years ago (1957!).



Tony Morse on the Kiglapait Intrusion field trip in Labrador.

Rud Platt

I am currently wrapping up two books: “**Reclaiming American Cities: The Struggle for People, Place, and Nature Since 1900**” (University of Massachusetts Press) and a Third Edition of my Island Press textbook: “**Land Use and Society: Geography,**



Rud Platt with two of our early geography Masters alums: **Bill Nechamen** and **Miriam Gradie Anderson**. The occasion was Bill’s ascendance to Chair of the Association of State Floodplain Managers (<http://floods.org/>) at their annual conference in Hartford in June. ASFPM is the principal professional partner to the National Flood Insurance Program and is a respected advocate for floodplain management and flood hazard mapping across the nation. Bill directs the New York State Office of Floodplain Management (a demanding job since Sandy last year and Irene the year before). Miriam is a staff member of the Wisconsin Floodplain Management program based in Madison.

Law, and Public Policy.” I also am completing a “Quick Response” study for the University of Colorado Natural Hazards Center on the impacts of Hurricane Sandy on selected elements of the New York City waterfront.

Mike Rawlins

Mike Rawlins has been selected as a member of the Science Definition Team for NASA’s Arctic Boreal Vulnerability Experiment (ABOVE), which will take place in Alaska and western Canada during the next 5 to 8 years. He and the other SDT members are preparing a concise experiment plan, which will serve to guide NASA’s solicitations for ABOVE science team projects in coming years. Mike recently published a study in the *Journal of Advances in Modeling Earth Systems*, which described a numerical model and its simulations of soil freeze/thaw dynamics across the terrestrial Arctic. The model is being used in a NASA sponsored project led by UMass focused on understanding how a warming climate is altering carbon cycle dynamics across the terrestrial Arctic. The project involves remote sensing specialists and hydrological modelers at City College of New York and the University of Washington and research assistance from PhD students **Chantelle Lonsdale** and **Moumita Clifton**. Mike is also serving this year on a NASA working group tasked with defining a long-term fractional land cover data set from an array of remote sensing retrievals over the past 30 years. Late last year he and **Ray Bradley** published a paper characterizing regional climate model depictions of future climate changes across the northeast US. In his role as manager of the Climate System Research Center and in support of the UMass Extension program, Mike continues his outreach with local media and community groups on climate and weather topics. Interviews in the past year have appeared in Reuters, the Springfield Republican, and on WGBY television.

Sheila Seaman

Sheila Seaman is enjoying projects focusing on measuring water and other volatiles in all sorts of geologic materials using the infrared spectrometry facility, and on projects in Maine, Iceland, and northern Saskatchewan with three new grad students. M.S. student **Megan Whitman** just finished up a field season working on the volcanic rocks of Isle au Haut in Maine, where she was housed for the summer and provided geologic insight by alumnus **Marshall Chapman** who did his Ph.D. research on the Isle au Haut plutonic rocks under the direction of **Mike Rhodes** back in the early 1990’s. M.S. student **Sarah Justus** did field work this summer on the Moldoxi volcanic complex in north-central Iceland, where she is studying the relationship between felsic and mafic volcanism. Finally, Ph.D. student **Amanda van Lankvelt** joined Sheila, **Mike Williams** and Ph.D. students **Jeff Webber** and **Sean Regan** in northern Saskatchewan, where she is working on the effects of water stored in nominally anhydrous minerals on the generation of granitic melts in the lower crust.

Stan Stevens

Stan Stevens is now a full-time lecturer and Geography graduate advisor. Stan continues to work with the ICCA Consortium on international conservation and rights initiatives. He was a delegate to IUCN’s 2012 World Conservation Congress in

Jeju, South Korea and is participating in the planning for IUCN's 2014 World Parks Congress. In 2012, Stan arranged the first visit to the US of Sonam Gyalzen Sherpa and Tenzing Tashi Sherpa, elected leaders of the Sherpa communities inside Sagarmatha (Mt. Everest) National Park and of the first Sherpa cultural conservation NGO. After presenting in a special session on Sherpas and conservation in the Mt. Everest region at the Annual Meeting of the Association of American Geographers in New York City they spend several weeks at UMass, where they attended and presented in Stan's classes, prepared proposals for funding for future conservation work in the Mt. Everest region, and began work on a participatory cultural mapping project with the assistance of Geography student **Marielys Velez**. In May 2013 he received a lifetime achievement award from Sherpa leaders in the Mt. Everest region of Nepal and began work with the Khumbu Sherpa Culture Conservation Society on a set of projects, which includes participatory mapping and GIS. Stan's newest book, *Indigenous Peoples and Protected Areas: Towards a New Paradigm Linking Conservation, Culture, and Rights*, is now in press with the University of Arizona Press. In 2013 he also published an article on "National Parks and ICCAs in the High Himalaya of Nepal: Challenges and Opportunities," in *Conservation and Society* and a book chapter on "Defending and Strengthening Sherpa ICCAs and Rights in Sagarmatha (Mt. Everest) National Park, Nepal" in *The Right to Responsibility: Resisting and Engaging Development, Conservation, and the Law in Asia*.

