Carleton Geology Newsletter

Volume XXXVII 2012

MINNESOTA

GNEISS

Published by
The Department of Geology
Carleton College
Northfield, MN 55057

The cover drawing is the 2012 Geology T-shirt design by Taylor LaCasse '13

The Carleton Geology Newsletter is edited by Jonathon Cooper
Layout by Ellen Haberoth

Photo Submissions:
Pictures submitted to the Newsletter can be either in traditional print or electronic formats, but electronic pictures should be medium to high resolution in order to reproduce well on paper. The file size of electronic pictures should be several hundred KB or more.

If you have a change of address or other correction to our address list you may edit it yourself and make sure your listing is done the way you prefer at http://apps.carleton.edu/alumni/directory/

If you have forgotten your username or password call the Alumni Affairs Office at 1-800-729-2586.

Or

You may notify:
Alumni Records
Carleton College
Northfield, MN 55057
(507) 222-4195
E-mail: addresses@carleton.edu

Department of Geology

Carleton College
One North College Street
Northfield, MN 55057

June 2012

Dear Friends of the Geology Department,

On behalf of the Geology Department, I send you greetings, best wishes and another edition of our Carleton Geology Newsletter. The faculty is busy and productive in their research, teaching and service. You will find detailed accomplishments of each faculty in the pages that follow. As always, there were many field experiences for students and faculty this year. In the fall, we had an over night field trip to Taylors Falls where over 40 students participated. In the winter term, our New Zealand off campus program had 21 students participate and our spring field trip to Missouri was also a great success. Again, a few of our former students won highly competitive National Science Foundation Fellowships. Seventeen seniors of the class of 2012 successfully finished their comps and a few of them are off to graduate schools and many have internships and summer jobs waiting for them. Most of the class of 2013 are scattered all over the country to do research for their comps. Twenty-one sophomores (class of 2014) declared geology as their major and we are delighted to have them for the next two years in the department.

We have had lots of good news in 2012. Sarah Titus was awarded tenure, promoted to Associate Professor and received a prestigious CAREER grant from the National Science Foundation for a five-year research project. Congratulations Sarah!

We are very fortunate this year to have Nick Swanson-Hysell 05' and Ellen Schaal 05' as visiting professors. In the fall, Nick Swanson-Hysell taught Sedimentology and Stratigraphy. Nick completed his Ph. D at Princeton in September 2011 and currently, he is a Postdoctoral Fellow at the University of Minnesota. Ellen Schaal, a Ph. D candidate at Stanford University, taught Paleobiology. Both Nick and Ellen did a great job and we wish them success with their futures.

Much of our departmental success is due to the extraordinary skills of Jonathon Cooper and Ellen Haberoth. Their talents, and tolerance are evident in these annual reports, which they start putting together in advance. We know that geology departments are by their nature cluttered and dusty places, but thanks to John Berg and Kass McKenna, our custodians, who continue to keep labs and classrooms in Mudd Hall a model for cleanliness.

We hope that this report finds you well.

Sincerely,

Bereket Haileab

DEPARTMENTAL NEWS

FACULTY UPDATE - Cam Davidson

A return to teaching in the fall was a welcome shock to the system after a productive sabbatical year during the 2010-2011 academic year. I must say it was great to feel like a graduate student again and get lost in research. However, teaching is always a good reality check, and I really enjoyed teaching a Freshman seminar, Geology in the Field (Geo 100), in the fall, Mineralogy with 21 students in the winter, and I currently have 39 students in two sections of Introduction to Geology this spring.

In my report last year, I mentioned that John Garver (Union College) and I submitted a research proposal to NSF to fund our Alaska research, and we received the good news late in spring that we were funded for the next four years! This means that John and I, and a number of Carleton and Union students, will be going to Alaska over the next few years to work on the tectonic and thermal history of the Chugach-Prince William Terrane. (See http://keckgeology.org/node/208 for more information about this summer's effort.) As part of the Keck/NSF project this past summer, Hannah Hilbert-Wolf '12 worked with me on "A U/Pb detrital zircon provenance study of the flysch of the Paleogene Orca Group, Chugach-Prince William Terrane, Alaska" for her Comps. She laid the groundwork by collecting and processing a heroic number of U/Pb zircon dates (~1500), and made an important contribution on the provenance of the CPW terrane. This summer, Nick Roberts '13 will be heading to Alaska with me to continue working on this project.

In addition to the Keck/NSF project in Alaska this summer, I'm looking forward our 4th installment of the Carleton Summer Science Institute (CSSI 2012) which takes place for in July and August. This summer we will have a total of six research sections (72 students) covering various topics in geology, neuroscience, chemistry, and animal behavior. It's aimed at rising juniors and seniors in high school, so if you know anyone looking for a rigorous, but fun summer experience in the sciences, please direct them to our website: http://apps.carleton.edu/summer/science/

Keck Summer 2011
From left to right: Cam Davidson, Ben Carlson (Union College), Emily Johnson (Whitman College), Sarah Olivas (University of Texas-El Paso), Lucy Miner (Macalester College), Hannah Hilbert-Wolf (Carleton), Steve Espinoza (University of Texas-El Paso), John Garver (Union College).

FACULTY UPDATE - Bereket Haileab

Last summer, I went to Northern Kenya to attend the tenth workshop on Human Evolution, which was devoted to the re-evaluation of the Geological History of the Turkana Basin. This is the subject that I have been interested in since I came to the USA and it was a very successful meeting for me. I met many colleagues that I have known for a long time and many whom I have only heard their names. Upon returning to Carleton, I team taught the Human Evolution and Pre-History course with Nancy Wilkie which was a great success. There were 25 students in the class and I learned a lot and will be teaching the course in the near future.

In the fall, the Geological Society of American annual meeting was in Minneapolis and we took advantage of the vicinity of the meeting and had several students present abstracts on many of subjects that we have been working on.

My family and I are doing well. This year was Delina's first year in the middle school and she did well. She was student of the month in October, in the A honor rolls and is enjoying school. Amira will be third grade next year and really loves school.

FACULTY UPDATE - Mary Savina

Last year when I wrote a piece for the newsletter, I anticipated spending the first part of the summer doing field work in the Cannon River. No one told the rain gods, though, and the river remained high from late May through early August. My student, Tony Daza, collected, keyed and measured mussel shells during one of the periods when the river dropped enough to expose one or two of the lateral bars. Also, he compiled the information that will allow us to document the river levels from before the September 2010 flood to the present. In the fall, Ailsa McCulloch, a 2012 grad, was able to do some of the mapping we'd hoped to do during the summer. This summer, my student Kao Sutton and I are again hoping to get into the river – but if we can't, we have a backup plan to document the changes in channel form over time. I've also been involved in conversations to locate a USGS gage in Northfield and to predict the effects of modifying or taking down the Ames Mill Dam in downtown Northfield (note: there are no immediate plans to do that). This work has involved talking with a couple of groups of St. Olaf students, colleagues at both colleges, and professionals from several city, state and federal agencies.

In August, my cousin Carol and I traveled to Iceland for two weeks. It was fun for me to be on a field trip that I didn't have to organize! We traveled in a small group – less than 15 – with folks from all over the world. I am planning to take an alumni trip to Iceland, perhaps in summer 2013 (watch for it), so this was especially good preparation for me.

Teaching highlights of this academic year included working with a great group of students in Geology of Soils in the fall, and running the first half of the New Zealand OCS program (you can read more about that elsewhere in the newsletter). In New Zealand, both Sarah and I were greatly helped by Nick Riordan, '07, Zack McGuire, '08, and Tyler Mackey, also '08 who were our teaching assistants, drivers, logistics managers, sanity preservers, and much more.

I'll be on leave for the entirety of the 2012-13 academic year. Nancy Wilkie and I hope to complete work on the publication(s?) for the Grevena Project (finally). As part of this effort, I plan to spend the winter in the southern hemisphere again, this time working with Richard Doyle who did his graduate theses in Grevena and who is now in the Soils department at the University of Tasmania.

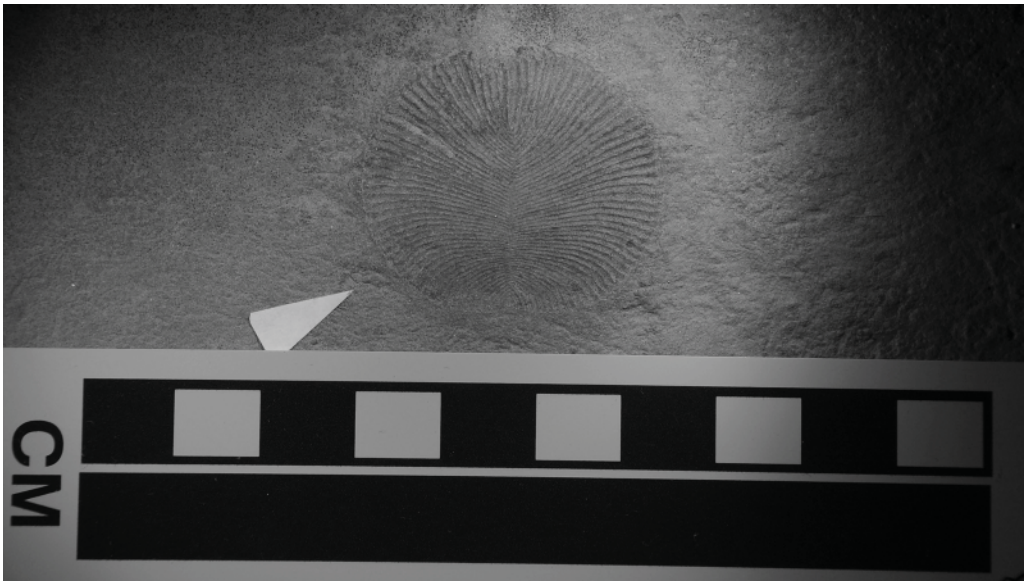
Mary Savina & Robb Jacobson '79 - Missouri Field Trip

FACULTY UPDATE - Clint Cowan

I have been on sabbatical this Fall & Spring Terms, and during Winter Term, I used a 'Targeted Opportunity Grant' from the College to work on identifying and filling gaps in the College's fossil collection (mostly in marine invertebrate groups). This was challenging, but included a trip to the Tucson Mineral and Gem show (which was an amazing experience that I recommend to anyone interested in rocks, minerals, fossils, and gems). We now have a more robust teaching and learning set of fossils of soft-bodied things (Ediacaran and Burgess-Chengjiang-type organisms), small shelly fauna, micro-fossils, and other cool things like eurypterids, sponges, and some crazy good graptolites that were previously sparsely represented in the collection. Our ability to purchase these important teaching specimens is due solely to the generosity and kindness of Alums, Friends, and Parents, who over the years have donated significant funds to the Geology Department to help us maintain our teaching collections and equipment. So we thank them profusely for this. These specimens will be used by generations of Carleton students.

I found some time (not enough) to squeeze in some research, in particular, I am pursuing two projects: some field measurements to test a hypothesis about the viscosity of ancient seawater, and working with Julia Anderson (Minnesota Geological Survey) and former student Andrew Walters '11 (now a the University of Wisconsin-Madison) on high-resolution isotope stratigraphy in the Platteville Limestone around southeastern Minnesota and northeastern Iowa. My sabbatical was rather odd this year, as I spent a great deal of time working on the logistics for the Off Campus New Zealand Program for Mary and Sarah. To relieve me of some of these duties in the future, Jonathon Cooper and I are going to New Zealand for a couple weeks this summer, using funds from the Office of Off-Campus Studies, for him to learn the ins-and-outs of logistics for future programs. I also did some planning and travelling to create a new Off-Campus Winter Break program in Belize, Central America (for Fall `12-Winter `13), and so I'm all set to take 15 students to the Tobacco Caye Research Station for two weeks next December. I did research in coastal Belize when I first got to Carleton, but I have never taken this many students before, so I'm looking forward to the field-teaching experience in this amazing natural setting. We will study benthic marine flora and fauna, and mangrove, and the controls on their distributions. We will also study things like nutrient loading, bleaching, ocean acidification, etc., so this program has been of interest to Biology and ENTS majors, as well as to Geo Majors.

What is left of my sabbatical ends abruptly this summer, as our 5th Year Allensworth Intern, Zach Stewart '12, starts working with Tony Runkel (Minnesota Geological Survey) and I on a project in the Jordan Sandstone that has implications for Cambrian mid-continent events (tsunamis? seismicity? impacts?), and comes in to play for understanding modern groundwater flow in this unit (it is the aquifer for the Twin Cities Metropolitan area). Also this summer, rising senior Andrew Wolter '13 is going to work with me to develop a bone histology module for Paleobiology- this will include comparing modern and fossilized bones in thin-section (mostly femurs, which I purchased in Tucson and online) from things like fossil and modern bison, camels, giraffes, alligators, birds, turtles, etc. He is also going to assemble a complete ostrich skeleton for display in the Weitz Center, with the help of Jonathon Cooper, who will assist with his "Smithsonian expertise" (making resin casts of the bones, wiring them together…. etc.). This should be pretty cool.



