

# CONTACT

The Alumni Newsletter of Wheaton College's Department of Geology and Environmental Science



Baraboo field trip in the snow. Circa 1970's.

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## FROM THE DEPARTMENT CHAIR

by Stephen Moshier

By today's standards of communication and social media, this paper newsletter is becoming old fashioned. We know it. You know it. Some of us still enjoy holding something tangible in our hands to read, if not flimsy and lacking gorilla-glass screens. Let's be honest, your paper copy is probably soon going to end up in the recycle bin. Yet, we are determined to reach our friends and alumni every possible way!

We recently started sending email blasts to you, short summaries of news from the department. We also established a facebook page (see article beyond). Many of you have enlisted in the cutting edge alumni-student networking program called Wheaton in Network (WIN) where our students can seek practical, virtual mentoring from folks like you. Check that out at [win.wheaton.edu](http://win.wheaton.edu).

Last year we had a very successful ten-year review of our program. One recommendation was to more effectively tap into one of our most valuable natural resources—YOU. So, we now have an Advisory Council of alumni and friends of Wheaton College Geology and Environmental Science chaired by Pete Vagt '71 and Stuart Dykstra. The group is charged with keeping us accountable to the changing demands for well-educated geoscientists in the 21st century and working collaboratively with our constituents and the college administration to achieve our goals. Adding a new faculty position in geology is a major priority. Our course enrollments continue to increase. We need to staff two lab sections for every geo-major course. We must start teaching some of our upper division courses annually or students can't double major or do off-campus semesters. Each professor is also committed to an active research program that involves our students. GIS is becoming more popular as an elective taken by other majors. We want geology and environmental science to be an important component of the reformed general education program. Our commitment to the Wheaton College Science Station in the Black Hills remains strong. But,

there are only three geologists and one environmental scientist to do all that.

This fall we welcomed Chris Keil '87 as Professor of Environmental Science and Director of the Environmental Studies Program. Chris comes to us from Bowling Green State University in Ohio. For many summers, Chris and his family have been part of the Wheaton College Science Station community with Chris teaching general education courses in Environmental Science and Environmental Chemistry. Chris has great plans for the Environmental Science major, which is now more fully integrated into the building space and organizational structure of the department.

Once again, I want to thank many of you who made gifts to the College designated for any of our endowed scholarships for Geology majors, faculty research funds or Wheaton College Science Station Improvement fund. There were substantial gains this year that directly benefit OUR students.

Please enjoy reading about God's many blessings: our students, our facilities, our resources and our alumni friends. ■

## SCHOLARSHIP AWARDS

During this academic year, the department had the privilege of awarding the Geology Scholarship to three outstanding Geology majors. The merit based Geology Scholarship awarded a total of \$2800 to three deserving majors, Katy Foltz '13, Chris Gates '13, and Ian Treat '15. A passion for geology, involvement in the department, and academic achievement are considered when selecting recipients.

Thank you alumni for your continuing contributions to our scholarship funds—we are blessed to have scholarships to aid our students. Please remember that you must designate these scholarships when making a contribution to the college. ■

## JEFF'S JOURNALS



Photo by Joshua Olsen '14

educating to change the world. As Coordinator (or Director) of the Environmental Science program, he is strongly encouraging a sense of departmental unity with geology. Chris really gives us a friendly, talented partner, and he currently working with me, Jim Clark and various students on the waste-water system research mentioned in the last issue (and updated below).

Jim and I recognize that we are scheduled to retire (too) soon and will strive to help attract the best candidates for new faculty. The great momentum here must continue and “ride the wave” that the Lord has generated. Jim and I are both on sabbatical leaves next school year 2013-2014. I will be invested in research and more departmental outreach possibilities from later summer until New Years 2014. Jim can tell about his plans. My first priority is to wrap up the investigation of late-tectonic metamorphic and hydrothermal features existing in the Precambrian units of the South Dakota Black Hills (also updated below). We can expect two to three good professional articles to result from the efforts.