Eve Vogel

Eve Vogel has been working hard on her new project, RiverSmart Communities, together with colleague **Christine Hatch**. This project is funded through the new Center for Agriculture, Food and Environment, and aims to advance ecologically restorative flood prevention and remediation in New England. The fundamental premise is that managing river flood hazards and damage under the principles of fluvial geomorphology, which analyzes the dynamic processes of rivers, can better protect human life and property, as well as ecological function in streams, floodplains and riparian areas. Eve's half of the grant focuses on institutional challenges to doing so, especially the jurisdictional and institutional fragmentation endemic to New England's town-centered governance. She has been researching four successful institutional case studies, including the Vermont Rivers Program and the White River Partnership, through interviews and documentary research. She has been aided in this work by three undergraduate assistants – in 2012-2013, including Geology major **Gina Accorsi** – and starting in fall 2013, new Masters student **Nicole Gillett**. Recently Eve received a follow-up grant from the Army Corps of Engineers' Institute for Water Resources to do a similar study

of four successful case studies of federal agencies working with local communities to prevent or recover from flood damage. In addition to the RiverSmart work, Eve continues to work on other projects in both the Pacific Northwest and New England. In 2012, Eve published an important theoretical exposition on the long-term political negotiations of large river basin management, and the management results, based on her Columbia River work, entitled "Parceling out the watershed" in *Water Alternatives*. In 2013

she published her first article on the Connecticut River, "New Deal versus Yankee Independence," in the *Northeastern Geographer*. A sequel to both compares long-term river management in the Columbia, Tennessee and Connecticut Rivers, and will be published as a chapter in a book on *Negotiating Water Governance: Why The Politics Of Scale Matter* by Ashgate. When there have been a few moments to spare amidst this work, Eve has also been following the relicensing process of five hydropower projects on the Connecticut River.

Mike Williams

Mike Williams is continuing his research on the tectonic history of North America. M.S. student **Calvin Mako** has been working in the southwestern US to constrain the timing of the Mazatzal orogeny. He spent a productive month in southern Arizona on some of the hottest days of the year. He then went to the Laserchron Lab in Tucson, and already has some new dates for important rock units.

Mike's long-term research project in the Athabasca area of northern Saskatchewan is gaining momentum, and collaborators, **Sheila Seaman** and **Laurie Brown** are both now involved with the research. The region is one of Earth's premier exposures of the lower continental crust. The hope is to better understand the modern deep crust by looking at this ancient example. Ph.D. students **Amanda van Lankvelt**, **Jeff Webber**, and **Sean Regan** all worked in Athabasca this summer. Amanda (and Sheila Seaman) is studying fluids in the deep crust and also the origin of granitic magma. Jeff (along with Laurie Brown) is studying the magnetic character of the rocks in order to learn about the tectonics of these rocks and possibly about the crust on other planets as well. Sean has been studying several of the major shear zones that cut the region in order to understand the role of intense deformation zones within the broader flowing deep crust. All will be making heavy use of the electron microprobes and FTIR as they begin to analyze rocks collected during the summer.

The Electron Microprobe/SEM Facility continues to move forward as one of the top microprobe labs in the world thanks to Lab Director, **Mike Jercinovic**. The lab hosts two electron microprobes and one scanning electron microscope that are running 24/7. The centerpiece of the facility is the Ultrachron microprobe, a unique microprobe developed at UMass and dedicated to dating tiny volumes of the minerals monazite and xenotime. Monazite dating has become almost routine at UMass with the main goal not to date rocks but to date tectonic events such as metamorphism or deformation. Last year, Mike Jercinovic completed the first "nano-date", dating the monazite filling a fracture only 800 nanometers in width!!

Jon Woodruff

Recent Highlights from the UMass Sedimentology Lab: **Christine Brandon** is the recipient of the 2013 GSA Marie Morisawa Award in Geomorphology and a Mark B. Bain graduate fellowship from the Hudson River Foundation. These grants will help support her PhD research on paleo-hurricane reconstructions from coastal sediments, including the analysis of deposits from Hurricane Sandy in 2012. An in-press publication of Christine's in *Geochemistry, Geophysics, Geosystems* highlights some of her initial work. **Brian Yellen** continues his NSF-funded doctoral work on sediment storage



Jon Woodruff's sedimentology class taking a core.

