



GEOSCIENCE NEWS





Dear Alumni and Friends,

Greetings from Ann Arbor! I hope the last year was a happy and productive one for you. It certainly was here.

I am delighted to report that the Department is thriving in all respects. We again have record-level undergraduate enrollments—160 declared majors and 71 minors. Our graduate population also continues to be healthy with 73 students including 60 PhD and 13 MS students. In the last year, we had a record number of applicants and graduated 15 PhD students.

Our faculty continues to excel in teaching and research and earned recognition for their outstanding accomplishments. Notably, Professor Joel Blum was named a Distinguished University Professor, the greatest honor that the University bestows on its faculty members. Other faculty members receiving awards in the last year include Professors Sara Aciego (Asst. Prof.)—

the 2015 Harold R. Johnson Diversity Service Award, Greg Dick (Assoc. Prof.)—the LSA 2015 Individual Award for Outstanding Contributions to Undergraduate Education, and Selena Smith (Asst. Prof.)—the Botanical Society of America's 2015 Emerging Leader Award. In addition, Professors Brian Arbic and Eric Hetland were promoted to Associate Professor with tenure, and Dr. Fuxiang Zhang was promoted to Associate Research Scientist. We are fortunate to have such talented and committed faculty.

Among other new developments, I am very pleased to announce that Professor Matthew Friedman will join our tenure-track faculty as an Associate Professor with tenure next fall. Matt is currently a Professor of Palaeobiology at the University of Oxford, and a paleoichthyologist, which is to say that he studies the fossil remains of fish. Matt's research interests and accomplishments are diverse, and include the study of the origin of jaws in vertebrates and the evolutionary relationships and patterns of morphological change in fishes. Matt will have a joint appointment with our department and the Museum of Paleontology. We hope to welcome additional faculty to our department next fall. We are currently searching for new faculty in the fields of climate/water and geology/geophysics.

As I reported in last year's letter, Professor Rob van der Voo will officially retire on January 1, 2016 and join our emeritus faculty. A symposium was held to celebrate Rob's retirement and 75th birthday in August with attendees from around the world gathering to honor his career. Among other news, Professor Peter van Keken will be leaving the University of Michigan to take a position as a Staff Scientist at the Carnegie Institution of Washington. Peter first arrived at Michigan in 1994 and joined the tenure track faculty in 1996. In recent years, he served very effectively as the Department's Associate Chair for Curriculum. We wish Peter the best. He will be missed.

While I have tried to minimize my travel to focus on departmental issues, the rest of the department apparently does not feel so constrained! In the last year, our faculty led field trips throughout the western hemisphere. Some of the highlights include trips to Chile to study the regional geology and mining, to central California to compare magmatism and volcanism styles in different tectonic settings, to Ontario, Canada to see metamorphic rocks that preserve evidence for the assembly of Rodinia, and to Key West to observe modern coral reefs. This list does not include less exotic, but equally educational, trips throughout the Midwest. These trips are an extraordinary experience for our students and provide them with a hands-on opportunity to observe the 'real world' and integrate the concepts that they have learned in the classroom.

As you are well aware, we also offer students an unparalleled field experience through our Camp Davis field station. This last summer we offered eight courses at Camp Davis ranging in topics from the traditional field methods course to ecosystem science, sustainability and energy, and history and literature of the Rockies. We are very proud that our Camp Davis courses attract students from across the College of LSA, and even more proud that the Department is able to provide financial support for students in need. In the last year, we helped 35 students attend Camp Davis.



COVER PAGE PHOTO

Students at Camp Davis performing a LIDAR scan of a recent landslide.

I reported last year that we had begun planning the renovation of the student side of the Camp Davis field station, which consists of sheet-metal residence cabins originally constructed between 1908-1919 at the original site of Camp Davis on Douglas Lake in northern Michigan and relocated to Wyoming in 1929. As much as we love the rustic nature of the cabins, the years and elements have taken their toll to the point that the infrastructure cannot meet our students' needs and our enrollment demands. The second phase of the renovation will include the demolition of the existing student cabins and bathhouses and the construction of 30 new student cabins with bathrooms, insulation, and heat. We have made gains in fundraising, thanks to support from the College of LSA and contributions from individual donors, but we still have a ways to go to get the project underway.