Dickinsonia Minima
Precambrian – Vendian
542-630 million years old
White Sea, Arkangelsk, Siberia

FACULTY UPDATE - Sarah Titus

This was a big year for me. I was awarded tenure, which is a welcome relief. I was also awarded two NSF grants. One funds a project with Joshua Davis, my sweetheart, on mathematical methods for structural geology applications. I've been working with sophomore geology major Mariah Radue on the field components of this project in Maryland. I may finally be forced to understand Appalachian geology. The second grant is a 5-year CAREER grant to look at transform fault systems in oceanic plates. Eventually it will involve field work in Cyprus and in Iceland with geology majors. Plus, I will attempt to recruit physics, math, or computer science students over the next few years to help with modeling of field data (with the idea that these are students who have yet to recognize the geosciences as an option for graduate school). Because CAREER grants emphasize education, there is also a planned summer program for local middle-school girls to get them (or keep them) interested in science.

On the teaching front, I had the opportunity to teach two new courses this year, which hasn't happened since my first year of teaching (when every course was new). The first was part of our off-campus studies program in New Zealand. The second was a Geophysics course with a colleague in the physics department.

The OCS program in New Zealand was a welcome change of pace. Teaching in the field is so different than preparing classes back in Northfield – you can watch students really get concepts that are difficult to illustrate on the board. We had two scenic mapping projects – in the mountains and by the ocean – as well as a put-together-the-outcrops-in-space-and-in-time project to tell a story of New Zealand's breakup with Australia. The students were excellent sports in less than ideal conditions – waking up for 6:30 breakfasts without complaint, working through gale-force winds, fording cold and rocky rivers, peering at the plate boundary through pouring rain.

Students on the OCS program to New Zealand take a walk on Fox Glacier.

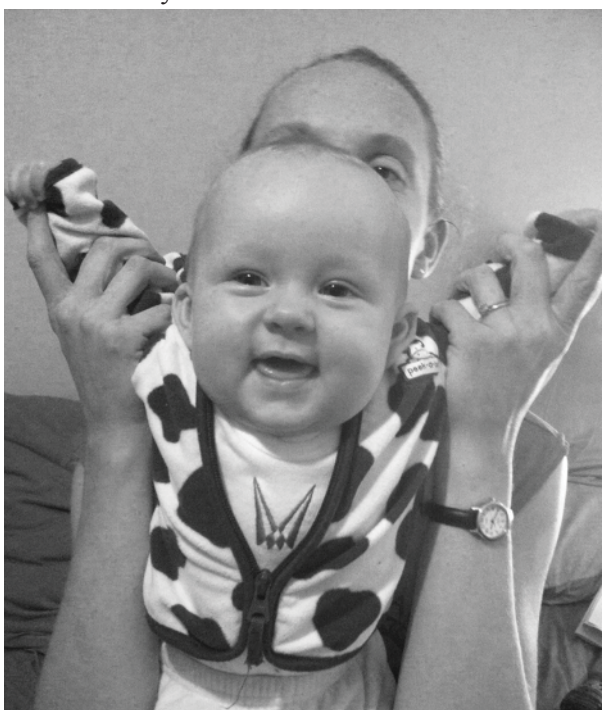
And for that Geophysics class… maybe you guessed that the colleague from physics is my Dad? It's true. The 17 students in Geophysics are having a "double Titus" experience. I've never taught an interdisciplinary class before – there is actually a lot of negotiation about what happens when there are such distinct disciplinary differences when approaching the same topics. I've learned a lot of basic physics that I probably should have known before.

Students in geophysics use a magnetometer to survey the Bald spot.

VISITING FACULTY - Nicholas Swanson-Hysell

What fun it was to be back in Northfield this fall teaching Sedimentology and Stratigraphy. One of the joys in preparing for the course was to work with Karen Campbell '79 in August to plan sedimentology experiments at Saint Anthony Falls laboratory where Karen was working as the director of education for the National Center for Earth-Surface Dynamics. As many of you know, Karen suffered a serious stroke while on vacation in northern Minnesota at the end of August and is currently on a long journey of recovery (http://www.caringbridge.org/visit/KarenMCampbell). Karen's enthusiasm to work with me to develop meaningful hands-on experiments for the class's day at the lab was invaluable help and really speaks to her love of science and dedication to educational outreach.

The first week of fall term classes was a busy one for me as I flew back at the end of it to defend my Ph.D. at Princeton. Thankfully the defense went smoothly and I was back in Mudd Hall newly credentialed for the start of second week. The term flew by as we developed bedforms at St. Anthony Falls lab, analyzed large datasets of tidal data and student-measured foreset thickness in MATLAB, and measured stratigraphic sections up-and-down the Hollandale Embayment.



A month after the end of classes, Sarah and my first child was born---Madeline Louise Swanson-Hysell. Maddy is doing great and has been bringing us lots of joy throughout the first half of 2012. We are now living in Minneapolis where I am working with Josh Feinberg '97 at the University of Minnesota's Institute for Rock Magnetism as an NSF Earth Science Post-doctoral Fellow. All around me here at the U of M Earth Science Department are other Carls---both Dan Jones '06 and Ben Harrison '03 are working as postdocs in Jake Bailey's geobiology lab just around the corner.

I just returned from a trip up to Thunder Bay Ontario with Angus Vaughan '12 and Kris Asp '12 who both presented posters related to their comps research on the Midcontinent Rift at the Annual Meeting of the Institute on Lake Superior Geology. As one could expect at any such conference, we bumped into other Carleton Geology majors including Jake Gibbons '07 and George Hudak '84. Fieldwork this summer will take me to the Lake Superior region, where the work I started last summer with Angus will continue, and then to Botswana before another Fall, Winter and Spring in Minnesota. Sarah, Maddy and I are hoping that this next winter brings more snow to the ground than the last one. Moving back from New Jersey to Minnesota we have high hopes of getting out on cross-country skis.

VISITING FACULTY - Ellen Schaal

As a former Carleton geology graduate, it has been a lovely homecoming to come back and work in the department. I took a leave from my PhD studies at Stanford University to teach Paleobiology this spring, while Clint is on sabbatical.

It's been a great teaching experience, made all the better by a group of enthusiastic and hard-working students. For their term project, the students wrote an original research proposal and explained how they would answer their research question using data and methods in Paleobiology. Their proposal topics ranged from the causes of mass extinctions to the evolution of human ancestors to studying past climate change with an eye to the future – it was fun to hear what creative ideas they came up with! Other highlights from the quarter include a fossil hunting field trip to Wang's Corner, exploring the history of Ordovician marine rocks around southern Minnesota, and a visit to an active quarry with fantastic stromatolites.

The geology department recently acquired many new exciting fossils for the Carleton fossil collection, including exceptionally preserved marine animals from shortly after the Cambrian explosion, trilobites replaced in intricate detail by golden pyrite, and the remains of some of the first multicellular animals on earth (Ediacaran fauna), which lived 575 million years ago. It was a joy to teach with these new specimens and to show my students such exceptional fossils. Thank you to everyone for welcoming me back into the Carleton geology department.

Geology Visits New Zealand Winter 2012

Mary Savina and Sarah Titus led an off campus study program for 21 students this past winter, on both the North and South Islands of New Zealand. Highlights include the White Island volcano, Tongariro Crossing in Tongariro NP, swimming with dolphins in Kaikoura, and visiting Muriwai Beach. The program was greatly helped by the local experts from Frontiers Abroad and 3 former Carleton geology graduate students, Nick Riordan ‘07, Zack McGuire ‘08 and Tyler Mackey ‘08.

Geology Department Invades Missouri

The spring field trip this year was a classic including unconformities, river geomorphology with Robb Jacobson ‘79, and one big failure! 37 students and a few geology faculty and staff members toured the scour initiated by the Taum Sauk reservoir failure. The scour was a very fortunate accident that has left an exceptional exposure on the flank of the mountain with a complete geological section of the Precambrian igneous rocks of the St. Francois Mountains. The trip was a great success.

Carleton People Present Papers at GSA and AGU Annual Meetings

The following Carleton Geology Department people presented papers in technical sessions at meetings of the Geological Society of America in Minneapolis, Minnesota; as well as Geological Society of America regional meetings. The Carleton folks are indicated in bold face type, and students and alums are indicated with their class years. The presentations listed are only those which involved a current Carleton student or employee; many other Carleton alums, too many to list here, also presented papers at the meetings.

English, Lydia P. '13, Bethune, James '10, Van Dyke, Mary N. '13, and Haileab, Bereket. "Using Chlorofluorocarbons and tritium to date groundwater from the Jordan Aquifer in Rice Country, Minnesota."

Fu, Wei-Hsin, **Haileab, Bereket,** and **Nega, Tsegaye.** "Rethinking an introduction to geology course: Lessons learned from incorporating a GIS module."

Manduca, Cathryn A., Bralower, Timothy J., Clemens-Knott, Diane, Doser, Diane, Feiss, P. Geoffrey, MacDonald, R. Heather, Ormand, Carol J., Rhodes, Dallas D., Richardson, Randall M., and **Savina, Mary E.** "Bringing together design and evaluation to understand student learning."

Davidson, Cameron, Garver, John I., **Hilbert-Wolf, Hannah L. '12**, and Carlson, Benjamin. "Maximum depositional age of the Paleocene to Eocene Orca Flysch, Prince William Sound, Alaska."

Van Dyke, Mary N. '13, English, Lydia P. '13, and Haileab, Bereket. "Geochemical analysis of surface water quality in Rice County, Minnesota."

Scheevel, Caroline R., '13 and Haileab, Bereket. "Study of clay minerals from the Morton Gneiss saprolite".

Denny, Adam '12, Harrison, Benjamin, and **Haileab, Bereket**. "Geochemistry of the Eocene Crescent Formation Basalt, Washington state: Implications for mantle plume activity."

Garver, John I., **Davidson, Cameron**, Izykowski, Tyler I., and Milde, Edward R. "Thermal evolution of flysch of the Chugach-Prince William Terranes, Eastern Prince William Sound, Alaska."

Davis, Joshua R. and **Titus, Sarah**. "Deformable and rigid ellipsoids in viscous flows: computational techniques."

Haileab, Bereket. "Sulfur, Fluorine, and Chlorine degassing of Plio-Pleistocene volcanoes in East Africa."

Titus, Sarah, Newman, Alice C. '11, and Yourd, Amanda R. '11. "Using deformation bands to characterize deformation at Kettleman Hills, California: Implications for off-fault deformation in the San Andreas Fault borderlands."

Swanson-Hysell, Nicholas L '05., Vaughan, Angus A. '12, and Feinberg, Joshua M '97. "Perspectives on failed rifting and fast drifting using new and old paleomagnetic data from the midcontinent rift."

DeLong, Stephen B., Murphy, Brendan P., Henderson, Whitney M., Yokelson, Intan N., and **Ferre, Megan D. '12.** "Storms, floods, and fire: Changing dryland landscapes during the North American Monsoon."

The following Carleton Geology Department people presented papers in technical sessions at American Geophysical Union annual meeting in San Francisco, CA in December. The Carleton people are indicated in bold face type, and students and alums are indicated with their class years. The presentations listed are only those which involved a current Carleton student or employee; many other Carleton alums, too many to list here, also presented papers at the meetings.

Scott, Chelsea P. '10, Titus, Sarah J., Davis, Joshua R. A Numerical Kinematic Model for Deformation Near a Ridge-Transform Intersection in the Troodos ophiolite, Cyprus Based on Gabbro Paleomagnetic Rotations and Sheeted Dike Orientations

Ferre, Megan '12, Pelletier, J D., DeLong, S. Rainsplash diffusion: Experimental smoothing of landscapes

Alster, Charlotte J. '12, German, D., Allison, S D Microbial Enzymatic Response to Reduced Precipitation and Added Nitrogen in a Southern California Grassland Ecosystem

Lundstrom, Elizabeth A. '12, Randolph-Flagg, Noah G. '11, Newman, Alice C. '11, Murveit, A M., Mariner, R H., Evans, W C., Hurwitz, S., **Ingebritsen, Steve. '79**, Hydrothermal Chloride Flux from the area of ongoing uplift West of South Sister Volcano, Oregon

Davidson Receives NSF Grant for Geology Research in Alaska

Written by CC Press Room

Following on a research award in November 2010 from the Keck Geology Consortium, Cameron Davidson, Professor of Geology, has also received a four-year, $212,563 award from the National Science Foundation's Tectonics program. Awarded jointly to Professor Davidson and a collaborator at Union College (Schenectady, New York), the NSF grant will supplement and extend work begun with Keck funding, a project entitled "Provenance and thermal evolution of the Chugach-Prince William terrane flysch, southern Alaska."

In the project, Professor Davidson and his Union collaborator will investigate several key problems in North American tectonics and advance geochronologic methods used for tracking the origin and thermal evolution of sedimentary rocks. The project will provide a better framework for understanding the timing and nature of basin formation (including hydrocarbon-rich strata), and the timing and extent of precious metals deposits (gold) associated with intrusive rocks. The project also has a strong educational component, one aimed at increasing the number of students in the geoscience pipeline and ultimately the workforce. All told, as many as 18 undergraduate researchers (many of whom will be members of groups which are underrepresented in the geosciences) will work on the project with Professor Davidson and his collaborator.

Sarah Titus Awarded Prestigious CAREER and EAR Grants from National Science Foundation

Written by CC Press Room

In February 2012, Assistant Professor of Geology Sarah Titus received a prestigious CAREER grant from the National Science Foundation (NSF) for a five-year research project on oceanic fault lines. The $418,891 grant will enable Sarah to undertake field work at three unique locations where oceanic "transform faults" are exposed above sea level: New Caledonia (in the south Pacific), Cyprus, and Iceland. This field work will feed into an elaborate and groundbreaking effort to quantitatively model the faults.