GEOGRAPHY PROGRAM NEWS

The Geography Program is welcoming 10 new undergraduate majors this fall. At present, one third of all geography majors (BA + BS) are Commonwealth Honors College students (campus-wide about 15% of UMass undergraduates are in CHC).

This past spring geography majors prepared a successful application to become a registered student organization at UMass. The UMass Geography Club will start its official meetings and activities in Fall 2013. Club activities will include field trips, films, lectures and social events. A website is “under construction” and should be completed this fall.

Amidst a number of changes in departmental space, the geography program traded Morrill 126 (the long-time geography teaching lab), for Hasbrouck 236 (the “Round Room”) across North Pleasant Street from Morrill. The new teaching laboratory/classroom was outfitted with fresh paint, new wall maps, new blinds, new A/V and computer equipment and furniture to enable its flexible use as a lecture room, a seminar room, and a meeting and event room. The room has proved to be a comfortable home for program activities including Geography Club meetings, thesis and dissertation defenses, and social events.

Student Achievements:

MingmaNorbu Sherpa was awarded a Ph.D. in May 2013, with a dissertation entitled “Conservation Governance and Management of Sagarmatha (Mt. Everest) National Park, Buffer Zone, and Buffer Zone Community Forest User Groups in Pharak, Nepal”, Adviser: **Stan Stevens**.

Ted White received his Ph.D. in August 2013, with a dissertation entitled, “Seeds of a New Economy? A Qualitative Investigation of Diverse Economic Practices within Community Supported Agriculture and Community Supported Enterprise.” Ted had been **Julie Graham’s** student, and after her passing worked with **Eve Vogel** as official chair, and Professor Graham’s long-term collaborator **Kath Gibson**, as a second primary advisor.

Two students received MS degrees in Geography: **Changjiang Ye** (Adviser: **Qian Yu**) and **Jessica Brooks** (Adviser: **Piper Gaubatz**).

Marielys Velez wrote an honors thesis on Sherpa cultural mapping, and assisted Stan Stevens with participatory mapping and GIS work in the Mt. Everest region in May.

For the **latest Geography Program news**, watch our website at: <http://blogs.umass.edu/umgeog>.

Julie Graham Memorial Plenary at the Rethinking Marxism 2013 conference:

On Friday, September 20, 2013, Katherine Gibson of the University of Western Sydney, Professor Graham’s longtime collaborator and co-author under the combined pen name of J. K. Gibson-Graham, gave the inaugural Julie Graham memorial plenary. The talk was entitled “Being the revolution: or how to live in a ‘more-than-capitalist’ world threatened with extinction.” Professor Gibson began her talk with a picture of Professor Graham, and noted Graham’s long concern for the natural environment and alarm at the destruction that may be wrought by climate change. Professor Gibson then went on to consider how the nonhuman, or the “more-than-human,” could be brought into J.K. Gibson-Graham’s influential conceptions about building a post-capitalist politics. She offered several case studies of people and projects thinking creatively and collaboratively to provide diverse kinds of economic productivity while also improving environmental conservation – for example, a proposal for an Australia-wide electric grid that could be powered entirely by renewable resources, including micro-generation, with molten salt for electric storage that would be supported by government and other investments. It was an exciting talk that advanced their established theorization of the “politics of possibility” into the realm of building a more ethical, inclusive, sustainable world – much, Gibson noted, as does their most recent book, *Take back the economy: An ethical guide for transforming our communities*, which was coauthored with Graham’s former student and department alum **Stephen Healy**, as well as Australian collaborator Jenny Cameron.

The talk was part of the Rethinking Marxism conference. Rethinking Marxism came out of Julie Graham’s work with Professors Steve Resnick and Rick Wolff in the Economics department here. The three, as well as other professors and grad students, aimed to use the tools, concepts and analyses of Marxism but in less constraining, totalizing ways. Their discussion group blossomed into a journal, now in its fifteenth year, as well as a regular conference here at UMass.

A note from **Tom McCrory**:

Here I am at another career first - working at an active oil-field. Better still (in terms of a two fer), it’s the Teapot Dome oil-field of scandal fame, about 40 miles north of Casper, Wyoming. The machine I’m standing next to is a Geoprobe direct push rig, which we were using to test an abandoned landfill for the thickness of its cover and the content of the gasses in the waste. Learned some interesting things about fracking while I was there.

Alums, our next Newsletter will feature your updates and stories. Please send your notes (and pictures) to Julie Brigham-Grette (juliebg@geo.umass.edu). Also, please send pictures to share on the Geosciences webpage (see the Alumni tab).