I suppose the most exciting thing, among many, to happen around here is the actual formation of a functional Advisory Council (AC) for the G&ES Department. Super-alum, Peter Vagt '71, has been fantastic as an organizing Chair for the first Council. You will read more about the constitution and actions of this body under its own section. Please allow me to personally thank all Council members and encourage others to get involved. A top priority goal for the AC is to facilitate the addition of another, essential faculty member into the department. Attracting funds for this addition seems far beyond the capabilities of most of us. Yet, the Lord has everything and more than we could ask for. And so, we ask. My plea is,

*“Friends, you or people you know invest in high-quality ministries to further Kingdom work. We are thoroughly convinced that Wheaton College’s Geology and Environmental Science Program is worthy of major financial support. We are currently succeeding at an amazing rate, without much outside support, to educate wonderful young Christians and uniquely prepare them engaging and serving other cultures. Our graduates from over the last decades are testimony to the effectiveness of this program. Now is the time to improve and grow into the best undergrad G&ES department anywhere. We need not be the largest, but we do need the right staff to complement our great new facilities. Many Christian organizations, congregations, and other ministries receive substantial donations for their effective ministry. We seek the same attention and the opportunity to plead our case before anyone who will listen. Can we count on you to help us find those funding sources? We are willing to go to anyone, anywhere in promoting this cause. We can write proposals to foundations or speak before individuals. You are needed!”*

That’s my basic sales pitch. It has been said, that if you have a high-quality product, then selling it should be easy. The marketing is the difficult part.

This news-related writing can be tough. I don’t want to bore you or rehash information from last year’s *Contact*, fact is that the 2012 version of Wheaton G&ES continues to grow in diversity and quality. Many of my personal observations must overlap with reports from others in the department. I am overjoyed that new colleague, Chris Keil joins us and really solidifies our common vision of

After some organizational changes, the NAGT (National Association of Geology Teachers) finally published our paper, *The Many Educational Facets of Development Cooperation Between a Kosovan Village and Earth Scientist*. (Jour. of Geosci, Ed. v.60, p.210-211) This represents an initial milestone in conducting geological research and outreach for our students. Current (as of January 2013) indications are that I will be able to continue our involvement in Kosovo, possibly during the sabbatical this fall. I am again advocating for an important session at the 2013 Denver meeting of the Geological Society of America, to feature the application of geoscience for international development. This will be another great opportunity for our students, Christian geologists, and Wheaton College to make an impact among the highest echelon of global scientists. George Davis, the President of the GSA, has beautifully stated this changing emphasis among professionals to use our skills in the service of humanity and the environment (2012 GSA Presidential Address, GSA Today, Jan. 2013. Page 14-18.)

### Updates

**My official role here is Faculty Adviser for the Haiti Wheaton Partnership.** Our main partner now is a small university in northwest Haiti. You can read in the GSA abstracts about one student-oriented research project (Wright and others) that occurred last Spring Break. We have many other potential opportunities being planned for student involvement in Haiti projects (especially via friends, Stu Dykstra and James Adamson). Please do pray for this focus because there are some institutional concerns, not allowing us to travel for Haitian work this year. We hope we can continue this work in the future.

**Black Hills Research.** I hope to get the vast majority of field and lab work completed before next September, so that the project on the Pactola Reservoir exposure can be written into publications. The latest work continues with

analytical data collected at the Univ. of Kentucky with colleague Dr. Kent Ratejeski and ES major, Chris Tulumiero '12 from tourmaline microprobe work; from McCrone Associates via Dr. Craig Schwandt and EDS scans on tourmaline plus other phases; and here utilizing our new XRD unit to identify phases, including tourmalines. Kit Carson '12 is also working with me on correlation of micro and macroscopic structural features of the exposure. Frances Griswold '13 continues to provide mineralogical data, including the An (Ca-ion) content of plagioclase grains. One last examination on the outcrop this summer, at the end of my teaching duty in July, should conclude fieldwork. You can read about the significance of stable oxygen and carbon isotopes in veins from the exposure below (Gates and others).