Sarah's project is notable in its emphasis on student participation. The structure of her project, with multiple field sites, tools, and computational components, lends itself naturally to the involvement of up to 20 undergraduate researchers over the five-year period. Interdisciplinary research teams involving geology majors and other STEM students will be formed for each field site: geology majors will complete field-based projects for senior theses, and other STEM students will be recruited for summer research experiences involving computational and modeling projects. Additionally, summer camps about the local geology will be run twice for girls of about 13-15 years old - the age at which research suggests girls lose interest in science as a possible career.

The NSF's CAREER program supports exceptional junior faculty who exemplify the role of teacher-scholars through outstanding research, excellent teaching, and the integration of teaching and research.

Sarah was also awarded a $74,502 grant from National Science Foundation EAR Tectonics division for her project "Differential geometry and statistics of deformation tensors." With Basil Tikoff at the University of Wisconsin-Madison, Sarah will explore a new conceptual framework for the analysis of naturally occurring rock deformation. The project applies mathematical techniques of Lie groups and Lie algebras to a series of geological examples, with the aid of Josh Davis who is transitioning from pure math towards more applied science applications.

2012 Awards

Distinction in Geology
Adam Denny
Hannah Hilbert-Wolf
Angus Vaughan

Distinction in Comps
Adam Denny
Hannah Hilbert-Wolf
Ailsa McCulloch
Zachary Stewart
Angus Vaughan
Griffin Williams

Mortar Board
Hannah Hilbert-Wolf

Phi Beta Kappa
Angus Vaughan
Nina Whitney

Sigma Xi
Charlotte Alster
Kristofer Asp
Sarah Berry
Adam Denny
Megan Ferre
Hannah Hilbert-Wolf
Laura Hockenbury
Evan Johnson
Elizabeth Lundstrom
Sarah Marks
Ailsa McCulloch
Peter Scheuermann
Kaj Snow
Zachary Stewart
Angus Vaughan
Alexander Walker
Nina Whitney
Griffin Williams

Catherine E. Boyd Prize in Medieval and Renaissance Studies
Evan Johnson

Writing Portfolio Recognition
Caroline Scheevel

Duncan Stewart Fellowship
Nicolas Roberts

Student Departmental Adivsors
Elizabeth Lundstrom
Griffin Williams

Senior Projects - 2012

Graduating senior geology majors, their hometown and titles of integrative exercise ("comps") projects:

Charlotte Alster, Tucson, AZ, Microbial enzymatic response to reduced precipitation and increased nitrogen in a southern Californian grassland

Kristofer Asp, Plymouth, MN, Crystallization History of the Sawbill Lake Intrusion, Duluth Complex, Minnesota

Sarah Berry, Downers Grove, IL, Dendrohydrological $\delta^{18}O$ Stable Isotopic Forward Modeling of *Carapa Guianensis* Tree Ring Cellulose for the Determination of Climate Change Variability in Source Waters

Adam Denny, Marshfield, WI, Geochemistry of the Lower Crescent Formation, Washington, and Reevaluation of Proposed Formation Hypotheses

Megan Ferre, Louisville, KY, Rainsplash Diffusion: Experimental Smoothing of Landscapes

Hannah Hilbert-Wolf, Allentown, PA, A U/Pb detrital zircon provenance study of the flysch of the Paleogene Orca Group, Chugach-Prince William Terrane, Alaska

Laura Hockenbury, Lafayette, CO, The Way of the Arun: Interdependent Intricacies of Stream Chemistry in the Nepal Himalayas

Evan Johnson, Portland, OR, Assessment of the Effects of Four Small Bridge Abutments on the Stability of the Banks of the Cannon River in the Cowling Arboretum, Carleton College, Northfield, Minnesota

Elizabeth Lundstrom, Burlingame, CA, Variations in hydrothermal chloride flux in the area of ongoing uplift west of South Sister volcano, Oregon

Sarah Marks, Brooklyn, NY, A potential terrane boundary within the Wyoming Province along the Yellowstone River shear zone in northern Yellowstone National Park, USA

Ailsa McCulloch, Woodside, CA, Using a Natural Tidal Slug to Determine the Hydraulic Conductivity of Wetland Soils in the Palo Alto Baylands, San Francisco Bay

Peter Scheuermann, Pittsburgh, PA, Metamorphic Petrology and Structural Geology of the Granite Peak Screen, Western Idaho Shear Zone, Cascade, Idaho

Zachary Stewart, La Crosse, WI, Eolian and Subaqueous Sedimentary Structures of the Devils Island Sandstone, Sand Island, Wisconsin (U.S.A.)

Angus Vaughan, Minneapolis, MN, Paleomagnetic data from 1.1 Ga Osler Group basalt flows on Simpson Island, Ontario: Evidence for rapid plate motion of Laurentia in the late Mesoproterozoic

Alexander Walker, Edmonds, WA, Effects of a 1970 restoration planting on soil in the Carleton College Lower Arboretum, Northfield, MN

Nina Whitney, Bowdoinham, ME, Geochemical analysis of Tertiary dikes emplaced in the Hrafnfjordur central volcano, northwest Iceland: the implications for dike origin

Griffin Williams, Kalamazoo, MI, The effect of annual cover crop growth on soil moisture of a temperate Minnesota Mollisol

Carleton Geology People Awarded NSF Fellowships

We are proud to report that three Carleton Geology majors have been awarded a National Science Foundation research fellowship for their graduate work. The fellowships provide graduate students with three years of support worth a total of over $100,000. The fellowships also carry annual stipends of $30,000 plus a onetime allowance of $11,500 for education. The winners of fellowships this year from the Carleton geology program are Mark Dyson ‘07, Nick Holshcuh ‘11, and Perry Spector ‘08, while Nate Evenson ‘10, and Kristin Sweeney ‘09 received honorable mentions.

Class of 2013 Geology Majors

Thomas Birren, Round Lake Park, IL
Laura Karson, New York, NY
Taylor LaCasse, Mount Desert, ME
Schuyler Metcalf, Norfolk, CT
Lillian Pearson, Madison, WI
Jenny Piela, Amherst, MA
Rose Prullage, Evanston, IL
Nicholas Roberts, Raleigh, NC
Caroline Scheevel, Austin, TX
Tyler Schuetz, Tustin, CA
Andrew Wolter, Elysian, MN

Bereket’s class at Taylors Falls, MN

Class of 2014 Geology Majors

Sarah Alexander, Shoreview, MN
Catherine Christenson, Eden Prarie, MN
Jennie Chu
Anderson Cole, Aspen, CO
Brian Frett, Wilmette, IL
John Garlow, Triadelphia, WV
Mary Harvey, Birmingham, AL
Rachel Johnson, Woodbury, MN
Maureen Kahn, Whitefish, WI
Elizabeth Kimberly, Stillwater, MN
Ryan Lawrence, Olympia, WA
Lucia Livesay, Manitou Springs, CO
Paul Mains, Saratoga Springs, NY
Chloe Nelson, Madison, WI
MacKenzie Persen, Paradise Valley, AZ
Mariah Radue, Mount Airy, MD
Brianna Rick, Burnsville, MN
Milana Socha, Chesteron, IN
Kaopuananiokekai Sutton, Hilo, HI
Chelsea Wagner, Marlborough, MA
Cameron Webb, Portland, OR
Joshua Zoellmer, Richfield, MN

Sarah Titus and her father Bill Titus (Physics) teamed up to teach geophysics as an interdisciplinary course

Professional and Technical Talks Given in the Geology Department This Year

Professional and technical talks given in the Geology Department this year included:

Dr. Sarah Roeske, Research Geologist at the University of California, Davis, "Evolution of large-scale strike-slip faults in Alaska"

Dr. Vicki Hansen '80, McKnight Presidential Professor of Earth & Planetary Sciences, University of Minnesota, Duluth, "A "Google Venus" Based Virtual Field Trip to Artemis – Our Solar System's Largest Plume/Superplume: A Journey Across the Crust and to the Core"

Dr. Katie Keranen, Assistant Professor of Geophysics in the School of Geology and Geophysics, University of Oklahoma, GeoPRISMS Distinguished Lectureship "Controls on Continental Breakup: Understanding Active Processes Along the East African Rift"

Dr. Daniel Lathrop, Professor of Physics & Geology, Associate Dean for Research in the College of Science, University of Maryland, "The Study of the Earth's Magnetic Field"

Jack Gibbons '07, Exploration Geologist , Duluth Metals, "Re-emergence of the Ni-Cu-PGE deposits of the Duluth Complex: Facilitated by analytical, hydrometallurgical, and geologic advances"

Dr. Colin Robins, Macalester College Geology Department "Expand your (soil) horizons! Records of climate change in an ancient (4-5 Ma), carbonate soil of the Mojave Desert"

Ben Stanley, University of Minnesota, "CO_2 solubility in Martian basalts and Martian atmospheric evolution"

Greg Brick, author of "Subterranean Twin Cities", described the natural and artificial caves, tunnels, and other underground spaces as described in his latest book.

Dr. Audrey M. Bouvier, Research Associate, Department of Geology and Geophysics, University of Minnesota, "Meteorites, what they tell us about the formation of the Solar System"

Missouri field trip mascot

Frank G. and Jean M. Chesley Lectureship

It was the Geology Department's turn to host the Frank G. and Jean M. Chesley Lectureship. We were very fortunate to have Dr. Thure Cerling visit our campus. Dr. Cerling is the Distinguished Professor of Geology, Geophysics and Biology at the University of Utah. His public talk, "ISO-Forensics. Or NCIS (Never Contest Isotope Science)" was at the Weitz Center for Creativity Cinema. Dr. Cerling also gave talks to the Chemistry Equilibrium & Analysis class; SOAN Human Evolution & Prehistory class and one for the Geology Department.

Geology Department T-Shirts Available

We have a supply of geology T-shirts available that can be purchased by mail. The cost for a current year shirt is $11 plus $4 postage payable to Carleton College, and as a gift we will throw a previous years shirt in for free (it'll be a surprise what shirt from the past you will end up with). The 2012 shirt is "Minnesota Gneiss" with a small breast pocket logo of the outline of the state of MN on the front, and a larger version on the back, text is in black and the shirt is lime green in color. As of writing sizes XS (youth L), S, M, L, and XL are available.

There is also a timeless (and priceless!) special shirt available for families with multiple generations attending Carleton. The shirt features a diagram of the interior of the Earth with the core labeled Carleton Faculty, and the layers going upwards toward the surface being Post Docs, Graduate Students, Seniors, Juniors, and Sophomores; the blebs of magma (which melted off the subducting plate) rising toward the surface are "Children that go to Carleton." It is a cardinal red with white ink. Sizes available: S, M, and L.

Email Jonathon at jlcooper@carleton.edu, or call (507) 222-4401 to find if your size is still in stock.

Geological Society of America Meeting Comes to Minneapolis

The national Geological Society of America meeting was hosted in Minneapolis this past fall. This was a wonderful opportunity to immerse the majors as well as the students in the Introduction to Geology classes in everything geology and the exciting research that is being undertaken today. The geology department also hosted a very well attended reception where Tim Vick was honored for his service and dedication to the department over the past three decades. The department would also like to thank Chris Rautman '72 for supporting the department and enabling the geology majors to attend the meeting this past year!

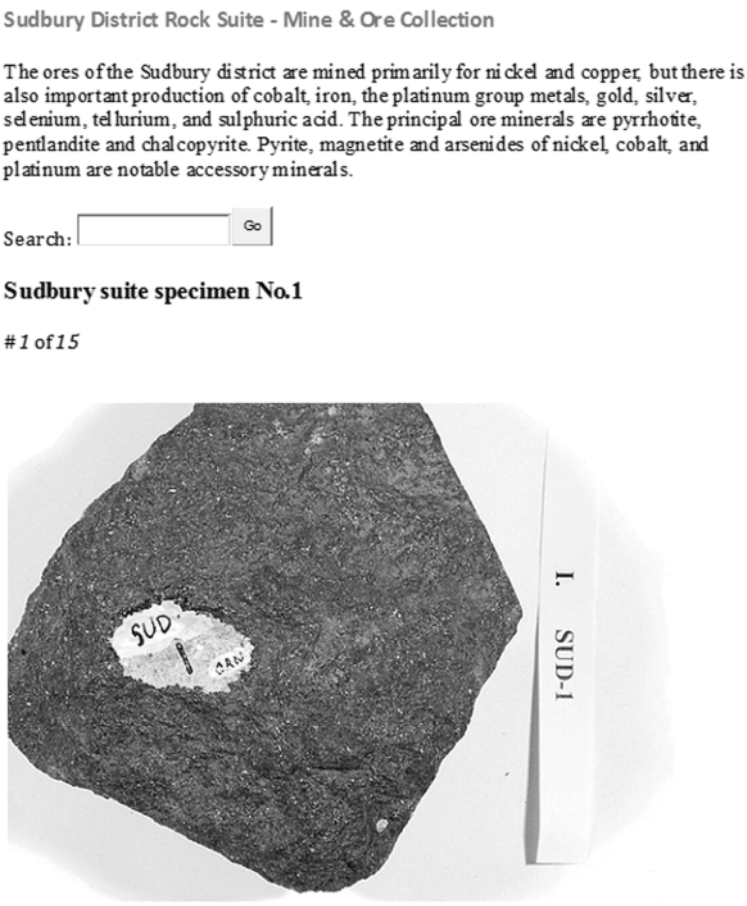
Sweet Talk About Suites

As most of you know, the Geology Department takes pride in its fossil, rock and mineral collections. We also have several rock suites, collected and donated over the years by alumni and friends of the department.