NEWS FROM AROUND MORRILL

PhD candidate **Christine Brandon** was selected for the **Marie Morisawa Award from the Quaternary Geology and Geomorphology Division of GSA**. It's given to a female graduate student pursuing research in geomorphology and she won it for her proposal titled "Reconstructing the flooding history of New York Harbor, including Hurricane Sandy, from event deposits in a back-barrier pond." Just one award is given per year and it will be presented at the QSG&G reception at the national GSA meeting in Denver. At the same ceremony, UMass Geo Alum **Gail Ashley** (Professor at Rutgers) will receive the **Quaternary Geology and Geomorphology Distinguished Career Award**; **Julie Brigham-Grette** will be doing the citation. Congratulations to Christine and Gail!

Dave Boutt was awarded a Lilly Fellowship for 2011-2012; this competitive award program, established in 1986, enables promising UMass junior faculty to cultivate teaching excellence in a special year-long collaboration. <http://umass.edu/loop/talking-points/articles/111751.php>

We have purchased two **new Geosciences vans** in recent years, but as we have retired our old red or maroon vans, the University is requiring that we replace them with white ones. Our continued emphasis on field experiences for our undergraduates

George Roberson

george.roberson@fulbrightmail.org,

<http://interactive-worlds.blogspot.com/2007/04/editor.html>

I continue to research, write, and publish with **Dick Wilkie**. We have a new chapter out, Wilkie, R and G Roberson. 2012. "Attachment to Place" in "21st Century Geography: A Reference Handbook", and a major new book published by the Association of American Geographers (AAG): Roberson, G and R Wilkie. "Envisioning Landscapes, Making Worlds: Geography and the Humanities", edited by S Daniels, D DeLyser, JN Entrikin, and D Richardson, eds.

In addition to my adjunct with the department, I've recently founded a research and advocacy organization as an umbrella to encompass all my academic and community-based work: Partners for International Collaboration and Education (PICE). I'm currently producing a feature length film, "Joshua Tree", a contemporary drama set against the 2008 USA economic collapse and ongoing foreclosure crisis. I am also co-author and it is now in post-production, info at:

<https://www.facebook.com/pages/Joshua-Tree/266490960116552>

I continue to co-host the Tangier International Conferences (8th annual just completed) and serve as Director and Publisher of Collaborative Media International (CMI). Our latest book, "No Man's Land" (Arab-spring related), was premiered in June in Tangier with the author and the Moroccan Minister of culture in attendance. And our "Moroccan Arabic (2nd edition)" textbook has become the standard for those starting out studying the language. Info at: <http://icpsmorocco.org/new/>; <http://collaborativemedia.blogspot.com/2009/03/welcome.html>

I was an invited speaker for the "Peace Through Performing Arts" training hosted by the USA Department of State's International Visitor Leadership Program. I spoke on our 8-year peace and performance centered collaborations in Tangier, Morocco. There were participants from Bahrain, Egypt, Iraq, Jordan, Saudi Arabia, Syria, Tunisia.

FACULTY NEWS, CONT'D

in the Connecticut River watershed, as well as taking the lead in organizing a 2013 summer field camp for 9 undergraduates that assesses the impact of major flood control dams in trapping sediments along the river. **Laura Kratz** successfully defended her Masters thesis on the geomorphic and sedimentological response of the Connecticut River watershed to flooding from Hurricane Irene and has accepted a geologist position at ARCADIS. **Davin Wallace** completed his NSF-funded post-doc and has accepted a position as an Assistant Professor in the Department of Marine Sciences at the University of Southern Mississippi. **Kinuyo Kanamaru** completed her post-doc and is now continuing her research on coastal typhoon and tsunami reconstructions at Kansai University in Japan. **Andy Fallon** presented his undergraduate research on long-term sedimentary reconstructions of flooding along Connecticut River at northeastern GSA and has accepted a graduate research fellowship at the Virginia Institute of Marine Science.

Qian Yu

The past year has been an exciting and productive year for me. First of all, the most exciting thing is I got my tenure! It is extremely rewarding to see my first Ph.D student **Weining Zhu** graduate. He had six papers published in the reputable journals of Geoscience and remote sensing, co-authored with me. This summer, my grad students **Jiwei Li** and **Changjiang Ye** conducted summer research in Beaver Island, Michigan with me. We were working on an NSF funded project to understand terrestrial carbon leaching from land to lake or ocean. The experiment uses aquatic mesocosms and green house incubation at Central Michigan Univer-



Grads Jiwei Li, Changjiang Ye and Prof. Qian Yu in Beaver Island, Michigan for summer research.

sity Biological Station to simulate litter leaching process. The result will provide different decomposition rates for dominant vegetation types and examine the bio-optical properties of dissolved organic carbon.

CONGRATULATIONS TO THE 2012 AND 2013 STUDENT AWARD WINNERS!