### Waste-Water Treatment.

We are now into the second and absolutely crucial year of experimentation on a waste-water system designed for reclamation of wastewater for agriculture, described in the previous newsletter. This coming semester must provide data to help formulate a strong proposal for funding to cover at least two more years research and implementation. Lab experimentation is the first stage, leading us hopefully to prototype stage of an outdoor model, and finally to a real pilot system on site in an area of need. At present, we have four faculty and the Dean directly involved (Clark, Keil, Lewis, myself and Dean Chappell), as well as Trustee Airhart and at least seven students. Chris Keil can supply you more detail about the current experimental investigation. Mac Airhart and I have been in discussions with the ECHO agricultural ministry in south Florida for partnership in the vision. I consider my sabbatical time as being “on duty,” if needed to go and advocate for this worthy venture. Please pray. ■



## ROCK SALES

by Jeff Greenberg

We are blessed with a the terrific mass of geological material accumulated over 150 years! There does come a point in which collecting becomes hoarding, and we are past that point! With much student help, we organized and staged a one-day sale last September with multitudes of great stuff at great prices. The good news is that we made some money and reduced stock. The bad news is that this time the sale was not as well advertised as the one three years ago. We tried again, with a somewhat smaller effort to sell more during Homecoming in October. Again, items were sold, but.....not nearly enough. We look forward to more effective ways to redistribute valuable items to the public. If you know collectors in this area or elsewhere wanting good deals, we'll take them by appointment. You should know that money made from the sales comes back to our Geology majors. This year, several financed their trip to the GSA in Charlotte by working at the sales. We are planning on having a small sale every Homecoming.

## KEIL'S CORNER



Hello! I'm Chris Keil, (pronounced Kēēl) the new director of the Environmental Studies Program. I'm thrilled to be back at my alma mater Wheaton College. I graduated with a degree in Biology in 1987, and wasn't even in pre-health professions. Back then there wasn't such a major as environmental studies, though I did have a certain Dr. Greenberg for geology, which I'm sure encouraged my interest in all things environmental. Though

not a Wheaton faculty member, for many years I taught Environmental Science in the summer at the Wheaton College Science Station. Prior to this year I taught for 18 years at Bowling Green State University in Ohio.

My wife, Maureen, and I live about a mile and a half from campus. I enjoy riding my bike to work daily, even in the bracing  $-17^{\circ}\text{C}$  ( $1^{\circ}\text{F}$ ) temperatures this morning! God blessed us with a home close enough to campus that we've enjoyed having students over for dinner most Sunday evenings during the semester. We like the company and it helps Wheaties answer the weekly question "What do I do for food on a Sunday night?" A couple of crock pots of soup, some bread and some veggies can go a long way. Maureen and I have two (almost) grown children, one is a senior at Wheaton majoring in Environmental Studies and the other is a sophomore at George Fox University.

My background is in Environmental Health, particularly in the assessment of air and water pollution. So I'm bringing a bit of a different flavor to the

program that I think will broaden the exposure to the environmental field that students get in the curriculum. I look forward to continuing my research here as well. The program I taught in at BGSU only had undergraduate students so I have lots of experience involving undergrads in my research. I published peer reviewed studies with them and even took a team of them with me to Ethiopia to do a biomass smoke exposure study. This semester a team of environmental studies students are helping me do some pilot work assessing particulate and carbon monoxide air pollution in the Wheaton area as well as measuring water quality parameters in local surface waters. I cut my teeth in the environmental field in a number of industrial environments so I'm very interested in environmental quality in urban areas and hope to build upon the connections between Environmental Studies and Urban Studies on campus.

At the same time I love the "great outdoors" and am one of the biggest fans of the Science Station in the Black Hills. I was a student there myself in 1985 and that summer was immensely formative

for me personally, spiritually and professionally. As I mentioned, I've been blessed to teach out there most summers since 1996 and my family has grown to love it as much as I have. Both of my kids have taken courses at the Station and my son even got engaged out there last summer! So I am super excited to become a more formal part of the faculty and staff of the WCSS. I hope to start getting ES students involved in summer research with me in the Black Hills soon.