We believe that field experiences are the foundation of undergraduate education in the Earth and environmental sciences. For this reason, field experiences through field trips and the Camp Davis field program are the focus of this year's capital campaign. We are only able to offer students these incredible opportunities because of generous gifts from you—our friends and alumni. Your gifts come in many forms—small donations, sizable corporate gifts, and large endowments—all of them are crucial to us. Nation-wide giving to academic programs is down and continuing to slide. We've witnessed the same trend and appeal to you to help us reverse it. Our ability to offer one of best undergraduate educations in the Earth and environmental sciences in the nation depends on it.

In closing, let me thank you for your continued support of the Department and encourage you to keep in touch. To assist you, in the last year, we have expanded our communications by developing an electronic newsletter (Earth eNews) that allows us to get news and information to you more regularly. We hope that you are reading and enjoying it. Let us know! If you are not receiving it and would like to be added to our eNews mailing list, send an email to michigan-earth@umich.edu. We have also upgraded our website to offer additional and improved content. If you haven't seen it, check it out at lsa.umich.edu/earth/.

Warmest regards,
Chris

PHASE -2 NEEDS YOU

REBUILDING THE STUDENT CABINS AT CAMP DAVIS

See the great new plans for renovating the student cabins at Camp Davis on page 15.

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Victors for Michigan

Undergraduate Research Experiences and Scholarships

Research is the name of the game for students who hope to become competitive in industry or academia. The Department provides opportunities for both undergraduate and graduate students with funding from both governmental sources and from alumni giving. Such opportunities help the students mature from learning science to actually doing it. When deciding what you would like to accomplish with your gift, consider helping us continue our efforts to support hands-on student learning. Browse the vignettes below of research areas currently underway.

HOW TO SHOW YOUR SUPPORT

Gifts to the Undergraduate Scholarship & Activities Fund - #307829 will support scholarships and research opportunities for undergraduate students in the Department of Earth and Environmental Sciences.

Give with the enclosed envelope or go to the Department home page and click on "Give Online".

<http://lsa.umich.edu/earth/alumni-friends/victors-campaign.html>

VICTORS FOR MICHIGAN - UNDERGRADUATE RESEARCH



When UM undergrad **Kate Yuh** traveled to the Alaskan Arctic to join the Cory Lab for their 2015 field season, she was prepared for long days of work in the field, snow in July, swarms of infamous Alaskan mosquitoes, and grizzly bear sightings. She did not, however, expect to find herself stuck waist deep in lake mud, unable to move an inch in any direction. Kate, along with PhD student **Adrianna Trusiak**, had traveled by helicopter to the northern coastal plain to sample one of many shallow lakes that sprinkle the boggy landscape where the tundra runs into the Arctic Ocean. Armed with a pH meter and bottles, she waded out to collect data and lake water for analysis back at the field station. Within feet of shore, Kate sunk quickly into the lake mud and became stuck in perilously chilled ~ 44 F lake water. With Kate rendered immobile, the team got creative and used what was readily available, the landing skids on the helo, to pull her from the bog and ensure her safe return to shore.

There's an app for everything these days, including aquatic geochemistry! Undergraduates enrolled in **Rose Cory's** (Asst. Prof.) Aquatic Geochemistry course use the 'ColorPicker' app on their smartphones to measure iron in groundwater. Students add ferrozine, a reagent that turns water purple in the presence of iron, with the intensity of color dependent on the concentration of iron in the water. Students compared their results using the app on their smartphones to the conventional approach (i.e., analysis of the water on a \$30K spectrophotometer). In a "eureka" moment, students found that the app results matched the spectrophotometer for waters high in iron. Apps like these may transform undergraduate education in the field as they can replace the need for bulky, expensive equipment and increase capacity for students to experience "real time" results outside the lab.



A Sampling of Student Research

Photo by Peter Knoop



Tristan Childress (PhD Cand, Adam Simon) is using stable iron and oxygen isotopes to investigate the evolution of iron oxide - apatite deposits in the Chilean Iron Belt and southeast Missouri. Tristan is a founding member of our new Society of Economic Geology student chapter and his research in these areas is collaborative with alumnus Martin Reich (Associate Professor, University of Chile) and researchers with the United States Geological Survey. Tristan is aiming for a career in industry, so please keep your eye on him over the next couple of years.