OUTSTANDING SENIOR AWARDS

Geology: 2012: Olivia O'Grady 2013: Ayla Heinze Fry, Lisa Kumpf

Geography: 2012: Julian Hartmann-Russell 2013: Rachel Labrie, Marielys Velez

Earth Systems: 2012: Amy Goldman 2013: Andrew Fallon, Christopher Hewes

OUTSTANDING TEACHING ASSISTANT AWARDS

Geology: 2012: Gordon Dushane 2013: Alex Hatem, Megan Whitman

Geography: 2012: Sainan Lin 2013: Xin Li, Changjiang Ye

MEMORIAL AWARDS

H.T.U. Smith Award:

2012: Thomas O'Dougherty, James Carrigan 2013: Chelsea McQuaid, John Bergamo

Elinor Fierman Award:

2012: Marissa Mnich, Mingma Norbu Sherpa 2013: Robert D'Anjou, Jeffrey Webber, Emily Levin

Gloria Radke Award:

2012: Sainan Lin, Laura Fattaruso, Kathryn Murdock 2013: Sainan Lin, Changjiang Ye, Mitch Isaacson, Alex Hatem, Melishia Santiago, Amy Hudson

Leo M. Hall Award:

2012: Greg DeWet, Samuel Davin, Sean Regan, Ashley Machek, Changjiang Ye, James Carrigan

2013: Sean Regan, Justin Herbert, Alex Hatem, Megan Whitman, Calvin Mako

Geography Alumni Award:

2012: Xin Li 2013: Sainan Lin, Changjiang Ye, Jiwei Li

Andrew Wise Memorial Scholarship: 2012: Justin Herbert, Xin Li, Leah Santangelo 2013: Noah Slovin, Jiwei Li, Amanda Van-Lankvelt, Ben Pelto, John Bergamo, Michael Kelly

Joseph Hartshorn Memorial Award

2012: Sainan Lin, Changjiang Ye, Mingma Norbu Sherpa, Leah Santangelo

2013: Robert D'Anjou, Brian Yellen, Mitch isaacson, Greg DeWet, Ben Pelto

Randolph and Cecile Bromery Graduate Fellowship

2012 and 2013: Sarah Justus

Randolph and Cecile Bromery Undergraduate Scholarship

2013: Elizabeth Freeman (summer intern)

2013 Student Award Winners



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Mr. John C. Moores, Jr.
Mr. Douglas L. Morgan
Ms. Eleanor C. Morgante
Mr. Van L. Morrill & Ms. Katharine F. Lemons
Mr. Robert C. Morse
Mr. John A. Moser
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Mr. Scott M. Muir
Ms. Virginia L. Mullen
Ms. Karen Mulvey
Mr. Sean D. Musselman
Ms. Janet Muzzy
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Dr. Jeffrey W. Pferd
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Mr. Edward A. Pinto

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Mr. Neal M. Price
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Mr. Herman B. Zimmerman
Mrs. Rebecca J. Zorra

A warm thank you to all who have supported the department over the past two years. Our apologies if we have missed your name (this list is provided to us from Alumni Relations). Please update your contact information with us, and thanks again for your continued support!

Please use the attached envelope or www.geo.umass.edu to contribute on-line.

If you are considering a larger gift, please contact Julie Brigham-Grette (head@geo.umass.edu).

Alumni support can make a critical difference for students in the Department of Geosciences.

GRADUATE SUPPORT – THE CRITICAL CHALLENGE

Perhaps the greatest challenge for the future of the Department is maintaining support for graduate students. The Department currently has 12 University- and Department- supported TA positions. We currently have many more applications to the graduate program than we can support, and many students end up choosing another program because we can't offer support or can't compete with other programs. We feel that developing endowed graduate support is essential for maintaining a strong

and broad graduate program into the future. This is one of our main development goals. Making a contribution to a graduate research or teaching endowment can enable a student to attend graduate school, and provide an opportunity to become a career geologist or to use geology to build a better career in any field. Please consider helping us to endow future graduate positions. And please feel free to let us know if you have ideas for developing enduring graduate student support.

JOSEPH HARTSHORN ENDOWED GRADUATE SCHOLARSHIP IN QUATERNARY GEOLOGY

Joe Hartshorn was a passionate, dedicated teacher, scientist, pioneer, and leader in his field. He came to UMass in 1968, retired as professor emeritus in 1987, and, sadly, he died on May 5, 2007. Although his interests were broad, Joe was particularly interested in glacial geology, and his studies of the glacial geology of New England set the standard for all who followed. He took a personal interest in the lives of students, and was always available to chat and share his wide experience, both in geology and life. His influence lives on in the successes and contributions of all of his former students. In order to pay tribute to his

memory, we have established the "Joseph Hartshorn Endowed Graduate Scholarship in Quaternary Geology". The scholarship was established in 2009 through gifts from Joe's family and friends, Department faculty, and alumni. We now hope to grow the fund so that it can significantly support student research and ultimately support a graduate fellowship in the department. In addition to the Hartshorn Scholarship project, our next goal is to fully establish the "Charles Pitrat Memorial Endowment Fund". Watch for notes in the next newsletter, but please contact us if you would like to help.