And here's some late-breaking news as this issue is about to go to press. The college has approved a change of name for the program to "Environmental Science." Even before returning to Wheaton as the director, I thought that "Science" in the name more appropriately recognizes the rigor of the program. And this simple name change represents the program graduates' ability to have effective vocations in the natural science and social science aspects of the environmental field. ■

## DOC MO'S MEMOIRS



In our last *Contact*, I reported on the beginning of my sabbatical leave for Spring 2012. A generous Alumni Grant to assist in my research on the ancient Pelusiac branch of the Nile Delta would have funded fieldwork in Egypt that is, until the “Arab

Spring” uprising resulted in the change in Egyptian government. Consequently, it was impossible for me to complete arrangements for my rather renegade expedition. As an alternative, I revised my plans and visited geoarchaeologists Jean-Philippe Goiran and Hervé Tronchère at the University of Lyon, France for a consultation on our independent projects on the Bronze-age Pelusiac Nile. I had been in correspondence with the Lyon team since we both presented papers on our work at the Geological Society of America annual meeting in 2009. After three days of consultation, I remained in France to complete a 4-day field trip of archaeological and geological sites in the Rhone valley, Mediterranean coast and French Alps. Somebody had to do it! Here is a photo of me trying to look French. I lost that lovely hat when a juvenile delinquent grabbed it from behind and tossed it in the Rhone River (my only negative experience in France)! One of many highlights was visiting Pont du Gard, the tallest aqueduct built in the Roman Empire. I was interested in the building materials and local bedrock, both different kinds of limestone.

My focus at the beginning of the semester was on creating a Geographic Information System (GIS) project for my region of study as a guest researcher at the University of Chicago, Oriental Institute, Center for Ancient Middle East Landscapes. There, I completed several of the computer based laboratory assignments for Dr. Scott

Branting’s graduate course on Ancient Landscapes and collected maps and space imagery pertinent to my Nile project. The proposed branch I discovered is the southern and eastern-most route. The team at Lyon University is studying the northwest routes.

I created a Digital Elevation Model of the study region by digitizing the topographic contours from numerous government maps available from the Oriental Institute. Topographic expressions of modern features (such as the Suez canal, highways, and smaller irrigation canals) were not included in order to reconstruct the landscape prior to extensive human development. I gave the DEM to Katy Foltz ’13, in Jim Clark’s Geographic Information Science Practicum, to model natural surface hydrology. Her results show that surface drainage is likely to have occurred along several segments of the proposed easterly course.

In April, I spent two weeks preparing for and starting a magnetometry survey of Winfield

(Indian) Mounds. A Wheaton College Anthropology crew excavated the site in the 1970s. We obtained a permit for our survey from the Du Page Forest Preserve. On April 14, a crew of nearly 20 students and faculty from Geology and Archaeology worked to explore the site to determine the location of excavation trenches, clear brush from some areas, and initiate a topographic survey to put the magnetometry survey and excavation trenches in proper geographic context. I borrowed a Geometrics G-856 gradiometer from the Geology Department at Northern Illinois University. It took a week to learn how to use it, practice on campus, and learn how to retrieve the data for processing with proprietary PC software. David Wheatley ’12 used the data for his term research project in Jim Clark’s Geophysics class. Preliminary results show interesting semi-circular patterns that may reflect house pits or other structures in an ancient village adjacent to the three mounds.

## A STUDENT'S EXPERIENCE AT GSA

by Chris Gates '13

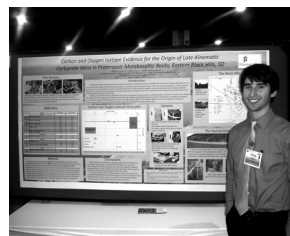
At 5:00 AM on November 3, I, along with ten other geology majors, began the trip from Wheaton to Charlotte, NC for the Geological Society of America, (GSA), annual meeting. Three of us, (Toby Wright '12, Kaitlyn Wallett '14, and myself), were scheduled to present research projects at the Undergraduate Research Poster Session (see p. 5 GSA Abstract), which was to take place on the third day of the conference. My poster was the product of a semester of research in the field of stable isotope geochemistry. While unsure of what to expect from my first professional conference, I was also excited to be immersed in the world of geology beyond Wheaton.

After 14 hours of driving, we arrived at the conference center in downtown Charlotte. I was amazed by the sheer size of the event and the number of geoscientists gathered there. Over the following three days, I was able to meet with potential graduate advisors, discuss analytical geochemistry with professionals, listen to technical lectures, and attend a meeting of the Affiliation of Christian Geologists, (ACG). We even had the opportunity to experience the geology of the region through a field trip led by Dr. Greenberg.