Chenghuan Gao (PhD Cand, Youxue Zhang) is working on multicomponent diffusion problems of major elements in basaltic melts. Chenghuan wants to constrain the diffusion matrix which governs the diffusion behavior of all the major elements in basaltic melts to predict elemental behavior in magmas.



Jessica Hicks (BS '16, Dan Fisher) is investigating the extinction of mammoths and mastodons during the plio-Pleistocene transition. Jessica is looking at yearly increments in tusk samples to elucidate the conditions present when these animals died. Jessica is also the President of our Sigma Gamma Epsilon, Iota Chapter, and President/Founder, of our Paleontology Club.

Brian Konecke (PhD Cand, Adam Simon) spent the summer at the Institute of Mineralogy in Hannover, Germany performing experiments to quantify the partitioning of sulfur between silicate melts and apatite. Brian's stay was part of a new institutional partnership between MICHIGAN EARTH and the Institute of Mineralogy.



Jennifer Von Voigtlander (BA '14, MS'15, Marin Clark) is the first graduate of the new 5th Year MSc program. She used precipitation differences from a basalt climosequence in Hawaii to investigate the effect of climate-induced weathering on wavespeed as a proxy for mechanical strength of the critical zone. Jennifer now works as a Geoscientist at Schlumberger in Houston.

Kevin Roback (BS '16, Marin Clark) is using satellite imagery to map landslides induced by the recent Nepal earthquake. Kevin has mapped more than 10,000 individual landslides by comparing before and after high-resolution Worldview satellite imagery, and created a landslide inventory that is of great interest to the Nepal government and international aid organizations, as well as the greater scientific community.



Aaron Kurz (BS, '16, Joel Blum) is combining mercury concentration analyses with ^{210}Pb and ^{137}Cs dating to reveal the historical record of mercury deposition from the atmosphere in sediment cores from lakes in Michigan and Wyoming. Cores in both states show increased mercury deposition from global coal combustion starting at the onset of the industrial revolution.

Tao Wen (PhD Cand, Clara Castro) is using noble gases as natural tracers to investigate cross-formational flow in the Glacial Drift, Saginaw and Marshall aquifers in the Michigan Basin, evaluating horizontal and vertical components of the groundwater flow based on a ^4He simulation model, and assessing cross-formational migration of stray methane gas and other contaminants originating in shale formations.



Kyle Meyer (PhD Cand, Kacey Lohmann) is using isotope values and elemental concentrations of fossils of marine organisms to reconstruct paleo sea surface temperatures and explore the linkage between critical intervals in Earth's past (e.g., those with elevated atmospheric CO_2) to help calibrate paleoclimate models that inform projections of future climate variability.

Nick Aquilina (BS '16, Greg Dick) is working to investigate harmful cyanobacteria blooms in Lake Erie. Nick is building a database to link organisms, genes, environmental chemistry, and literature on this topic.



David Levine (BS '15, MS '16, Jeff Alt) is investigating hydrothermal alteration of peridotites that are exhumed and serpentinitized at slow spreading mid-ocean ridges on the seafloor. David is studying the progressive alteration of serpentinites to carbonate and talc around a fault that acted as an upflow pathway for hydrothermal fluids.

HARD ROCKS IN THE FIELD

Yosemite National Park and Long Valley Caldera

During the last week of summer (Aug. 28th-Sept. 5th), Becky Lange and Gordon Moore led 13 undergraduates and 5 graduate students on a field trip to the east side of the Sierra Nevada Mountains in eastern California. The purpose was to compare and contrast the magmatism (and volcanism) that forms in two distinct tectonic settings: (1) bimodal basalt-rhyolite in the Basin & Range (continental extension) and (2) intermediate (andesite/dacite) granitoids in the Mesozoic Sierra Nevada batholith (subduction zone). The highlights of the trip were the Long Valley Caldera, site of a supervolcano eruption of >600 km³ of high-SiO₂ rhyolite (75-77 wt% SiO₂) ~675,000 years ago, and the Tuolomne intrusive suite (63-69 wt% SiO₂) in Yosemite National Park.