THE RANDOLPH AND CECILE BROMERY FUND

The Randolph and Cecile Bromery Fund is intended to support underrepresented graduate and undergraduate students interested in pursuing geology, especially African Americans, and it is also intended to support and enhance student field research. The fund has already helped to support several graduate students; it has partially supported geological field excursions, and it has brought guest speakers to the Department. The Fund has now grown sufficiently that we are initiating two new programs to recruit minority students: the Randolph and Cecile Bromery Minority Graduate Fellowship and the Randolph and Cecile Bromery Minority Undergraduate Scholarship. We sincerely thank Bill and Cecile Bromery for their generosity! "Bill" Bromery

was Head of the Department of Geology and Geography, and Chancellor of the University of Massachusetts (1971-1979). During his distinguished career as an exploration geophysicist with the USGS and as a Commonwealth Professor at UMass, Bill also served as president of the Geological Society of America, President of Springfield College and interim President of Westfield State College. He received numerous honorary degrees and accolades, served on industry boards, as well as two terms on the President's Committee on the National Medal of Science. We are extremely proud to provide undergraduate and graduate student support and opportunities from the generous funds provided by Randolph and Cecile Bromery Fund.

MEMORIAL FUNDS SUPPORT STUDENT RESEARCH

The Department of Geosciences has six relatively modest Alumni Memorial Funds. The proceeds go directly to students, most commonly helping to support field expenses, attendance at field camp, or other costs associated with student research. Many alumni, at one time or another, have received some support from these funds, and many claim that the funds were critical in allowing them to complete their thesis or senior research. Please consider contributing to one of the memorial funds or possibly make a general contribution in support of student research, visiting lectures, or field excursions.

Elinor Fierman Memorial Fund--Established in 1983 by a gift from Jack Fitzpatrick (B.Sc., '76; M.Sc., '78). Elinor Fierman graduated in the class of '76 and went on to Duke University. In the spring of 1977, she was killed by a car while studying roadside geology. This award in her name is given to a student researcher (undergraduate or graduate) with a preference given to laboratory studies.

Geography Alumni Award Fund--Established in 1995 from gifts given by Geography alumni, the award is given either to support Geography graduate student research or to any student in the Geography program for other worthy purposes.

Gloria Radke Memorial Fund--Established in 1984 from gifts given by family and friends of Gloria Radke, a graduate student interested in Pleistocene geology. At the end of her

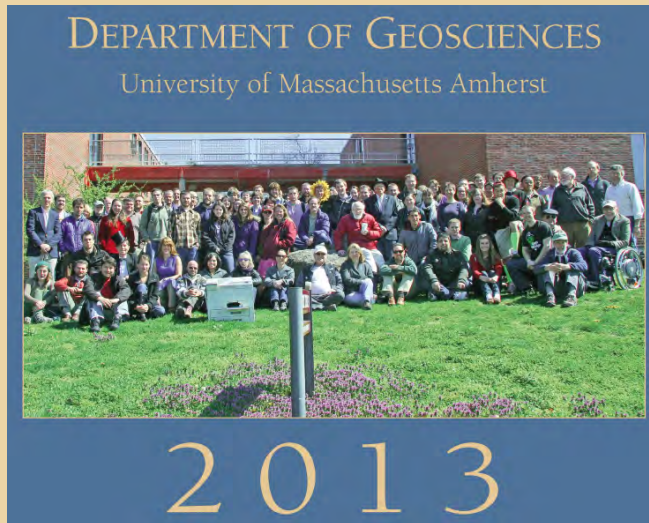
first year here, she was killed by a drunk driver on the S-curve by Atkins Farm Stand in South Amherst. This award is given to graduate students in support of field research.

H.T.U. Smith Memorial Fund--H.T.U. Smith was Head of the Department from 1956-1969. This award in his name is given to support field work with preference to undergraduate students (including enrollment in a field course).

Leo M. Hall Memorial Fund--Leo Hall was Professor of Geology in this Department from 1967 until his death on December 26, 1985. Among many other qualities, Leo was noted for his devotion to field study and to the teaching of field methods. This award in his name is given to graduate students in support of field research.

MEMORIAL FUNDS SUPPORT STUDENT RESEARCH

Andrew D. Wise Memorial Endowment Fund--Andrew D. Wise was an undergraduate geology major in the department (BS-1983). After graduating, he worked as a hydrogeologist with Weston & Sampson in Peabody, MA. He played the trumpet and was an avid skier and cyclist. In 1998, he traveled through the country for six months on a motorcycle, visiting many of the National Parks, and finally settling in San Diego, California where he was employed by Gradlent Engineers. He died on July 18, 2006. In June of 2007, Richard and Geraldine Wise established the Andrew D. Wise Memorial Endowment Fund in memory of Andrew. The purpose of the Fund is to provide support to students in the Geology Program for expenses, programs, and experiences for which other support is not available. We welcome contributions to this important fund.