In spring 2012, Peter Schuermann, Kris Asp and I inventoried the economic geology suites, as part of an independent study the two seniors completed in economic geology. We found at least 17 suites from different mineral districts. Jon Cooper, the Technical Director, has started a project of cataloging the teaching suites, beginning with the Sudbury deposits (http://apps.carleton.edu/curricular/geol/acad/rocksuites/). Peter and Kris have added hand-specimen descriptions of some rocks in the Viburnum trend and Bingham suites as well as recent bibliography on these deposit types.

Our suites provide examples of several important ore deposit types, including porphyry coppers (Butte and Bingham), Mississippi Valley Type lead-zinc deposits (Magmont and Buick), and deposits within range of department field trips (BIF, Minnamax, Homestake, Sudbury, Thompson). However, we do not have examples of several major deposit types, including volcanic-hosted massive sulfides (VMS) and epithermal gold deposits, among others. We wonder if anyone among our alums might have collections from mining districts of these types that they would be willing to donate to the department. We could make good use of such specimens in future mineral resources classes as well as in mineralogy and petrology.

Thank you, Mary Savina


Sudbury District Rock Suite - Mine & Ore Collection

The ores of the Sudbury district are mined primarily for nickel and copper, but there is also important production of cobalt, iron, the platinum group metals, gold, silver, selenium, tellurium, and sulphuric acid. The principal ore minerals are pyrrhotite, pentlandite and chalcopyrite. Pyrite, magnetite and arsenides of nickel, cobalt, and platinum are notable accessory minerals.

Search: Go

Sudbury suite specimen No.1

#1 of 15

Creighton Mine - Disseminated Ore- average sulphide content

30 November 2011

The department is starting to cataloge and digitize the various teaching collections and identify areas that need improvement. Visit the website and take a look at what the students have accomplished so far.
http://apps.carleton.edu/curricular/geol/acad/rocksuites/

George H. Davis Honored with Doctor of Science, honoris causa.

George H. Davis, Regents Professor (Emeritus) at The University of Arizona (Tucson) has been presented with an honorary doctorate degree from Carleton to celebrate his distinguished career and contributions to the Geosciences. Read Mary Savina's citation and George's acceptance speech on the following pages.

Citation for George H. Davis Commencement, June 9, 2012 Carleton College

President Poskanzer: It is a great honor and pleasure to present my colleague George H. Davis for the degree of Doctor of Science, honoris causa.

George H. Davis is Regents Professor (Emeritus) of Structural Geology and Provost (Emeritus) at the University of Arizona – and a long-time friend of Carleton College. After receiving an undergraduate degree from the College of Wooster, and a Masters degree from the University of Texas at Austin, George completed a Ph.D. in geology at the University of Michigan in 1971. He has spent most of his academic career at the University of Arizona, starting as Assistant Professor of Geology in 1970. He continues to teach, pursue geologic research, and carry out other professional projects. His term as President of the Geological Society of America (our oldest professional geology society) begins in a few weeks on July 1.

At Michigan, George and Merrily became close friends of fellow graduate students Shelby and Jean Boardman and that friendship started the connections between George and Carleton. He has visited the campus over the last thirty years, for instance, for the 1983 Symposium "Revolution in the Earth Sciences: 1932-1982" (celebrating 50 years of the Carleton Geology Department), as a Benedict Distinguished Visiting Professor of Geology ten years later, and as a lecturer on geoarchaeology three years ago. In addition, he has advised the comps projects of Carleton geology students and guided their graduate school work at Arizona.

George's contributions to geology are numerous. His major publications include field-based studies of deformed rocks of the Basin and Range and the Colorado Plateau in the U.S., economic geology and structural geology in areas of Argentina and Canada, and most, recently, the archaeological geology of Greece. He has also contributed to literature on the teaching of structural geology and general education geoscience courses. At the University of Arizona, he has supervised 40 MS and Ph.D. theses (and been on the committees of many other students). His widely-used textbook, Structural Geology of Rocks and Regions, now in its 3rd edition (2012) is known for its personal style, creativity, and humor (three elements not typically associated with the concept of a "textbook").

George has a generosity of spirit that is extraordinary. It shows in the ways he mentors graduate students and other faculty, how he interacts with undergraduates and in his commitment to geology and the liberal arts. In 2010, when he vicariously helped my students prepare a field guide for a spring break trip to southern Arizona one of the students commented in her field guide entry "At Picture Rocks, there are many petroglyphs carved into rock. George Davis says it's cool, and I trust George Davis."

Recently, George was nominated by one of his first-year seminar students and received the Inspire Integrity Award of the National Society of Collegiate Scholars. According to the NSCS website, "these awards are presented to full-time university faculty and administration who have, through their lessons and actions, made a significant impact on the lives of their students and instilled a high degree of personal and academic integrity." George's first-year seminar was on the topic "What it means to be human, our place in the universe."

The seminar and the award put me in mind of another geologist who connects Carleton and the University of Arizona, that is, Larry Gould. Larry's inaugural address in 1945, as Carleton's fourth president (and the one who had to follow Donald Cowling), was titled "Science and the Other Humanities" and it's an interesting read 67 years later. In that wide-ranging address, Gould suggests that the branch of humanities called mathematics and science "seeks to orient man as a child of the earth."

President Poskanzer, members of the Board of Trustees, faculty, staff and senior in the class of 2012: I am very pleased to present George Davis for the degree of Doctor of Science.

By: Mary Savina
Charles L. Denison Professor of Geology
Director of Archaeology

Carleton College's Personal and Professional Impact George H. Davis June 9, 2012

President Poskanzer, Professor Savina, Trustees, Faculty and Staff, and Carleton College Graduating Class of 2012.

This honor is about the transformative power of a liberal arts education, and the transformative dimensions of deep friendships rooted in college and 'attended to' through life.

My immersion in the liberal arts started with my undergraduate years at The College of Wooster in Ohio. Back in the early Pleistocene (that would be 1960) I entered The College of Wooster as a freshman. The person I would marry, Merrily Siepert, entered the very next year. Certain faculty at Wooster were the embodiment of broad and generous learning, but President Lowry was the architect. After I became an assistant professor at The University of Arizona I began reading everything I could lay my hands on that Lowry wrote. Decades before the financial collapse of 2008, the freshman year of these graduating seniors, Lowry warned of "the endless goading of men and women into purchases they cannot afford to make." On another occasion he referred to a coin-fed hobby horse that you could ride off into the sunset without ever leaving a grocery store. He said: "It is a haunting symbol – this imitation rider on the imitation horse: making all the safe motions and going nowhere." Lowry, through his writing, implored me (I felt he was talking to me, personally) to consider myself an apprentice throughout life in my teaching, in my research, in my outreach, in my living life. He would want each of you to hang on to the passion for your chosen field, to keep your curiosity 'amped up,' to strive toward deep learning and discovery, and to embrace that certain brand of humility that derives from knowing that the complexity of nature will outrun even our keenest minds and highest levels of our competence. My mom always helped me with the humility part. If she were alive, and I called her at this very moment on my cell phone, and I told her what was happening this morning, she would say: "Sometimes it makes me humble when I think how great I am." It was her teasing way of trying to make sure that any one of her 3 sons didn't say something really stupid!

Wooster's Howard Lowry and Carleton's 4th President, Laurence McKinley Gould, were cut from the same cloth, though Lowry never carried out a 1500-mile dog sledge journey across Antarctic ice fields to the Queen Maud Mountains to look for fossilized Glossopteris flora (Permian in age), one of smoking guns proving that South America, Africa, Australia, and Antarctica were all once part of the Gondwana supercontinent. I never really held a conversation with Howard Lowry, but Larry Gould showed up in my life as mentor, colleague, friend, and personification of liberal arts vision. He impacted me personally. Now how did this happen? Lowry and Gould knew one another. At Wooster, following my sophomore year, Dr. Lowry conferred upon Dr. Gould an honorary degree. This occurred fifty years ago, almost to the day, just after Dr. Gould had retired from his Presidency, here. It was Larry's 19th honorary degree; he would receive 32! Within the speeches given that morning we read a fusion of the core values of a Wooster and a Carleton. Just 2 weeks later, Newsweek ran an article describing the fact that Dr. Gould had been recruited to The University of Arizona. "Gould is uncertain about his future at The University of Arizona. They're taking me on temporarily for the spring semester. If I work out, perhaps they'll put me on permanently in the fall."

It worked out! Larry's one-year stint in Tucson soon expanded to more than 30 years. He died in 1995 at age 99, nearly 70 years after he had explored Antarctica as Second in Command of the Byrd Expedition. Larry Gould helped pave the way for serious science at The University of Arizona. My C.V. shows that I was among the direct beneficiaries. Larry emphasized to me, and to the department, "Good is the enemy of excellent." Larry witnessed the advances, but I'm not sure that even he could have imagined that The National Science Foundation now ranks The University of Arizona #1 among all public and private institutions in the physical sciences; or that U.S. News and World Report now ranks the graduate program in geology at The University of Arizona #1 in the nation. (Of course, I never believed in U.S. News and World Report rankings until this particular ranking hit the streets). Incidentally, we would not have made it to this #1 ranking had it not been for the Carleton-Arizona geology pipeline, including such notables as Clark Arnold, Elizabeth Youngblood Anthony, Christine Smith Siddoway, Dave Barbeau, Eric Jensen, Reed Krider, Carrie Morrill, Ofori Pearson, Karen Swanberg, Megan Anderson, Willie Guenthner, Kendra Murray, Matt Dettinger, Nate Evenson, and one of my present department colleagues, Pete Reiners.

Yes, a liberal arts education has meant the world to me. It made me a better Provost of a comprehensive public university, with its 18 colleges, 120 departments, and a budget approaching $1.5 billion. What helped me carry the load is written

bold-faced, for you, on Carleton's Homepage: "The most important thing our students learn is how to learn for a lifetime. Critical thinking, problem solving, creativity, effective communication: these are the tools that transform a collection of facts and figures into a way of understanding the world," …or understanding a university. At no time in my life have I read more broadly than I did in the 7 years while provost, …not reading books on "How to Be a Provost?," but biographies, novels, nonfiction, poetry, …all the things that feed and nourish when engaged in big tasks in uncertain environments. Who would have imagined that Seamus Heaney's translation of Beowulf would illuminate for me the post 9/11 retreat of the American public indoors, away from public places?

I mentioned at the start that a second transformative dimension is deep friendships, rooted early, attended to through life. The graduating seniors palpably know what I'm talking about, for key friendships have now taken root for you, and will hold even though you are heading off in 500 different directions. Facebook alone will not be sufficient in attending to them. It requires investing through life, keeping priorities intact, scheduling time together, traveling together. Apropos to this morning is the lifelong friendship Merrily and I held with Shelby and Jean Boardman. Shelby finished his PhD at The University of Michigan and landed a job at Carleton in 1971. He became a wonderful teacher, advisor, and leader, was eventually named the Charles L. Denison Professor of Geology, and served Carleton as Dean from 2002 to 2005. His life was cut short in 2007, and within a year his wife Jeanie also died. One epitaph regarding Jeanie is particularly apt: "She was energized by enriching the lives of others."

Of all things, Merrily and I are in possession of an archeological record that presages the start of this friendship, in the form of a letter that my wife, Merrily, wrote to my mom. "George just made his first trip down to the geology building, and he met a girl named Jean Boardman. Jean said that her husband, Shelby, is also starting grad school. George thinks that we all are going to be good friends." What an understatement!! We became fast friends for life. Over time and during memorable trips together, we seemed to be in conversations just at the right moments. We celebrated the good things, pondered the complex things, and supported one another in the most challenging times. It was Shelby who introduced me to Carleton's extraordinary geology faculty-staff 'family,' which for me stands as the aspirational standard for working tirelessly and creatively on behalf of students. Through Shelby I felt in some small way a part of the Carleton geology family, connecting closely with Eiler Henrickson, Ed Buchwald, Tim Vick, Mary Savina, Clint Cowan, Bereket Haileab, Cam Davidson, Sarah Titus, and Dave Bice. Shelby and Carleton geology colleagues provided the tonic I needed when I was recovering from a university presidency that didn't go as I had dreamed and imagined, inviting me here to serve as a Benedict Visiting Professor, where I became immersed in students, teaching, and field trips in snow in September.

Yogi Berra is credited with saying, "if you don't know where you're going, you'll end up some place else." I say, "even if you think you know where you're going, your liberal arts education will take you to unexpected places." I'm at such a place in my life this morning. I sense Jean and Merrily sitting next to one another, and I feel Larry and Shelby by my side. I'm again part of a liberal arts college and I am grateful.

Lyman Lakes Overflows its Banks

Overnight June 14th just shy of 6 inches of rain fell in Northfield according to the Carleton College weather database (www.weather.carleton.edu). Several streets flooded including Highway 19 when Lyman Lake spilled over the roadway and washed away the wooden footbridge into the Lower Arboretum.

NEWS FROM ALUMS

Faculty and Staff Updates (Retired and very happy updates!)