Attending GSA allowed me to grasp the importance of exploring geology as a community and the joy of sharing research and new discoveries. The Christ-like involvement of Christian geologists in the larger professional community is an example that I hope to follow. ■

## ETS PAPER(S)

by Jeff Greenberg



It was a peculiar year for the ETS (Evangelical Theological Society) meeting in Milwaukee, WI for 2012. That is Theo- and not Geo-, even though Steve Moshier and I had a role to play in the program of papers presented. The meeting theme was Creation Care, which of course has tremendous interdisciplinary associations. My first

contact from ETS came via an official invitation to present on Age-of-the Earth issues. I was actually more interested in how the theme related to Christian responsibility in tending God’s “garden.” Steve and I remained as co-authoring colleagues, but Gregg Davidson ’85, Professor of Geology at Ole Miss, was the front man on a point-counterpoint discussion of geological time with plenty of geology and theology. In addition, I took on a great team of colleagues in presenting the paper, Dimensions of Dominion for the theme. Coauthors included an environmental lawyer, two ordained pastors, a distinguished author and video producer, another geologist, Wheaton alum risk manager extraordinaire Vince Morris ’12, and Wheaton College Theology Professor, Dan Block. Even though our talk was poorly attended (opposite N.T. Wright in the schedule!), we think the importance of science in ethics was articulated. ■

## GSA ABSTRACTS

### Carbon and Oxygen Isotope Evidence for the Origin of Late-Kinematic Carbonate Veins in Proterozoic Metabasaltic Rocks, Eastern Black Hills, SD

Carbonate minerals are relatively scarce among the Precambrian metamorphic units in the Black Hills. Thin bands of impure dolomites occur in some lower-grade regions and isolated marbles appear as enclaves in the Harney Peak Granite. Other than those concentrations, calcite, dolomite, and more iron-rich carbonates are known in carbonate-facies iron formation and veins systems.

A curious association exists between carbonate-bearing veins and early Proterozoic gabbroic sills and basaltic flows. The origin of the veins is closely linked to the latest phase of deformation and metamorphism observed in the Black Hills.

Samples of vein material were analyzed for their carbon and oxygen isotopic signatures. Sampling locations include the extensive vein networks from the Pactola Dam exposure of metabasalt and an outcrop of higher (amphibolite)-grade metamorphic amphibolite, interpreted as metabasalt, near Keystone. Low-grade metadolostone (?) near Nemo and high-grade marble from the Needles Highway, were also analyzed for comparison. Analyses were made to test the hypothesis that the veins were of hydrothermal, open-system origin. Thin-section studies do not support the derivation for voluminous carbonate from the

metamorphic breakdown of mafic volcanic material.

Plots of  $^{13}\text{C}$  versus  $^{18}\text{O}$  values strongly suggest that the Pactola veins are of hydrothermal origin. Very low  $^{13}\text{C}$  values also infer a source of reduced organic material and are also consistent with magmatic influence. Metasedimentary-“S-type” granitic components for the vein fluids are good matches for the  $^{18}\text{O}$  values between 10 and 12‰ (SMOW). In concert with other data, the stable isotope compositions support the concept of widespread fluid infiltration along shear zones and concurrent with granite intrusion.

GATES, Christopher H.1, WEBB, Forrest C.2, and GREENBERG, Jeffrey K.1, (1) Geology and Environmental Science, Wheaton College, Wheaton, IL 60187, chris.gates@my.wheaton.edu, (2) Geology, Univ. of Kentucky, Lexington, KY 40536

### Geological Parameters in Modelling Natural Waste-Water Treatment Systems for the Global Poor

Comprehensive geological knowledge can be the foundation of appropriate technology solving two devastating global problems. Poor sanitation practices account for the death of well over 2 million children each year. Additionally, food scarcity and poor nutrition may be responsible for over twice that many childhood fatalities annually. The W.H.O., U.N., etc. recognize that these calamities are not inevitable.

Experimental modeling of “Sheaffer” waste-water treatment systems suggests that many communities of the global poor are candidates for major development improvement. Such systems are

currently effective in more affluent, developed regions, but can be scaled to accommodate sanitation and agricultural essentials in diverse areas of need. The active treatment agents that destroy microbes are atmospheric oxygen, solar radiation, and time (possibly aided by algae). B.O.D. (biological oxygen demand) and fecal coliform bacteria are greatly diminished in processing. Treated outflow water is rich in nutrients and ideal for use as fertilizing irrigation for nearby crops. Water otherwise dangerous and lost becomes an agricultural resource.