The overall question addressed was why does voluminous, highly differentiated rhyolite form in extensional settings, bi-modally with basalt, but not at subduction zones? Instead the most abundant magma type emplaced into the upper crust at subduction zones is "intermediate" (andesite-dacite) in composition.

The field trip around Long Valley Caldera included visits to obsidian domes, variably welded pyroclastic ash-flow deposits, and exposed cliffs of air-fall (pumice) deposits. The pumice clasts in these deposits contain ≥ 9 different mineral phases, which provide detailed information on the temperature, oxidation state, and dissolved melt water content in the rhyolite magma at the time of

its climactic eruption. The day trips into Yosemite National Park included transects across the Tuolomne Intrusive Suite, a series of mostly dacitic magma bodies (granodiorite) that were emplaced over a ~8-9 million year period during Mesozoic subduction. Magma emplacement contacts and sub-solidus (metamorphic) overprinting textures were examined. There is little evidence of any significant magmatic differentiation within the intrusive suite; compositions are largely restricted to SiO₂ contents <70 wt%, in sharp contrast to the voluminous rhyolite erupted from Long Valley Caldera (>75 wt% SiO₂). The field trip also included transects across underlying metavolcanic and metasedimentary rocks of Ordovician and Triassic ages, beneath the Mesozoic batholith, shedding light on the tectonic setting and evolution of this western margin of North America at those times. Needless to say, the evidence of glacial action shaping the topography of the mountains was everywhere. All in all, a glorious week was spent in a true geological wonderland!



ECONOMIC GEOLOGY IN THE FIELD

Elliot Lake and Sudbury Basin

Adam Simon led 2 undergraduate and 6 graduate students on a field trip to Elliot Lake and Sudbury, Ontario during the last week of August, 2015. This field trip was the first for our newly founded Society of Economic Geology Student Chapter and we thank SEG and the Department for sponsoring the trip. For three of the participants, it was their first time camping and “looking at rocks.” They are now hooked. We spent time examining Proterozoic ripple marks preserved in sandstone outcrops along the Trans-Canada Highway east of Sault Ste Marie. Ripples marks preserved in three sandstone units indicate changing paleo-current direction. We visited outcrops of the Mississagi formation that contain detrital pyrite grains on top of foreset beds of trough cross-beds, and the uraninite-pyrite quartz pebble conglomerates at Elliot Lake. Collectively, these rocks preserve evidence for the progressive oxygenation of Earth’s atmosphere (a concept originated by economic geologists).

Students put their metamorphic petrology skills to the test when searching for and finding outcrops of the McKim Formation that contain staurolite retrograded to quartz and sericite. Geologists from the Ontario Geological Survey gave us a comprehensive tour of the Sudbury Basin, which is the one of the world’s most prolific producers of nickel, copper and platinum group metals. The Basin formed from a large meteorite impact 1.85 billion years ago that produced a crater 250 km diameter and 30 km deep. The impact superheated the entire 30-km thickness of Earth’s crust in the Basin and fractionation of the melt yielded immiscible sulfide liquids that gravitationally settled to the bottom of the melt sheet to form footwall and contact ore deposits. We toured a former underground nickel mine and learned about the evolution of underground mining techniques. Students visited with Canadian junior mining companies Sudbury Platinum and Wallbridge to learn about the process of exploration, how drilling campaigns are conducted, how capital is obtained to finance operations and, perhaps most importantly, were allowed to collect samples from two prospects. This exercise validated the absolute love that geologists have for hammering rocks. A truly cathartic experience.



ABOVE: Students examining the Onaping Fallback Breccia.

RIGHT: Students examining Ni-Cu-rich sulfide mineralization in the Parkin offset dike. “Looks like a bolide impact to me.”