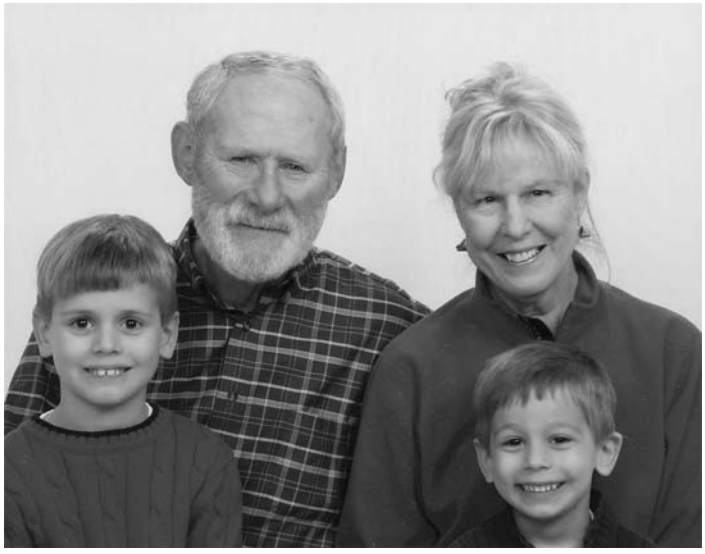
I cannot believe that another year has passed since I last sent in my note for the annual Geology Newsletter. I had so much fun at the annual meeting of the GSA in Minneapolis. I rode up to the meeting on a bus with current geology majors and had a chance to chat with many of them as we rode along. That evening was alumni night and as usual the Carleton party was swamped with people. Rumor has it that the Carleton alumni gathering is the largest such gathering at the meetings. I also got to see and hear and number of poster papers. I wish I could have understood more; you guys are so far ahead of me now!

Cynnie and I are both happy and healthy. Our two grandsons are great fun and seem to enjoy teaching Grampa how to put together Lego models. Adam has taken a new job as head of information technology at Lewis and Clark College. So in addition to visiting grandsons in Portland we are hoping to see some of the West Coast alums in the near future too.

We are still hiking, bird watching, geologizing, canoeing, sailing, showshoeing (not much snow this year) and enjoying all things outdoors. I hope you are all doing the same. Please think about visiting Carleton during alumni weekend. We get such a kick out of visiting with alums on that weekend.

Hope you all are well and prosperous.

Ed Buchwald.



Ed and Cynnie Buchwald with grandsons Theo and Max Buchwald at Christmas past

Hello Carleton Geo friends –

Jean and I have had a great first year of retirement, although it has gone too fast! I guess that means we're having fun.

Last fall we spent a glorious three weeks visiting our daughter Laura in Italy while she was living there. What a beautiful country! A highlight was a weekend of playing fiddle music at Coldigioco with Laura, fiddler and pianist Walter Alvarez '62, Sandro Montanari and other friends.

Jean and I are both happily pursuing our hobbies with more freedom to spend time on them – Jean is a quilter and she turns out quilts steadily in a mind boggling variety of patterns. I'm doing lots of chamber music, which I love. I'm in two string quartets and a piano quartet (one pianist and three string players).

We're also doing volunteer work. Mine includes serving on the Northfield Arts and Culture Commission (a city committee to promote the arts in Northfield); developing web content for the geology department at my alma mater, Beloit College; serving on the Dacie Moses House Committee and helping out with seed collecting and prairie burns in the Carleton Arb.

And home repairs which should have been done years ago. Ugh.

Our son Andrew and his wife have moved to Maine where he is a computer programmer for the state department of revenue. Laura returned from Italy recently and is now working in a violin shop in the Twin Cities. She was sad to leave Italy, but very happy to find a job that actually paid some money for food and rent in a vibrant cultural center with both social opportunities and an active market for string instruments.

I miss my daily contact with all the great folks in the Geology Department, and Jon Cooper has held up well under the pressure, but I still cruise through there occasionally to make sure things are up to snuff. So far, so good. They have a great t-shirt design this year which I hope to be wearing a copy of soon – "Minnesota Gneiss." Why didn't we think of that before?

Hope to see you soon at some reunion or ????!

Tim Vick

Celebrating The Life Of Kate Stalker '05

Kathryn Elizabeth Stalker was born September 4th, 1983 in Seattle, WA. After graduating Garfield High School she went on to receive a degree in Geology from Carleton College in Northfield, MN. She also earned licenses to practice as both a Geologist and Hydrogeologist in the State of Washington. Her passion was always stoked by the outdoors and backpacking and travel were her greatest joys. Although she was rooted to the Pacific Northwest she relentlessly sought to see and know the world around her and traveled to many destinations across the globe. She was loved by all who knew her and she will be deeply missed. In lieu of flowers donations in her name may be given to Planned Parenthood or Carleton College. A memorial and celebration of Kate's life was planned for June 11 in Seattle, WA . Kind words, messages and remembrances can be sent to Kate's husband, Reid Parker at hipalbatross.ocb@gmail.com.

Old Men and Rivers
By: Wendell A. Duffield
Carleton Class of '63
January, 2012

Ask almost any knowledgeable Minnesotan where the mighty Mississippi River begins its 2,300-mile journey to the Gulf of Mexico and the answer will be, "At Lake Itasca, up in the northern part of our state."

Itasca is one of the ten thousand lakes that decorate and submerge much of Minnesota. These lakes are bodies of water left behind as the melting snout of North America's most recent glacier retreated towards its Arctic origins around 12,000 to 10,000 years ago. They're recharged today by seasonal rainfall and snow melt. Though a member of such a very large family of lakes, Itasca has a small footprint (about 1.5 square miles) and shallow average depth (about 30 feet).

But Itasca's fame is broad and deep. A modest breach in its north shore is where ten thousand and more visitors are said to have walked across the birth bed of the Mississippi River on a few properly human-positioned stepping stones, without getting their feet wet. A dry crossing is a sort of unofficial rite, an initiation to become a certified resident of Minnesota. Should someone slip and wet a foot or more, rules of the rite allow multiple attempts until success is attained. Only an inept or unable person would fail. And as Garrison Keillor repeatedly points out, so many Minnesotans are above average.

I'm one of the many initiates who succeeded at first try. I was six years old at the time I passed muster, with legs barely long enough to jump from stone to stone at the crossing. My mother recorded the event with a black-and-white snapshot, eventually lost in the chaos of the family-house attic. A lot of water has flowed down the Mississippi since then.

Now as a septuagenarian who was tossed by the rapids and spun in the eddies of formal education for two decades, followed by nearly a half century of navigating the experiences of a professional in the sea of geology, I find myself doubting that Itasca is the source of North America's greatest river. This doubt has sprouted not from naiveté, but rather from earth-science factors that don't fit into the popular Itasca scenario. And it continues to grow with time. I've concluded that all of us initiates to date may have been bamboozled by the Itasca tale, which is told as gospel to children before they are educated enough to be critical thinkers. As a concerned adult research scientist, I feel an obligation to publicly question traditional evidence of the river's source before new generations of kids might be misled.

For the past few years, I've voiced my doubts to many listeners. And by speaking out, I've discovered how passionately adherents to the Itasca story do not want to hear an alternative view. Questioning of this oft-repeated "truth" seems to be equivalent to dissing one of Christianity's Ten Commandments. Once chiseled into stone and sermonized over generations, such rules accrete a protective coating of question-proof armor for believers.

But I stubbornly persist. "Wait! My story holds as much water as that lake from which you believe the Mississippi River flows," I explain to those who listen, but then react as if I'm attacking their sanity. "Just consider these facts, backed with scientific principles of …"

Before I can finish the sentence, derisive sounds drown out the information I want to explain.

Discouraging? Yes! But recently I unexpectedly encountered an independent human source of evidence that calling Lake Itasca the Mother of the Mississippi may indeed be a shaky, if not a false claim. And I've decided to write his story in hopes of reaching readers who are open to new ideas — people who might acknowledge that I'm not a wild-eyed heretic out to dash a Minnesota legend.

Allow me to introduce my college classmate, Michael Freed. Mike is an exceptional person whose curiosity seems unbounded. He's a sponge looking to soak up information, simultaneously refusing to accept a new concept as valid without testing it himself. He also seems more interested in educating himself than helping to educate others. Selfish? I think not. He just wants to learn as much as possible before his mind begins to atrophy under the debilitating stress of time.

Having neither seen nor heard from Mike since graduating from Carleton College in1963, we two happened to reconnect at a recent class reunion, where he told me his take on the Itasca claim. So here's his story. Read, open your mind, and see what you think. If you decide it's malarkey that needs protesting, please contact Mike, not me!

A Conversation with Michael Freed

During an evening on-campus gathering of the class of '63 in one of the college's new apartment units, Mike coaxed me to a quiet corner of our meeting room, relatively free of the noise from inane palaver of our classmates.

"Duff," he began, as though I had expected to hear from him that night. "I've heard you say that Itasca isn't the source of the Mississippi. I was at one of your geology talks open to the public."

"Really?" I said in surprise. I'd been giving these lectures as a volunteer for continuing-education organizations. Most attendees were new faces for me.

Mike and I hadn't been close friends during the college years. My aging memory seemed to remember him as majoring in one of the social (so-called) sciences — a path that allowed and invited multiple "answers" to questions, in sharp contrast to a more rigidly physical science such as my geology major.

"I didn't see you. Why didn't you let me know you were there?"

Before he could answer, I sensed the reason for his silence might be that Mike was still a loner. During our college years, while most students had their cliques of close buddies, Mike had been the introvert. In fun, we extroverts referred to him as Mr. Apostrophe, thinking we were quite clever to label him as I'm Freed — freedom being neither wanting nor needing to belong to a social group.

Mike's answer tonight was "Cuz during the question period you were mobbed by doubters. I think I was the only one swayed by your tale. And what you said got me thinking about a way to test your ideas. That's what I want to tell you about now."

That focused my attention. I was ready to settle in and listen. A drink would help lubricate the conversation.

"Want a beer?"

"Sure."

"Hamm's?"

"No. Make mine Dos Equis."

I retrieved two beers from the open bar provided by Carleton, whose motivation probably was to help loosen the purse strings of potential donors. Then Mike and I sunk into adjacent easy chairs.

"Cheers." We clinked bottles and drank in toast. "So what'd you do to test my ideas about the Itasca source?"

His story began with "I took a canoe trip."

"Canoe trip," I echoed. "What for? To paddle up the so-called Mississippi from the Twin Cities to rediscover where Itasca is?"

"Nope," came the reply from lips pursed in wry smile. "I put in a couple miles downstream from St Paul, paddled to the confluence of the Mississippi and Minnesota Rivers, and pulled up on the bank — across from Fort Snelling."

Map showing rivers discussed in this essay.

"And then," I said, inviting him to offer some wise insight about that place.

"Well, then I sat and reviewed info I'd gathered about the spot. I figured that confluence held the key to understanding which of the two rivers deserved the name Mississippi upstream from there."

It was my turn to smile, as I nodded in agreement, wanting to hear where the current of this conversation would flow.

"Bottom line," Mike said, sounding as certain as an experienced CPA. "The present upstream names don't agree with what the landscape tells me."

Yes, I silently shouted as I made a fist of my right hand, thumb up, and held it out toward Mike. He was talking about physical evidence, not blind belief.

"I'd guess the names upstream from there are based on home-state politics or some similar blather, more than science."

He punctuated that comment with two gulps of Dos Equis. I followed suit with Hamm's.

"What Chamber of Commerce wouldn't want to claim the source of the Mighty Mississippi as theirs?"

I interpreted that comment as a hint to where Mike's canoe trip might end.

"Lookin' upstream from where I sat," he continued, "I think what's named the Minnesota River should be the Mississippi. And what's called the Mississippi I'd call Itasca or maybe somethin' else."

He leaned forward, pulled some notes from a hip pocket, and mumbled what sounded like something thousand cubic feet per second.

"I've got two reasons to change the names. First one is about the amount of water that each river carries to the confluence."

This geologist could see that sociologist Mike had done key homework for his canoe-launched discovery trip.

"If flow was a lot more in one than the other, I think it'd make sense for the biggie to be called the Mississippi."

He harrumphed, put on a professorial look and sound, then added, "The branch of a tree isn't mistaken for the trunk."

"Yeah. That seems logical to me."

"I found information about water flow on the internet," he said. "There're seasonal and geographic differences in how much water comes in from upstream, depending on rain, spring snow melt and such. But averaged over a few years, the two rivers flow about the same. So there's no convincing bigger-is-better argument for the way things are named."

"Agreed." I was hearing part of my own story from a pair of independent lips — lips of a person not trained in science, but aware of what a mute landscape can tell of its history.

"Let's drink to that." We clicked bottles, swallowed, burped and grinned.

"Next point," Mike said. "My second reason for changing the upstream label from Minnesota to Mississippi is kinda complicated."

"Go for it. I've got all the time you need." Mike had already made this class reunion a winner. For once I was in no hurry to rush home from boring remember-when conversations.

He checked his notes again, while I fetched pretzels and peanuts from the bar.

"I'm no geologist, but I took that introductory course back in the day to satisfy a science requirement. I remember Profs Dunc Stewart and Eiler Henrickson telling us that mountain glaciers are like river systems. There's the main tongue of ice plus smaller tributary branches that feed in from the sides."

"Right. So?"

"The glacier ice flows more-or-less like the liquid water — just way way slower."

"Right again. So?" I thought I knew where Mike was headed. I wanted to hear him reason it out, rather than coach him.