An algorithm utilizing many geological as well as cultural variables is being designed to evaluate potential sites favorable for system installation. Systems should become sustainable operations because they are simple, without high-maintenance machinery and fuel requirements, and they will be under local supervision. Geological limitations for installation include surface area for treatment ponds, depth to water tables, slope angles, water flow-through volume, and climatic features.

EDGREN, David C., WALLETT, Kaitlyn N., and GREENBERG, Jeffrey K., Geology and Environmental Science, Wheaton College, Wheaton, IL 60187  
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### GIS Watershed Analysis for Erosion Control of Upper La Baie Des Moustiques, Northwest Haiti

“Ground-truth” data were collected from the upper (southern) end of La Baie des Moustiques in order to assess the factors contributing to severe erosion and loss of agricultural

productivity. The data for one area of the watershed, including bedrock geology, surface-water hydrography, soil characteristics, and slope angle were processed together to indicate critical relationships. The ultimate goal of the study is to find solutions to life-threatening problems.

Approximately half of each year features strong storms and torrential rainfall in Northwest Haiti. The other months are more typically periods of drought. Livelihoods depending on agriculture and coastal fishing are, like most of Haiti, below any sustainable level. Current environmental-social conditions require significant changes.

A poorly consolidated, Miocene siltstone along with all local soils are under constant degradation from runoff down steep slopes into the ocean. Deforested highlands and slopes provide no natural regulation for soil preservation. A system of canals exists in the upper bay for the purpose of controlling drainage and facilitating irrigation. However, these are easily clogged and contribute to salination of otherwise valuable soil regions. The organization of datasets and covariant analyses indicate specific GIS criteria that can guide development projects. These results should in turn lead to a proposal for more comprehensive investigations.

WRIGHT, J. Toby, MEADOWS, Derek, KISHKUNAS, Kaitlyn M., and GREENBERG, Jeffrey K., Geology and Environmental Science, Wheaton College, Wheaton, IL 60187  
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## SEMINAR ROOM.... WHERE STUDENTS PREPARE FOR EXAMS

Students have a habit of spending hours preparing for exams on the many white boards in classrooms, seminar rooms and hallway meeting areas in the new Science Center. This is what the board in our seminar room looked like before the sedimentary rock exam in Petrography & Petrology in early November (mostly contributed by junior Courtney Goll '14). The obvious disadvantage is that professors can see what the students are studying so they can write harder questions. At least, that's what the students think!



## CLARK'S CAPERS



Jim again offered Quantitative Methods for the Geosciences class in the spring, 2012. The course was heavily enrolled (25 students) so that Jim could challenge a large number of our geology and environmental studies majors with applications of statistical methods

and computer environmental modeling. All seemed to thrive in these challenges. He spent the summer near Sacramento, CA with his children and three grandchildren (another is on the way!). Caring for grandchildren and helping to build his son's barn contributed much needed exercise. He also managed to go to the Big Island of Hawaii at the invitation of Water for Life, a YWAM ministry. Jim taught graduate students at the University of the Nations about groundwater processes, exploration and drilling methods. He also managed to see a lot of unique volcanic geology, which even a no-rock geologist could fully appreciate! He also spent a week in Bolivia visiting HNGR intern Erin Pyne '13 who was doing a reforestation project with Food for the Hungry. Exiting the plane in LaPaz (elevation 13,600 feet) literally took his breath away, but the views of the Andes were spectacular. Erin was working in ToroToro which is internationally known for its well-preserved dinosaur tracks. Some nice three-toed tracks and amazingly huge *Apatosaurus* tracks were the highlight. Our geology and environmental studies continue to enjoy the soils course and 37 are enrolled in the Basic Agronomy course offered for the second time this semester with John Vendeland as the guest instructor. The course is not required for any major program but the word spread about the course after its highly successful introduction to the curriculum last year. A highlight so far is harvesting coffee beans from coffee plants grown in the science building greenhouse. The plants grew to six feet in height in less than three years and provided about a half pound of "Wheaton Blend" coffee that the class roasted and delightfully consumed.