Reflections by Adam Simon

INTERNATIONAL EXCURSIONS

CHILE

In late February, Adam Simon (Associate Professor) and alumni Antonio Arribas and Peter Knoop boarded a bus with 12 undergraduate and 6 graduate students and embarked on an 11-day field excursion in Chile. Among the many goals of the trip included understanding the role of natural resources for the Chilean and global economies and the importance of environmental stewardship to mining companies. Prior to the trip, the instructors and students met each week and students



made presentations about various aspects of the geology, ecology, economy, culture, and history of Chile. Once on the ground in Chile, our first several days were spent in northern town of San Pedro de Atacama where we witnessed a truly historic rainfall in the driest place on Earth. We visited the Salar de Atacama, which is one of the leading producers of lithium used in batteries that power modern society. An early morning visit to experience sunrise at the El Tatio geyser field, at 4,000 meters, was used to discuss fluid flow and heat transfer in crustal systems (and altitude sickness and the importance of mate tea). A visit to Cordillera de Sal allowed students to put their structural geology skills to the test to

realize they were standing in a doubly plunging anticline. Students visited several porphyry ore deposits, including Minera Spence (BHP Billiton), Minera Centinela (Antofagasta Minerals Group; the integration of Esperanza and El Tesoro mines), and Chuquicamata (CODELCO), the world's largest open pit mine by total mass excavated (nearly 50 billion tonnes since 1913). Many, many samples were collected, including beautiful samples of atacamite. Among the interesting observations was the resemblance of the town of Chuquicamata to an American town circa 1920. This was done to entice American miners and their families to relocate to the desert of northern Chile. Students spent time with mine geologists at each property and learned the basics of logging drill core, about the origins of the mines, and the socioeconomic impacts of the mining operations. The second half of our trip was spent in and around Santiago, Chile's capital. We hiked Baños Morales, where the geology varies from volcanic breccias to marine sediments, with ammonites and glacial striations, and all tilted as much as ninety degrees. The structural complexity was impressive. Thankfully we had a graduate student structural expert among us who could explain it all. We went horseback riding in the Andean foothills to the northeast of Santiago, followed by an incredible outdoor barbeque that featured traditional Chilean food and beverages. Our last day included a tour of the Museo de la Memoria y los Derechos Humanos, dedicated to the people who went missing during the rule of Augusto Pinochet (which is apparently a topic now not included in US K-12 education). We are especially grateful to alumnus Martin Reich (Associate Professor, University of Chile) who helped with logistics and site access, and allowed one of his graduate students to accompany us (thank you Daniele Tardani!). This trip was made possible by generous contributions from our alumni. We thank you for allowing our students to have this experiential learning opportunity. As someone who teaches natural resources classes, this was truly a transformative experience.

by Adam Simon

SOFT ROCK GEOLOGY IN THE FIELD

Michigan to Key West, Florida



As part of the annual tradition, Kacey Lohmann continues to lead a major field trip each Spring. This year was the Southeastern US, beginning in Michigan and ending in Key West, Florida. The purpose of this trip is to familiarize the students with the regional geological history of tectonic deformation, basin formation, and associated sequence of sedimentary deposits. We began in northern Indiana with an examination of Pleistocene glacial deposits and the underlying Detroit River Fm. Proceeding southward, the classic Carboniferous and Upper Ordovician limestone and shale sequences provided students exposure to ancient carbonates and their abundant ooids and fossils. Passing through Kentucky and Tennessee, the synorogenic Carboniferous clastics are excellent examples of the fluvial-deltaic deposits characteristic of the Appalachian Foreland Basin. The structural style and geomorphic expression of the Alleghenian deformation, and the resulting structural provinces were visited as we passed through eastern Tennessee and into the Carolinas. Though exposures were sometimes difficult to find, Coastal Plain deposits, including the latest Cretaceous Pee Dee Fm. were discovered and the classic belemnite and bivalves sampled for later laboratory analysis. Passing down through Georgia, we finally reached the Florida Peninsula where

the real work on Paleogene and Neogene sediments began. After working on the modern beach to examine modern clastic environments, we examined Paleogene deposits at Haile Quarry in northern Florida where Pleistocene-aged fossils occur abundantly in surface karst fissures. Then, off to southwestern Florida to the Miocene Peace River Fm. where deep shelf shales, rich in shark's teeth and other phosphate, are currently quarried. Passing eastward to the Atlantic coast, Plio-Pleistocene limestones are abundantly exposed. Finally, upon arriving on the Keys, we were able to snorkel off of the active coral reef to examine modern carbonate deposits. This was followed by a day long trip down the Keys to visit the shallow water limestones formed during the last major interglacial at 125,000 years ago. While the bulk of the trip was complete, the excellent outcrops of Carboniferous along Interstate 75 in eastern Kentucky provided geological rest stops on the long journey home.