"The thick main tongue gouges out a deep valley. The thinner ice of side branches can't keep up, so they gouge out shallower valleys."

"Yeah. But you're not telling me what that has to do with our river problem."

"Hang on."

Another swig of beer provided thinking time.

"When the glacial ice melts and becomes a system of rivers, you end up with a main river in the deep valley, and a bunch of smaller ones that feed waterfalls in from the sides."

"You're a good amateur geologist, Mike. We call those hanging valleys, cuz they're perched way up there on the sides of the biggie. Think Yosemite Valley with its Bridalveil, Ribbon and other falls spilling in from the sides."

We both squirmed, searching for comfortable butt support in old lumpy chairs.

"But I hope you're not telling me that the river valleys we're talking about here in Minnesota were carved by glaciers."

"No. Water did the job. Stewart and Henrickson also taught us that water flowing south from the big North American glacier that was melting back a few thousand years ago created the valleys. And there was a whole lot more flowing down the Minnesota then than what's considered to be the Mississippi above the Cities today."

I decided to offer a little coaching in hopes of keeping his story flowing in the direction I preferred.

"Stewart also told you that for those glacier-melt days the Minnesota was called River Warren. And that today's Mississippi, upstream of the Cities, was so puny that it hardly merited a name, most especially not Mississippi. It couldn't keep eroding its bed down deeper and deeper as fast as Warren was doing for itself."

"Exactly. So here's my point," Mike said. "There's a waterfall called Saint Anthony's where the Mississippi flows through Minneapolis. That's my evidence for what you call a hanging valley — a small version of those hanging valleys in Yosemite."

"Yes!" I shouted, drawing brief glances from classmates across the room. "I think the river history in the Twin Cities area is something like that. You're a heck of a geologist for a sociologist."

Mike smiled. We both squirmed again, seeking not-to-be-found comfort.

"Another beer?"

"Sure."

I retrieved more vocal-cord lubricant. Now it was time to urge Mike upstream with his canoe-trip saga.

"So Mike. Once you decided the Minnesota River should be called the Mississippi, how far upstream did you paddle?"

"As far as I could." He leaned forward and slowly shrugged his shoulders, arms outstretched — a furrowed-brow expression of pain painted on his face. "That paddling was damn hard work."

"What'd you do for food and such?"

"There're lots of towns along the way. I caught a few fish, too. Cooked stuff over driftwood fires and slept on sandy beaches.

"But here's the main thing I noticed goin' upstream. The valley for a lot of that stretch is huge — a few hundred feet deep and up to four or five miles wide. Makes the valley of the so-called Mississippi upstream from the Cities look like a mistake — like a shallow scratch across a smooth surface."

"Thank River Warren," I said. "Warren deserves most of the credit for the size of the valley of the Minnesota — and for the valley of the Mississippi downstream of the Cities too.

"Here's an interesting tidbit for you. During its heyday, the amount of water flowin' down Warren at its upstream origin was three times that comin' out of the downstream mouth of the Mississippi today. Just remember, Warren was the outlet for gigantic Lake Agassiz, which kept gettin' bigger as the snout of the melting glacier retreated northward."

That was a sobering thought. Time for another swig of beer. Mike continued.

"If you want more description on what it's like to paddle up the Minnesota, read Canoeing with the Cree by Eric Sev…."

"I've read that," I interrupted.

"Then you know that lucky guy had help with the paddling."

Another gulp of beer, maybe because Mike was remembering his solo sweat-generating trip. Then.

"About three-hundred miles and several days of sore shoulders later, I had to portage around a small dam where water is fed into the Minnesota, I mean our Mississippi, from the south end of Big Stone Lake."

"More evidence of Warren's work," I said. "Big Stone fills a stretch where Warren eroded its bottom extra deep. The dam's there to help control lake level for the convenience of folks living along its shores."

"I understand," Mike said. "So, now I'm paddling up a thirty-mile-long finger lake whose imaginary center line is the boundary between Minnesota and South Dakota. I stayed right to keep my trip and our Mississippi in Minnesota.

"I loved that part. No current to fight. Good fishin' too."

He stretched, flexed his arms and shoulders, and smiled. We crunched a few pretzels and washed them down with a beer chaser.

"I know that lake," I said. "I fished and swam there as a kid."

Mike continued. "Then you know that at the north end of Big Stone, the state boundary veers overland, a bit to the left. I stayed right and entered what's labeled Little Minnesota River on maps."

He hesitated before a mild venting.

"Can you explain this to me? Little Minnesota! What sense does that name make? Nobody's ever called the river stretch between Itasca and Lake Bemidji the Little Mississippi! So why's this the Little Minnesota?!"

"Who knows! It's another bit of nonsense about how rivers are named. The system seems controlled by whims instead of logical uniform guidelines."

"Alright. So you and I agree that when I left Big Stone Lake I was still paddling up our Mississippi. Then, bingo, I'm suddenly in Browns Valley."

"Yup. My hometown."

"I know." Mike shifted his body around, and formed a gotcha expression that I took as shifting his thoughts, as well.

"Now comes where I part ways with Sevareid and his paddling partner Walt Port. Those two portaged for a mile across a continental divide that runs east-west through Browns Valley, then put into Lake Traverse and headed north, goin' downstream from there all the way to Hudson Bay.

"But my route from BV took a twist that the Minnesota Chamber of Commerce won't like if I'm still on the Mississippi," he continued. "The path of the so-called Little Minnesota swings westward, enters South Dakota, cuts across that side of Warren's valley wall, and heads off into a Sioux Indian Reservation."

Mike and I now had our upstream Mississippi in South Dakota, and heading northwest. I kept quiet, to see how Mike would describe what had been some of my home turf while growing up.

"Here's more naming nonsense," he said. "I'm now paddling up a river named for Minnesota, but all except its last mile or so is in South Dakota."

We raised right hands, did a high-five slap of agreement, chewed peanuts and did the beer wash down.

"Another ten miles, and the goin' got tough. I'd timed my trip for the high water of spring, but banks of the river were closin' in toward the width of my canoe anyway. I had to pull out and call for help."

Mike leaned back relaxed, as though his tale was complete, but added "Info from the internet says the river I pulled out of starts near a tiny town called Veblen, another twenty miles upstream. I drove up there to take a look.

"There's no lake. Just open country where rainfall and saturated ground feed streamlets that join to become our baby Mississippi."

We settled back into our chairs and audibly exhaled in joint conclusion. We polished off our beers.

"Well, that's my story," Mike said. "And now it's yours if you want it. You seem to like to talk and write. I prefer to keep movin' and doin'."

He squirmed. "Speaking of movin'. My bladder needs to."

Mike stood, made his way across the room and through the door labeled GUYS. Consumption of two beers in one hour creates that kind of need, especially so for us old guys.

I waited. Mike didn't return. I went to drain my processed beer. Mike was not to be found. Similar to graduation day of '63, he once again silently disappeared. Mister Apostrophe was alive and mobile.

Later

I heard from Mike, via email, about a year later. Meanwhile, I had dusted off my 1963 ALGOL and discovered that he graduated as a biology major. He had more science in his background than I had thought during our earlier beer-soaked Mississippi conversation.

His email described a recent solo hike along the Great Rocky Mountain Continental Divide from Mexico to Canada. He asked if I wanted to meet and discuss why so many people don't really understand what a continental divide is. Later, we did meet; that's a story for another time.

After the river conversation with Mike, I've continued talking about the Mississippi and how rivers are named, where people will listen. I suspect I've convinced no one of the need to even consider changing some labels in this gigantic North American drainage basin. Even so, I may have enlightened a few listeners about how arbitrary the official naming of rivers can seem. Some readers may remember when part of today's Colorado River, the part actually in that state, was called the Grand. Pick any two river systems with a main trunk and tributaries, and see if you can define a consistent and logical set of rules for the names.

If nothing else of value has transpired, I think I finally enlightened myself as to why I'm interested in the mundane and somewhat trivial topic of naming rivers. The words old and forgotten are involved.

Old River Warren did nearly all the heavy lifting, that is to say the erosion that plucked and carried rock and silt to the Gulf of Mexico, thereby sculpting the valleys now occupied by the Minnesota River and much of the Mississippi below their confluence.

I can easily imagine generations of awe-struck people back in Warren's time, watching this almost unimaginably massive river coursing over their lands. There would have been no wading across. One Native American, whose remains are known today as The Browns Valley Man, was ceremoniously buried in a gravel bar of River Warren about nine thousand years ago, a location perhaps selected out of respect for such a powerful presence of nature. I wonder what that man and his forerunners called the river.

And if they could talk to us today, I wonder what they would say about the names Warren and Minnesota and Mississippi.

So far as I know, Warren is the first name to be recorded in printed literature for this drainage track. But Old Warren doesn't get broad credit and appropriate recognition for all of its work. Bummer! Doesn't seem fair!! I suspect that other than some geologists, few people know the story of River Warren. The truth is that today's Mississippi and Minnesota Rivers are nothing more than opportunistic carpetbaggers by comparison!

As a kid growing up in its broad deep valley, I didn't know about River Warren either. Yet I skied and sledded on Warren's valley slopes. I hiked and camped within the wooded side rills. I swam and fished in the Big Stone and Lake Traverse dregs of Warren's huge powerful water. I skated on and fished through their winter covers of ice. At age fifteen, a wet-behind-the-ears certified pilot, I landed my dad's Cessna 120, solo, on the looking-glass smooth and slippery frozen surface of Traverse. That adventure, too, is a story for another time.

Now that I know your story, I thank you River Warren. You created a magical playground for past and future generations of kids like me to enjoy. You and this old geologist are soul mates in ways that many might not imagine, whatever the official names are for the waters in your valley today.

Intrepid explorer Mike Freed '63 (Biology) paddling toward discoveries

1938. Mary Hill French: These days my only geology is keeping up with the literature and reviewing / editing Bevan's papers and the proposals and reviews he's been asked to write. Otherwise: friends, bridge, family, dinners, occasional movies. At the moment I'm busy arranging a family reunion in July – children, grandchildren, great grandchildren. We are all looking forward to it.

1942. Charles D. Edwards: Not much new. My 2 sons John E. Edwards and Robert D. Edwards are geologists that are active in business and I am proud of them.

1950. Paul Fossum: Every sunrise. President Curry County Public Transit Board. We operate the "Coastal Express" on US 101 CA to North Bend airport. So my continuing geology is rock slides on the highway!

1954. Walter Varco: Walt is now in an assisted living facility and is unable to communicate. I know that he would like to hear about Carleton Geology but, unfortunately, those days are over. Sincerely, Sandy Varco

Marian E. (Pat) Bickford: I continue to be active in research currently doing U-Pb geochronology and Hf-isotope geochemistry on zircons from (1) mid-continent USA ~1450 Ma granites and rhyolites; (2) ~1000 Ma rhyolites from India. I am also working on interpreting aeromagnetic anomaly maps of mid-continent arc. I am also editing two books to celebrate the 2013 125th anniversary of the founding of GSA!! I will be 80 in August 2012 – still going strong !!

1956. Richard Buchheit: Attended 55th Carleton College reunion and celebrated Tim's retirement last June. Delta and I are becoming closer to being "snowbirds" having spent Oct/11 – May/12 in 4-Corners area at Dove Creek, CO. Side trips to Yuma and Scottsdale, AZ and the Carlsbad Caverns. We traveled the Great River Road from Minneapolis to St. Louis, then Nashville and Mammoth Cave, Kentucky. Quite a contrast between Mammoth and Carlsbad. We're seeing CO_2 drilling and seismic survey on our ground in CO as I write this. Target at 10,000 ft. and some directional drilling. Expect 30+ years of production.

1959. Ed Husted: The paralegal program, which I helped initiate in 1992, is celebrating its 20th anniversary this year.

Norris Jones: I have been retired from the Geology Department for 12 years. My son Charlie (U of Pittsburgh) and I have just finished the 8th edition of our "Laboratory Manual for Physical Geology", which is published by McGraw-Hill (Charles has been my co-author since the 4th ed.). Now I can go back to just having fun.

1960. Michael W. McLanahan: Nothing new to report.

1961. Don Davidson: Aside from providing Bereket with "stuff" for a W. Texas project, I have been a docent for the Presidio State Park (Tubal) on mining history. Mary and I completed a bike and barge trip to Holland in April. No residual problems despite cool weather and headwinds. Looking forward to a September fishing trip with Mel Kuntz as well.

1962. John Lufkin: I have been gainfully employed the past 2 years teaching introductory geology courses at Metro State University in Denver, and have been busy writing geology books. Next August I will teach my two short courses in Geology of Ore Deposits and Ore Microscopy at Metro, and hope to publish 2 books on Geology of Colorado and Geology of Colorado's Parks & Monuments next fall. Next November, I also plan to continue my annual trips to Costa Rica and elsewhere. My two boys are doing very well, also. John, 31, just graduated from his residency program in family medicine at Brackenridge Hospital in Austin, and will take a 6-month job in New Zealand in early July. Nate, 30, who attended Holy Cross on a basketball scholarship and played two winters of pro basketball in Europe, got married last October in Jamaica, and is enjoying employment in Austin working for a software computer firm. I just returned from my 50th Carleton reunion, and enjoyed it very much!