UMASS AMHERST 2014 DEPARTMENT OF GEOSCIENCES CALENDARS COMING THIS FALL!

This calendar features many beautiful photos showing geoscientists in action, submitted by various folks from the department.

You can purchase your calendar for \$15.00 by contacting us at 413-545-2286, or you can receive one as a gift when you make a contribution to any of the department funds.

Please use the attached envelope to send your gift to us, or navigate to www.geo.umass.edu to contribute online.

NEWS FROM THE OFFICE OF THE STATE GEOLOGIST

By Steve Mabee, Massachusetts State Geologist

September 2013 marks the start of the Survey's 12th year of operation since becoming a part of the Department of Geosciences. From our humble beginnings in 2002 armed with just a vision and some ideas, we have secured over \$2.6 million in funding with nearly \$1.0 million earmarked for geologic mapping. Along the way we have supported 35 students or temporary employees and 2 post-docs. The current focus of the Survey is on hazards, energy, water, geologic mapping and climate change issues. We have come a long way but still more can be done. The future looks bright.

Joe Kopera begins his eleventh year with the Survey and continues to coordinate all bedrock mapping efforts in the Commonwealth as well as maintain the Survey's web site. Joe is supported mostly by STATEMAP funding from the USGS but is also funded by other projects. Joe is completing, along with help from **Addie Rose Holland**, a redesign of the Survey's webpage that we hope will be online this fall. Joe remains a big part of the Survey's success. We are nearing completion of a three-year project to help populate a National Geothermal Data Base and explore the geothermal potential of Massachusetts granites. **Mike Rhodes** and **Dave Boutt** are co-PIs. This project was funded through a sub-contract to the Survey on a grant from DOE to **Lee Allison** at the Arizona Geological Survey. **Chris Koteas** who helped us on this project in the first two years has moved on to a faculty position at Norwich University. **Maria Fernandez** continues in here tenth



year as a GIS specialist. She handles all the challenging GIS mapping projects and continues to work with **Peter Robinson** to publish some of his maps. The Survey continues to benefit from the help of other individuals over the last two years. I want to thank **Don Sluter, Teresa Gagnon, Amy Ryan, Forrest Iwanik, Joe Schmidt, John Gilbert, Marissa Mnich, Brandon Leighton, Mitch Isaacson** and **Mike Vollinger**.

Some of the recent activities and new initiatives of the Survey are highlighted below.

- We secured an eleventh year of STATEMAP funding from the USGS to continue geologic mapping in the Hudson quadrangle and to prepare a seamless onshore-offshore surficial geologic map of the North Truro quadrangle. For this latter project we will be collaborating with Mark Borrelli at the Provincetown Center for Coastal Studies.
- We have finally completed the peer review process and made all the corrections for the seamless onshore-offshore surficial geologic map of Plum Island, which includes the Newburyport East and northern portion of the Ipswich quadrangles. The final peer reviewed map should be available on our website this fall. The work is a collaboration among the Massachusetts Geological Survey, Byron Stone (USGS), Walter Barnhardt (USGS Woods Hole), Duncan FitzGerald (Boston University)

and Chris Hein (now at Virginia Institute of Marine Science).

- We received funding from FEMA to prepare fluvial erosion hazard maps on four tributaries of the Deerfield River in the aftermath of tropical storm Irene. This storm produced record-breaking peak discharges at several gaging stations within the Deerfield watershed and caused severe damage. There were several landslides and debris flows that forced the closure of Route 2 in northwestern Massachusetts for 3.5 months.
- We are also working on preparing a landslide susceptibility map for the western part of the state. We are working with **Chris Duncan** (GISMatters, Inc.) and looking at various methods of evaluating the risk from landslides. The hope is to incorporate this information into the Massachusetts Statewide Hazard Mitigation Plan.
- Approval was just received to collect shear wave velocity profile data in different surficial materials to improve the data used to assess ground motion and loss estimates from various earthquakes using FEMA's HAZUS software. This software is used extensively by planners for emergency preparedness and response planning. We hope that collecting actual shear wave velocity data will improve the modeling efforts.
- We have also been recommended for FEMA funding to explore the development of a fluvial geomorphological assessment protocol in Massachusetts similar to the programs already in place in Vermont and New Hampshire. With the recent flood damage, there is tremendous interest in applying fluvial geomorphological principles to the management of river corridors and the design of stream crossings. Massachusetts currently does not have a protocol in place that standardizes the collection of fluvial geomorphic data nor is there a data base into which this data can be placed for others to use. This project is an attempt to address this issue and is an outcome of a fluvial geomorphology workshop that the Sur-

vey co-sponsored with the Water Resources Research Center at UMass Amherst in the fall of 2012.