Next year, the SOUTHWEST.



TOP: Peter Cook (BS '14) examines Mississippiian sediments in northern Kentucky.
RIGHT: Students examining pelleted mud facies on the coast of northern Florida.
ABOVE: Lohmann discussing transport and depositional processes of the beach environment.





Victors for Michigan

National and International Field Excursions

An older geologist once said, "You are only as good of a geologist as the number of rocks that you have seen." The alumni-initiated Field Excursion Fund continues to provide numerous opportunities for our students to have hands-on experiences with sedimentary and igneous rocks, ore deposits, and tectonically deformed sequences. We see such excursions not as adventures, but as an essential component of each student's educational growth.

Help us train the next generation of Michigan Geologists. GIVE to BLUE



The international trip to Chile provided a wealth of geological and cultural experiences for our students. Photo by Peter Knoop



Forrest Gilfoy taking meticulous notes while examining Carboniferous limestones in Northern Kentucky.

Remember how important field experiences were to your education at Michigan! These remain a vital component of each student's experiences which mold their intellectual and personal character.

Consider how you can help support these activities both for national and international opportunities.

Give what you can and help build a strong endowment that sustains the field experience and ensures the quality of the next generation of geoscientists.

Upper Ordovician Ls. Photo by Emma Forbes

HOW TO SHOW YOUR SUPPORT

Gifts to the Field Excursion Fund - #366013 will be used to defray the cost to our students of field experiences in the U.S. and abroad. Such experiences are vital to developing the geological perspective necessary to support the needs of our society in future.

Give with the enclosed envelope or go to the Department home page and click on "Give Online".

<http://lsa.umich.edu/earth/alumni-friends/victors-campaign.html>



The Alumni Advisory Board joins LS&A Dean Andrew Martin and Chair Chris Poulsen during this year's annual meeting in Ann Arbor.

THE ALUMNI ADVISORY BOARD

The Alumni Advisory Board had its annual meeting this past October 16, and we are continuing towards becoming more active and better serving the Department, its students and our fellow geo-alumni. We have set three focus areas for this upcoming year: fundraising for Camp Davis, assisting in students finding employment, and increasing the student diversity by helping with Earth Camp. If you have ideas or are interested with helping in any of these areas, please contact me at sghenry@umich.edu, and I will get your names and ideas to the Chairs of these sub-committees.

The funding for the renovation at Camp Davis is critical, and the Board will be putting a lot of our effort into helping the Department meet their fundraising goal to begin the 2016 renovation. My wife Krys Swirydczuk (PhD, 80) and I have very wonderful memories of our times out at Camp Davis. She taught Geology 116 at camp for three summers ('76, '77, '79) and so stayed on the "staff" side of camp. I was a Geology 440 student in 1973 and still have fond memories of the more "rustic" side of camp. Unfortunately my "rustic memories" of cabin 15A from 42 years ago are pretty much the same as whoever stayed there this past summer, but the cabin has an additional 42 years of wear. Camp Davis needs our help!

After 35 years of teaching and interpreting reflection seismic data for the petroleum industry, I have been repeatedly asked what have been the most useful classes that I have taken. Always at the top of my list is what I learned at Camp Davis. Understanding the geologic processes of sedimentation, structure and the scale of what can be seen in the field is critical to making maps of the subsurface that make sense. When working with students I often ask, "Is your interpretation geologically reasonable?" Too many of them haven't seen actual geology, from being in the field, and they have a hard time answering that question. If you found your field experiences, either at Camp Davis or on the Department's field trips useful in your career, help the Department's students by supporting Camp Davis.

It would be wonderful if one of our geo-alumni would just make the contribution to meet the fundraising goal and get the construction started this summer. I think it is also useful for more of us to contribute at whatever level we can to reach that goal and hence get that "good feeling" of helping students obtain the same advantage of understanding the scale of geologic processes that we received at Camp. So, if you want to help the Camp Davis fundraising effort, just go online to the Department's website and make your contribution. Any amount contributed will help the Department get closer to their goal, and you will know that you helped to get the 2016 renovation started.