1963. Wendell Duffield: Anne and I continue to spend summers at a cabin on Round Lake, near Hayward, Wisconsin. As I type these notes (late April), our little RV is partly packed for the drive north and east. In June of 2011, Mountain Press of Missoula, Montana, published my most recent book "What's So Hot About Volcanoes?" My editor for this project was Jenn Carey, another Carleton grad and geology major. I continue to be a "cub reporter" for an e-newspaper/magazine called suite 101. I have ten stories posted as of mid April, and I hope to write a few more as the muse strikes. All of my postings so far are earth science related — a couple of them about the Upper Midwest. You can see what I'm up to by visiting http://wendell-duffield.suite101.com On January 31, 2012, surgeon Amber Randall of Flagstaff installed an entirely new knee for my right leg. I think the original knee was a victim of being a field geologist for too many decades. Playing basketball in high school and at Carleton, plus fifteen years of jogging must have contributed to the wear and tear. But life remains good. As Prairie Home Companion philosopher Garrison Keillor would say, "Be well. Do good work. And stay in touch."

1964. Terry E. Tullis: It's been a while since I brought folks up to date. I retired in 2005 after teaching at Brown for 35 years. Still enjoyed teaching students, but got tired of grading exams, etc. Now I'm an Emeritus and Research Professor, the latter so I can still have a lab and get grants from NSF and USGS. Still doing lab experiments trying to understand the fascinating frictional behavior of rocks with applications to earthquake mechanics, and also doing

computer models of earthquakes. Some of this is related to earthquake prediction and I'm currently the Chair of the National Earthquake Prediction Evaluation Council, a group charged with advising the director of the USGS on earthquake predictions and the science related to trying to do that. I'm still part of the leadership of the Southern California Earthquake Center. I travel quite a bit related to these activities. Also some travel for research – I'm currently in Rome for 3 weeks doing friction experiments at INGV. I've also been lucky enough to be a faculty lecturer on alumni trips for the Brown Travelers, with one to Iceland in July 2012 and one to the Caribbean in January, 2013 which will be my 15th such trip for Brown. The most amazing of these was a 3-week around-the-world trip on a private jet. Geology is fun! Being a grandparent is too – I skipped parenthood and went directly to being a grandfather though my wife Connie's son. We have 6 and 16 year old grandsons who live in Brooklyn, NY, a bit far from Providence, but manageable. Every summer we also get at least one of them to our place in the Black Hills and from there to points further west in a recently-purchased RoadTrek RV. Life is good.

1966. Beth Schwarzman: Continuing to find retirement busier than working. I lead a couple dozen walks each year for the local land trust and other conservation groups here on Cape Cod, focusing on geology and natural history. I also make trail maps, write pieces about conservation land, and put together an on-line nature calendar for the town. August will feature the 10th Carleton-in-the Grand Canyon Alumni Adventure, 15 days of white-water river running in dories, with some geology taught by me, and drawing taught by retired Carleton faculty member Tim Lloyd. Betwixt and between we'll be sailing to Maine's Penobscot Bay for a few weeks this summer, and spending time in the San Francisco Bay Area visiting the children and grandchildren. All well; hope that's true for others too.

1970. Tom Moklestad: Celebrated 30th anniversary with the lovely Lorie. Daughter Erica graduated from Northern Colorado, son Andrew from Colorado-Boulder. I teach a little geology on the side at Community College of Denver. At Dinosaur Ridge, an outdoor museum, we struggle to preserve outcrops of dinosaur evidence. Educational program attendance has increased 650% since 2006.

1971. Royston P. Kruse: I am on a 6 month project working with a relief organization in South Sudan.

1972. Chris Rautman: I retired in November (2011) from Sandia National Laboratories after more than 26 years. Janice and I intend to remain in Albuquerque where our kids and grandkids live. So far I am doing some consulting work, volunteer work, and am working in my woodshop.

Kelton Barr: I am enjoying the variety and challenges of practicing hydrology in a Midwestern consulting firm, doing karst, glacial, and bedrock hydrogeology and geothermal. Life has never been better!

Meg Hayes: After 40 years in Alaska, Meg Hayes ('72) will be moving with Pete Tryon ('73) to Bellingham WA this summer. Pete is retiring from the Anchorage School District and plans to volunteer in high school robotics. Meg will continue to consult in land management with Alaska clients. Since grad school at the University of Alaska Fairbanks, a circle of Alaska friends has planned to retire to the same Outside community while doing so is still an adventure. Several Alaska friends have already moved to Bellingham and friends of friends continue to be drawn into the plan. We will be moving our camping gear and most of our boats to take advantage of wild places in western Canada and the US. These are places that Pete, who was raised in Fairbanks, is interested in seeing in a season other than school vacations. We are changing where we live, but not who we are, and look forward to seeing old friends.

1973. Dick Pautsch: I'm retired! I retired on May 31, 2012, and immediately fled Houston for more harmonious Boulder, CO. Will be interesting to see how things play out over the next year.

1974. Margie Simpson: Chuck and I retired last winter. We spent the summer cruising the Inside Passage, mainly in central B.C. We are near Seattle for the winter and will be leaving in May for a trip around Vancouver Island, continuing down to Mexico

1975. Larry Meinert: In 2010-2011, I was the GSA/ USGS Congressional Fellow in the offices of Senator Chris Coons (DE) and Rep. Gabrielle Giffords, (AZ 8th), staffing the Senate Energy and Natural Resource Committee and the House Science, Space, and Technology Committee. Currently I am head of the Mineral Resources Program at the U.S. Geological Survey and responsible for leading the research, assessment, and information-gathering functions of more than 300 scientists. I am also chief editor of Economic Geology, the leading international scientific journal in the field of natural resources. In my spare time I operate a small winery specializing in a barrel-fermented Bordeaux blend of Cabernet Sauvignon, Carmenere, and Malbec. In 2011 I ran my first Boston Marathon.

Emily Wrubel: #2 son, Carson just graduated from Univ. of Colorado in film. Yippee! Both boys are happily living in the west. It does give us great places to visit! I'm still teaching 8th graders, but am ready for a change. I saw fellow geology major, Lisa Galblum ('77?), last summer in Berkeley during a 2-week trip to CA. I am currently reading Sara Taber's (also '75?) book, "Born under an Assumed Name," which is an excellent read. Got an email from Ann Rohsenow Thomas ('74) that Sara, who lives in the DC area, is doing a signing in my neck of the woods soon, while I will be in DC with 8th graders .....

I haven't been back to Carleton at all, so I'm thinking maybe for the 40th....2015 anyone?

1976. Leah Evison: Finally made it back to Minnesota! Ian and I now split our time between St Paul and Chicago, and daughter Liz is working for Carleton in IT this year, so it's fun to be closer. I am now managing a bunch of Minnesota Superfund Sites for EPA, and enjoying a slightly slower pace compared to recent years, whew. And hoping to get canoeing again this summer.

Karen Kimball: Empty nest. Will (Spear) went off to college last fall, Columbia College 2015. Having a ball - fencing and school. Jeff (Spear) graduated from CC in 2010 and is living in Harlem; working in the Columbia Core office part time and fencing full time. He is going to London in August as a US athlete.

1977. Bruce K. Nelson: We keep receiving superb Carleton geo majors to our graduate program here at the Univeristy of Washington. It's a pretty good way for me to keep up with news from Carleton. My research on geochemistry (both volcanism and environmental flavors) continues. This year I also took on the position of Associate Dean for my College (of the Environment), but worked out a deal to keep teaching the honors course, and preserve time for research. Keeping the classroom connection with the undergrads is critical (and someone has to lead the undergrad field trips to Hawaii). And we're still loving the life in the Pacific Northwest.

1978. Craig Banister: In March, I joined the Colorado Archaeological Society, a professional and avocational group. So far, I've participated in a site survey (looking for artifacts), several lab curations of artifacts from a dig site, and an excavation at Blackfoot Cave, between Denver and Colorado Springs. It's quite interesting and I've put some of my geology knowledge to use in analysis of lithic materials.

James Harrington: At work, I'm (hopefully) entering the home stretch of a career in risk management. It's been fun and not where I pictured being when I left Northfield way back when. I'm also teaching photography and Photoshop classes at the nearby community college. At home, I'm looking forward to helping my son with freshman earth science next year. During our hikes here in Northern Virginia we can see lots of geologic history and it's fun to see my kids start to understand the excitement of the earth's story. That's what hooked me and maybe it will hook one of them too. You can find me at all the usual places online. It's been fun reconnecting with some of you on Facebook. Why didn't we think of that?

Brenda A. Pommerenke: I went back to work for the federal government in September 2009, having spent 4 years in their employment directly after Carleton (1978-1982). In March 2012 I was appointed as a contracting officer, so I can now wisely spend your tax dollars buying and using imagery of the earth.

Dorothy Davis Morrow: Still fundraising for private college in Nebraska as full time employment – 17 years now. Personal enjoyment comes from family life – busy with husband and two boys, ages 11 and 14. Love gardening, knitting, have taken up making rugs as a new hobby – called rug hooking. Have to be careful how I say that! Life is good!

Steve Ingebritsen: I'm pleased to have 3 Carleton students and alums associated with my USGS project – Noah Randolph-Flagg (2011), beginning PhD studies @ UC-Berkeley; Alice Newman (2011), beginning MS studies at U Vermont, and Ilana Crankshaw (2016).

Lona Sepessy: Coming down from the exciting travels of last year to New Zealand and prehistoric cave region of France, made for a rough landing. School librarian work, that I love, is still no comparison for travel! Claire is off to her Freshman year at Lewis & Clark College in Portland, (no I couldn't convince her that Carleton would be the perfect school and MN wasn't really that cold!) Whit isn't sure that being the only child at home is all that great, despite our hands off parenting style! Scott (Jamieson '78 Biology) and I are looking for some good R & R this summer on Lopez Island in the San Juan Islands, with some gunk-holing around in our Hunky Dory. Look us up if you're out this way.

Meryl Rosenfeld Haber: It has been a very busy year, and a good one. My son was married in our back yard, so it was an intensive year of gardening. His wife's family are all professional musicians and surprised me by bringing an alto krummhorn for me to join them in a quartet at the reception. I haven't even seen one of those things since my Pro-Musica days performing in the Great Hall! The thrill and the intimidation....Let's hear it for a well-rounded liberal arts background!

Alison Rempel: My eldest is a junior Bio/Neuro major at Carleton and my youngest will start as a freshman at Olaf in the fall. While I love the idea of having both in Northfield for a year, having an Ole in the family will take some getting used to. We're looking forward to the empty

nest, especially for trips like last weekend - the Bay Area Club did a day of tea, wine and chocolate thanks to Dave Gambill'77. Tom and Teri Bauhs ('78 and '80) were along, too, and it was great fun to catch up!

1979. Daniel "Woody" Hitzman: Promoting more efficient oil and gas exploration with light hydrocarbon microseepage surveys. Expanding our Paris and China offices. Up to 60+ countries visited. Also working in downstream petroleum industry with H_2S control and EOR solutions.

Dan Maturen: Start a new job with Glacier Park Inc., location manager at Rising Sun Motor Inn, Glacier National Park, MT.

Dan Spencer: I had a wonderful visit with recent retirees Tim & Jean Vick in Northfield in February. In April I taught for the Wild Rockies Field Institute canoeing on the Green River in Utah's Canyonlands – a trip I did 35 years ago in 1977 with fellow geo major, Dan Maturen, '79 – very fun to teach the geology of the Colorado Plateau again. Finally, August-December 2011 I taught for 4 months with Semester at Sea – traveled over 29,000 miles while circling the globe + visiting 14 countries fantastic experience.

1980. Reid Fisher: Company was bought ~ 1 year ago, but probably a good thing. Still need folks with good field mapping, air photo interp., and writing skills. GIS a plus. Daughters now 12, so next year two teenagers and junior high. Actually a lot of fun. Country and Western and Western swing fiddle to stay sane. (Hi to Tim V!).

Steve Miller: I am alive and well living and working in Houston, Texas. My news is to report from my trip to Utah with my son Toby digging for trilobites at the 2nd annual trilobite jam, and to recommend the 3rd annual trilobite jam occurring west of Delta, Utah over June 23-26th, 2012. The digging is fecund, the trilobites prolific, the catch is legal, but the best part is the assembly of people who come to dig. A most excellent adventure. http://www.trilobitejam.com/jamseminars.html

Ed Secor: Still plugging away at restoring old buildings to their original glory. Son Daniel will be off to the University of British Columbia next fall. One of the contra dance bands I play in was selected to participate in a new talent showcase in Atlanta, Memorial Day weekend, and will be playing dances across California in August. Watch for Gypsy Caravan at a contra dance near you!

Thomas V. Woodward P.E. R.G.: Upon the sale of Vector Engineering I was able to fully retire and start a new life of skiing, travelling, motorcycle riding, and watching my three children grow, marry and prosper. I also do a number of voluntary projects for (fellow) senior citizens and CASA (Court Appointed Special Advocates) children by assisting in their growth and any special need they may have.

1981. Susan Nourse Mullin: Graduated from United Theological Seminary of the Twin Cities in May 2010, will be commissioned as a deacon in the United Methodist Church on May 31, and appointed as the Director of Faith Formation at Faith UMC in St. Anthony (suburb of Minneapolis). I enjoy working with Janet (Traxler) Olson ('77 soc/anthropology major) and Rod Long, parent of another Carleton alum, Kevin Long.

Heyo Van Iten: Just got back from a short research stint in Nanjing, China. Preparing for summer field work in New Mexico, New York State, Newfoundland, maybe SW England & N Wales. Looking forward to the combined Cambrian/ Ordovician/ Silurian sub-commissions field conference next June in Sweden/Norway.