Jim continues to develop his geophysical instruments. The resistivity boxes that students in his geophysics class built for a lab session last year are now found in Uganda, Kenya, Malawi and Madagascar. This semester two of the

geophysics majors, Riley Mulhern '14 and Riley Balikian '13, are doing independent research studies to improve and experiment with the instruments. Riley M. will be going on a HNGR internship this summer and can test his improved devices. Another geophysics major, Brad Sparks '14, is doing an independent research project on the WASTE project. He is using the EPA software model AQUATOX, to analyze the sanitation experiment that Jeff Greenberg is coordinating. One of Jim's former students, Stuart Dykstra, has started an NGO, "International Water" ([www.internationalwater.org](http://www.internationalwater.org)). He brings significant experience

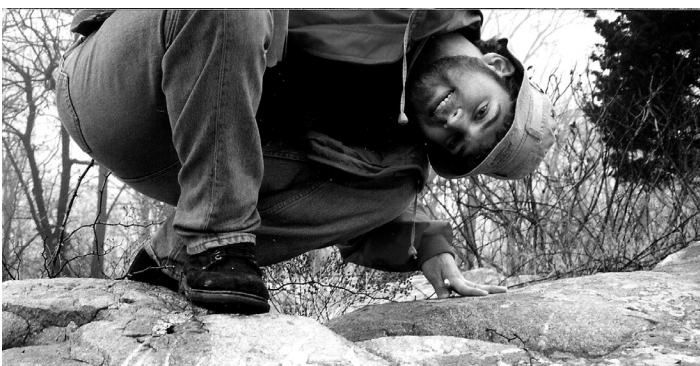
in groundwater studies to his organization and has assembled a loosely knit team of virtual experts to help with different projects. All three Wheaton geology professors are included in the list. We see him frequently in the geology department where he is using space and equipment to develop a hand pump monitoring system that would report via satellite how well a hand pump is functioning in rural Africa. This technology is sorely needed because hand pumps in Africa get such hard and continued use that they frequently break. Stuart's system would alert repairmen about non-functioning pumps. ■



## JOIN US ON FACEBOOK

Go to Facebook.com and search for: *THE Department of Geology and Environmental Science at Wheaton (IL) College*

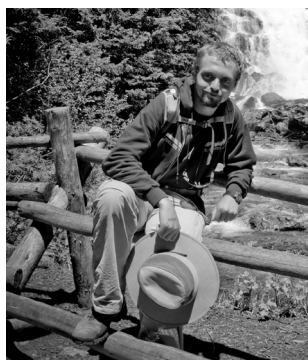
You will find news and comments from current students and alumni, as well as a growing archive of images and videos from the history of the department!



Left: Doc Mo posted this photo of Jamie Fulton '97 at the famous tension gashes near Baraboo, WI back in the middle 90s. Jamie remarked that he tossed the hat only recently. Right: Peter Vagt '71 posted a memorable moment from 1971 Field Trip - Doc DeVries explains geology the state trooper. Robert Young '73 recalled that this happened in Mississippi and was featured in the yearbook.

## FIELD CAMP

by Joshua Olsen '14



This past summer at field camp in the Black Hills was for me the ultimate geological experience and the best time of my life. As a future-junior, I was at first uncertain what the next eight weeks was going to entail. I had heard great things about this endeavor, amazing tall-tales and descriptions of the unparalleled (but truly indescribable) majesty of God's creation that had been seen in years past. Before I knew it, my luggage was packed away in one of the big white vans I was

about to get all-too-familiar with and I was "shipped out." It was probably somewhere between the five-hundredth and the seven-hundredth "Wall Drug" billboard (a phenomenon best experienced in quizzical silence with friends) that I knew this was going to be a very memorable trip.

The daily routine consisted of mapping and drafting interspersed with day-long field trips and a couple hundred too many pack-out lunches. The usual projects and field exercises were there: Cowboy Hill, Whitewood, Nemo, Bear Butte, and the like. The only major difference between this and previous years was that the famous and fantastic Western Trip was in the middle of the summer instead of at the end. This was a nice change of pace during the hottest weeks, however, it did not give the same "big finale" feeling. The lack of this high-note at the end may have caused some stress, but we all made it through and made the best of it.