In December, 2012, the American Ground Water Trust held a conference at the UMass Amherst campus called "Shale Gas in Massachusetts". Earlier in the year, a two-page fact sheet summa-



Right: Amy Ryan and Joe Schmidt get ready to retrieve sample after Chris Koteas finishes driving the core barrel. Soil sampling was done as part of the U.S. DOE grant to measure thermal conductivity of various surficial materials in Massachusetts.

rizing a study by the USGS that evaluated the hydrocarbon potential in the Mesozoic rift basins along the Appalachians was prepared. Unfortunately, this document was interpreted by some to mean that shale gas has been discovered in the Connecticut valley, which is not true. This, of course, led to an escalation of concern over possible drilling and hydraulic fracturing ('fracking') in Massachusetts. In response, the Survey prepared a frequently asked questions document for the residents of Massachusetts. You can find the link to this document on the Massachusetts Geological Survey's web page (www.geo.umass.edu/stageologist)



Pictures of some of the damage from Tropical Storm Irene along Route 2 in northwestern Massachusetts. Left: Translational debris slide along sheeting joints oriented 284° dipping $38-40^\circ$. Right: Rotational slide that moved along a layer of lacustrine sediments 5 to 6 m below the surface that were noted by Joe Hartshorn in earlier mapping of the Rowe quadrangle (Chidester et al., 1967)

STAY CONNECTED WITH UMASS GEOSCIENCES!

Look for familiar faces (both presenters and attendees), department information booths, and gatherings for alumni and friends at upcoming meetings:

Geological Society of America (GSA)
annual meeting,

October 27-30, 2013, Denver, CO

Graduate School information forum, Sunday, Monday, and Tuesday; private alumni party Monday evening

American Geophysical Union (AGU)
fall meeting,

December 9-13, 2013, San Francisco, CA

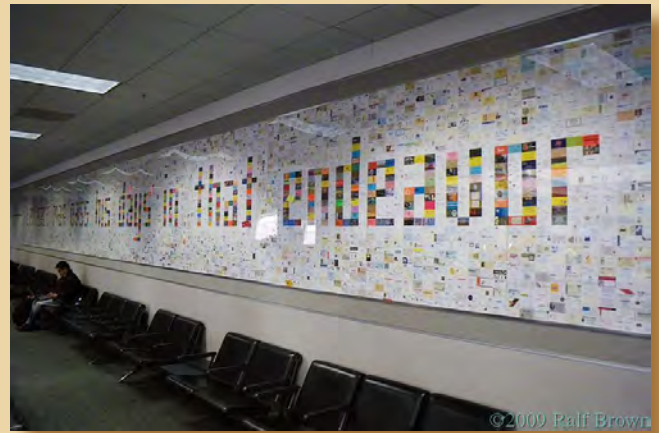
American Association of Petroleum Geologists (AAPG) annual meeting,

April 6-9, 2014, Houston, TX

Association of American Geographers (AAG)
annual meeting,

April 8-12, 2014, Tampa, FL

SEND US YOUR BUSINESS CARDS!



Our Alumni gallop the globe with successful careers across a wide spectrum of business, academic and Federal, state and local government agencies. What better way to help us celebrate your success and provide perspectives to our undergraduate majors, than to display **your business card** on a large mural in the hallway of the department? We will start modestly and see how it grows. Using the enclosed envelope, please send us your personal business cards. And while you are at it, feel free to help us fund student research by also enclosing a gift to one of our multiple memorial and alumni funds.

Thanks...Julie Brigham Grette
Department Head



Geosciences Department annual group photo, April, 2013.

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Gail Ashley (Rutgers University) will receive the Quaternary Geology and Geomorphology Distinguished Career Award at the upcoming GSA meeting in Denver. **Julie Brigham-Grette** will do the citation.



Changing of the guard: **Mark Leckie** and **Julie Brigham-Grette** (our new Department Head) examining ice-contact and glacial lake features below the former home of **Don** and **Nancy Wise** during a recent spring picnic.

KEEP US IN THE FIELD AND IN THE LAB

We are seeking increased funding in support of undergraduate and graduate research opportunities and field-based experiences. ***Please consider making a donation to one of our memorial fellowships, or our general departmental fund to support field trips and student travel to meetings.*** As you are well aware, these hands-on, problem-solving activities enrich the geosciences experience and better prepare our students for diverse careers.



Please contact the Department of Geosciences if you have any questions or comments about this newsletter. We plan to publish this on a regular basis, so please let us know if you have suggestions for improvement. We would love to hear from you, please send news updates to: head@geo.umass.edu.

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