1982. Benjamin Levy: Living in Central New York, I've been able to parlay my geology education and training (not to mention liberal arts education) into a great job in the aviation technology business. Never underestimate the utility of a really accurate base-map. Advice for any students entering the work place this year (and it was a recession when I graduated) - get as much math as you can while in school, and have a can-do attitude. Having changed fields from environmental science to air traffic management, I travel in the US and abroad – lots of fun. Two wonderful kids growing up in central NY. I am grateful for the opportunities to grow and have time for pastimes which would otherwise be taken up by urban traffic jams.

Peter Wiegand: Still in Scotland raising our 2 yr old and working on another postgrad degree. Researching the challenges for 'carbon, capture & storage' deployment in the power sector for my dissertation currently. Sorry to miss the reunion; hope all are well.

1983. Marcia Bjornerud: I received the 2011 Outstanding Educator Award from the Association of Women Geoscientists at the GSA Annual Meeting in Minneapolis. I am honored to share that designation with Mary Savina who received the award in 1995. See www.awg.org/news/gaea/ click: past issues – Sept. Oct. 2011

Mark Gonzalez: Had a book chapter, "Badlands of the Northern Great Plains: Hell with the Fires Out," published by Springer in "Geomorphological Landscapes of the World." Will return to Northfield in May to attend oldest boy's graduation from St. Olaf College--I still convulse every time I mention the name of that cross-town rival. Outside of the pomp and circumstance on the other side of town, I'll look forward to a visit with Ed and Cynnie Buchwald. Mt. Bluebirds have settled into my nest boxes--isn't life grand!

Amy Sager Patton: While working in Southern Oregon on a groundwater quality investigation, I was put in touch with a local geologist, Bill Hicks, who tells me he

was Mary Savina's mentor before she started teaching at Carleton. Small world…

1984. Mark Gordon: "I am still working at Shell, but have moved from the research lab to a production group. The work is still basically the same. I have not been out in the field as much as when I first came to Shell. Dave Kirschner '84 just joined Shell today. We have met several times over the past few years while he was working on projects with us. Cecilia and I travel a fair amount and next week we go to Hawaii. We like going to the top of Mauna Kea, visiting Green Sand Beach and swimming with the sea turtles."

1985. Peter Cole: Biking to work today, an eagle flew over my left shoulder. Other than that, one kid is off to college – Syracuse – next fall and we miss him already. His younger sister will be getting lots of attention.

1985. Jean Miller: Jim and I with 2 of our 3 kids moved from Philly to Raleigh NC. We left our oldest kid at Penn State. We've been here 3 months and are slowly getting settled. I am currently unemployed but will be getting my NC license soon so will probably be back at it soon. We would welcome any visitors.

1986. Sean McKenna: I thoroughly enjoyed seeing everyone at our 25th reunion and getting together to send Tim into retirement last June. Last week I was at the University of Arizona and found the building named after Larry Gould (picture below). Our daughter, Libby,

is finishing up her freshman year and loving Carleton. In March, I was promoted to Senior Scientist at Sandia National Laboratories - I'm trying not to take it as a comment on my nearing 50.

Sharon Frank Wichman: Over New Year's we took the family camping and hiking for a week in Death Valley! It was as beautiful as ever and a great place to be with three teenage sons. I couldn't remember much from 25 years ago, but I did manage to avoid the steep slopes of my comps field area, and marvel at the dry falls I climbed back then.

The Wichman family at Ubehebe Crater, Death Valley National Park. Brenden, Nathan, Lionel, Sharon and Robert. I'm the short one now.

1988. Bonnie Wong: I just finished medical school and am starting residency in rural family medicine in Pueblo CO in July 2012.

1989. Suzanne Savanick Hansen: I will attend a parallel conference to the UN Conference on Sustainability in Brazil this summer. I'll give a poster at the "World Symposium on Sustainable Development at Universities".

1990. Andrew Garrett: Jennifer and I have been in Washington for 2 yrs now, and I just accepted position of Director for the National Disaster Medical System, overseeing the federal system that backstops the local/regional/state disaster medical response capabilities in

the U.S. We have nearly 9000 federal employees (most of them intermittent) on over 60 medical, veterinary, and mortuary response teams across the nation. At home, a wonderful new daughter joined the family on March 3rd-- Adeline Lilan Sun Garrett-- to keep big sister Amelia (almost 4yrs old) company. (picture above)

Rebecca Arenson: Enjoying the start of year three in my current rental residence and watching the perennials I put in last year grow take off this spring as well as expanding the garden. With SW Airlines running good specials I've been able to spend more time visiting my niece up in Massachusetts; she is 5 now and I am thrilled that she loves rocks and the outdoors - she keeps asking her parents when she can go collect minerals and fossils, so we are taking her to a old mine this summer. A future geologist in the making! After a really rugged year at work we finally are up to a full complement of three people, including our new Program Coordinator, so I can finally just do one job. Less stress is nice.

Mark Newcomb: Working on the challenge of helping finance coal mine methane capture projects via the carbon credit market, learning about GIS and ESRI products, integrating my Carleton geology background with environmental economics.

1991. Catherine Inman: Hard to believe we've been in Alaska 10 years! My husband Tim is teaching Biology at Wasilla High School, and I started my own small business last fall after 9 years with the Conservation Districts. "Mat-Su conservation services" provides hands-on natural resource education, and I organize stewardship projects for students – salmon stream restoration, rain gardens, and habitat projects. Having a blast! Hello to all, and stop by if you get to Alaska!

1992. Christina Vosen Ostendorf: Things continue to be hustling at the Ostendorfs on the Powder River near Miles City, Montana. My guy and I are raising our 3 kids in the boondocks. They attend a 1-room school just across the river and we own and operate a Red Angus commercial cattle ranch. Friends are always welcome to visit.

1996. Sara and Dave Mitchell: Our big news is that Dave and I welcomed daughter Lucy Jean Mitchell into the world on February 1, 2011! Big sister Anna (who turns 3 in August) loves to play in the sand, collect rocks, and learn about dinosaurs.

1997. David McGee: Since my last update we've moved to Massachusetts and had a second child (Kate), and I've started a position at MIT. All good things, but it will be nice to stay in one place and keep the number of kids constant for awhile. It's been great to see some Carls come through recently - please be in touch if you're coming through Boston.

1998. Allison Payne: The Love of my life Jesse and I are still living happily in Anchorage, Alaska, loving the bike and ski trails and the blossoming music scene. I'm still running my own geothermal consulting company. My main project is at active Spurr volcano, about 80 miles west of Anchorage. Here's hoping we hit hot water! Alaska needs power as our natural gas reserves dwindle. Jesse works on wind and solar projects in Alaskan villages that are off the main power grid. In my "free time" I've also been teaching geology at the University, I got certified as an EMT and wilderness EMT, and am just finishing up my yoga teacher training. Our burgeoning band occasionally practices, and music still brings a lot of joy to my life. I can't complain. Life in Alaska is good. :) Come visit! XOXO Allison

1999. Bretwood (Hig) Higman: My wife Erin McKittrick ('01) and I spent 2 months exploring Malaspina Glacier last fall. We went with our two kids Lituya and Katmai

(then both still in diapers) and had a great time. I've been busy lambasting a giant mining company for their atrocious seismic hazard assessment. They seem to think idle speculation that there's no threat of earthquakes is enough basis to build 700 foot earthen dams that must stand in perpetuity. Andrew Mattox ('99) and I will be headed into the field in a few weeks to continue our own effort to assess seismic hazards here, albeit without the help of the mining company's $millions.

2000. Zach Katz: Just back from 6 years overseas in Papua New Guinea and Cambodia. About to move to Baltimore where my wife Maggie will attend graduate school. Holler if you come through. **Sean Sturges:** My wife Suzanne and I have two wonderful little boys, and spend most of our time chasing them around.

2001. Jamie Levine: I was teaching at Whitman College as a sabbatical replacement for the 2011-2012 school year and absolutely loved it. But, I will be moving to Boone, NC to start a tenure-track position at Appalachian State University in the fall. I'm looking forward to closer proximity to metamorphic rocks and fall colors.

Laura (Cleaveland) Peterson: It's been a good year teaching geology at Luther College. My research lab got a big boost from an NSF grant for research instrumentation,

and I'm looking forward to spending Fall 2012 with students from Luther, Carleton, and other ACM schools on a new study abroad program – Earth and Environment in Italy – at the Geologic Observatory of Coldigioco.
Peter McAuliffe: Just moved to a new house in Seattle. Our oldest son, Caleb, is three in mid-May and my son, Liam, is one in late July. Life is good. Hope all are well!
2001. Ani Kame'enui: Working at Sierra Club as a lobbyist for their public lands team…enjoying the hustle of life inside the beltway but missing mountains and life in the pacific NW. Had a baby (!!) in mid-February, Kalco Nur, and are excited to be a new family of 3.
Carl Tape: I taught my first class spring 2012 -- Applied Seismology. We're enjoying life in Fairbanks!
2002. Matt Kuharic: Almost 10 years since Andy Gendaszek ('02) and I drove from the sun to the rain over the cascade crest into Seattle. Life is good: snowpack is deep, salmon are big, and mountains are near. Give me a call if you ever come through.

Another Missouri trip mascot - Barred Owl
Picture taken by Nina Whitney '12

Alyssa Thomas: I am starting my second year of a PhD in environmental studies. My research focuses on understanding the compliance behaviour of recreational fishers in New Zealand. Understanding human behavoiur is tricky at best but I am extremely excited about my research and the implications!
2004. Lindsey Kleppin: I was very fortunate to be part of Kate Stalker's ('05) wedding party and the grueling 4 hour pedicure we both shared. The nuptials were catered by a kimchi taco truck and the after party featured Kate and Reid's karaoke rendition of "We Like the Cars That Go Boom." I will miss her sense of humor and adventure, and I would never go to a Boyz II Men concert with anybody else. I spend summers doing environmental remediation at a formerly used defense site on St. Lawrence Island in Alaska and recently accepted a position as a logistician with Doctors Without Borders. I completed a Meningitis vaccination campaign in Chad and am looking forward to upcoming missions with the organization. I took 2nd place in the Women's Middleweight division of the 2012 Iditarod Arm Wrestling Invitational in Nome. On a related note, I am still single.
Gabriel Nelson: Recently took new permanent position at the small geoscience agency FrOG Tech. I will be doing cool regional scale basin analysis and structural projects.
2006. Molly Kent: After finishing my MS at UT Austin in August, I moved back home to Seattle to start a paper and greeting card company. I also substitute teach middle and high school science whenever I can!
Kelsey Dyck: I'm finishing my dissertation on Pleistocene climate variability, am recently married, and loving life by the ocean.
2007. Ross Mitchell: Published in Nature in February on NPR, BBC, CNN, Etc.,
Mark Dyson: I am studying for a MS/PhD in Energy and Resources at Cal, focusing on integration of wind and solar energy into the electricity grid.
2008. Tyler Mackey:
This past year I had the good fortune of TAing with a phenomenal group of geologically-inclined Carls on the New Zealand Geology OCS. Thanks for a great program! I've also wrapped up my Masters here at UC-Davis and am starting a PhD at the same, continuing my work with Antarctic stromatolites.
2009. Kort H. Butler: I have been accepted into Western Kentucky University's graduate program where I will begin earning a Master's degree in Geoscience starting this August down in Bowling Green, KY. This April I met up with my classmate Maija Sipola in Dayton, Ohio at GSA, where we both presented our respective work.
Kirke Elsass: I am gearing up for a summer which will likely include road tripping with my kayak through the Great Lakes, working at a farm-themed camp in the Catskills, and subsequently moving to Detroit.
Phil Varela: It's been just over one year since I started working for the National Park Service in northwest New Mexico. I'm continuing my work on a paleontological resources inventory of the park and making new fossil discoveries along the way. Recently, I led a geology hike for a group of Carls who traveled to Chaco Culture for a Carleton Alumni Adventures trip.
2010. Will Jacobson: Just returned from 3 weeks of fieldwork studying Dead Sea deposits from the last glacial. Starting a PhD this fall at Columbia. Living on the upper west side, Manhattan, NY.

Stuart A. Sweeney Smith: I am very excited to be starting a MS/PhD program at Stanford University this fall, in the Energy Resources Engineering Department. I hope to study alternatives to conventional oil, preferably renewable alternatives. California, here I come!

Jordan Epstein: Left Geotechnical and seismic hazard consulting for the moment and started at a (workforce) performance management enterprise software start-up working for another Carleton alum (Kartik Hansen) – that company was promptly purchased 2 months after I joined. Anyway – life is great, playing a bunch of Frisbee and volleyball, and looking forward to coming back home to Carleton in a few weeks (May 10-12)! Say hi to Cam, Bereket, Sarah, Clint, Mary, and everyone!

Neil Foley: In a month and a half I'll be starting a little trip from Istanbul to Western China with Ben Haynur (2011), continuing our segmented 'round the world trip. Should be a grand adventure. Soon after that I'll be starting a PhD program at UC Santa Cruz to study glaciers. Very excited. Hi to Mudd, students, and profs.

2011. Noah Randolph-Flagg: Finishing up Fulbright in central China studying water and earthquakes, looking forward to starting grad school at UC Berkeley in August, returning to work at the USGS in Menlo Park with Steve Ingebritsen ('78)