Seven and a half weeks, a pair of hiking boots, and gallons upon gallons of water and sweat later I could barely fathom that it was almost over. The countless memories, photographs and videos, a few scars here and there (and of course rocks!) would be all that I could take with me. Boy, did I want to go home! That was enough roadcuts and drafting pens for me. But there was a big part of me that wanted to stay. I had grown intellectually, spiritually and socially in that place. In solitary communion with God and nature and in camaraderie with the whole community we learned, loved, lived, laughed, and languished together, enriching our minds, bodies, and spirits. "And whosoever shall compel thee to go a mile, go with him twain." Matthew 5:41

I like to think we all did this, no matter how reluctantly (Specimen

Ridge, anyone?), side by side with our compatriot geologists, and we are all better for it. Drafting one more map, walking one more mile, taking one more strike and dip, is all worth it in the end because in the process you will see the most amazing things on this earth, the Earth itself and to experience it with the best group of people ever, your friends.

Thank you, Geology department, (and Dr. Carrigan!). May your dips always be true and your faults never trace. *Mente et Malleo!* (By Thought and by Hammer.)

*Note: This summer the teaching staff for GEOL 412/413 included Jeff Greenberg, Steve Moshier and Chuck Carrigan from the Geology Department of Olivet Nazarene University. Enrolment in the course was 23! ■*



## A NEW CHRISTMAS TRADITION

Since moving into the Science Center in 2010 we have enjoyed gathering in the lower exhibit hall for the annual Christmas dinner. This year we added the video Yule-log for atmosphere (Doc Mo misplaced the Rockman video, but it may appear for the 2013 party). A highlight is singing Carols to celebrate our Lord's birth, accompanied by Dr. Clark on the keyboard. ■

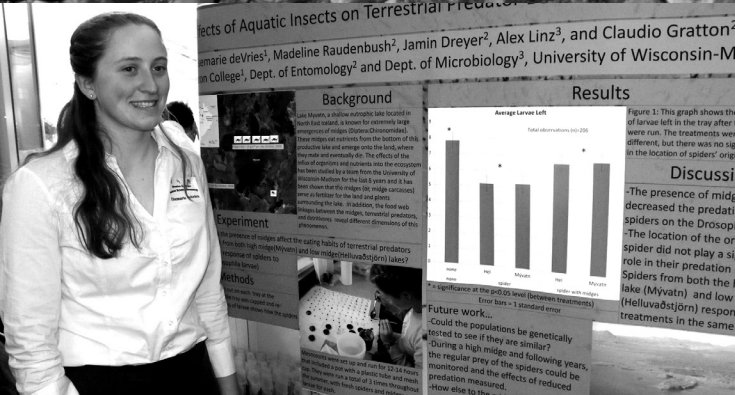
## CLASS OF 2012 GRADUATES

Eleven Environmental Studies majors and twenty-two Geology majors (the largest number in the history of the Geology major) graduated in 2012. Below is a list of the graduates. We are very proud of our graduates and hope they come back to visit us frequently.

<b>Environmental Studies Majors:</b>	Michael Davis
Chelsea Berg	James "JD" East
Stephanie Burchard	David Grasman
Alexandra de Sosa	Hal Hackett
Susanna Harro	Kaitlyn Le Baudour
Michelle La Forge	Jacob Lepori
Rachel Lamb	John "Micah" Markley
Sarah McCormack	Brian McMullen
Joel Peterson	Derek Meadows
Christopher Tulimiero	William Middlebrook
Kellan Warner	Elizabeth Peterson
Curtis Witek	Robert Ramsay
<b>Geology Majors:</b>	Scott Roche
Daniel Alle	Ann Shillaber
Emma Bayer	David Wheatley
Mallory Boracci	James "Toby" Wright
George "Kit" Carson	Jonathan Yates
Timothy Congdon	

DEPARTMENT OF GEOLOGY  
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Clockwise: 1951 Field Trip; Structural Geology class; Elsemarie DeVries '14 at the Summer Research Poster Session Homecoming weekend; Geology majors at Field Camp