Thank You,

Steve Henry, AAB Chair

Dr. Laura Sherman (PhD '13) obtained her PhD under the direction of Professor Joel Blum. Her research focussed on the mechanisms and rates of Mercury (Hg) cycling amongst Earth surface reservoirs of air-water-biosphere-lithosphere. Following her PhD, she continues as a post-doctoral fellow to further this research. Given her extensive background in geochemistry and environmental issues, her present position in Washington utilizes all of her skills and talents. Below is a vignette of her experiences and first perceptions.

EXPERIENCES OF AN ALUMNA IN WASHINGTON

I came to Washington a year ago terrified, excited, and ready to learn. One year later, I still feel all of those emotions almost every day and I'm so glad I made the decision to take a Congressional Fellowship through the American Academy for the Advancement of Science (AAAS) and the American Geophysical Union (AGU). I'm planning on staying on after my fellowship ends as a policy advisor on energy, environment, and agriculture issues for Senator Michael Bennet from Colorado.

My day-to-day experiences are very different from those in academics and I only rarely use my actual scientific knowledge. I am no longer in charge of my own schedule and I don't get to delve deeply into topics of personal interest. But I do get to meet with people from all walks of life, I get to learn about topics as diverse as wildfire mitigation, Clean Water Act regulations, and Country-of-Origin labeling for meat products, and I get to help make positive policy changes. The writing, communication, quick thinking, and multi-tasking skills that I gained at University of Michigan serve me well everyday.

If you haven't experienced the federal government, sometimes it's hard to imagine what Congress is really like and what role a scientist can play. Before I had this position, I relied on a number of common myths:

Myth #1: Politicians don't work hard.

Although this may be true in a limited number of cases, in my experience, they work extremely hard. And the staff members work even harder. It's just a different kind of work: figuring out how to vote and the ramifications of each public decision; meeting with any and all constituents; strategizing about how to make policy and political decisions work together; and negotiating with friends in both parties to get things done.

Myth #2: Congress never gets anything done.

This one is partially true. The work to product ratio is horrible. Some of you are probably in science because you like working hard on something, figuring it out, and getting the results published. I loved seeing a tangible result for all of my work. But I remember all of the times where we tried something in lab for weeks (or years...) and it never worked. And I remember how many times I wrote and re-wrote a paper because I couldn't get the framing right. I've found that these experiences in academics actually prepared me well for my time in Congress.

The other crucial point is that it's good that Congress only gets a limited number of things done. There are a lot of crazy ideas floating around Capitol Hill and you definitely don't want most of them making it into law. We spend a lot of time stopping other people from imposing bad ideas on the public.

Myth #3: There is no place in Congress for science.

In my experience, scientific knowledge is actually a very valuable commodity in Congress. The issue sometimes is that without knowledgeable interpreters, all scientific knowledge is treated equally. Junk science or politically motivated science can be given the same worth as carefully conducted research that is broadly accepted in the scientific community. I think that one of the best things scientists can bring to our government is our skepticism and urge to always question first and accept later.

It's also important to remember that everyone else is going to weigh in with the government. Scientific opinion is just one piece of the puzzle along with business interests, human rights, political concerns, social welfare, etc. But if scientists don't add our knowledge to the table, it just won't get included in the decision making process. The other voices are loud, but I think that there is a place for science and Congress needs to continue to be pushed to listen.



FACULTY NEWS

Ben van der Pluijm (Professor) ended a nearly 15 year stint as director of the Global Change Program, which offered a set of introductory courses on planetary stewardship and sustainability, and (LSA's first) minor degree. The inception of this educational program was funded by generous support of the Hewlett Foundation and the U-M's Provost Office, in collaboration with Tim Killeen (president of Univ of Illinois). The GC Program has been absorbed the Program in the Environment. Ben is now developing a new course that focuses on societal resilience, moving from the aspirations of sustainability to the impacts of change. Over the summer, Ben also worked on a new version of the successful Earth Structure textbook, which changed so much that a new title will be used. "Processes in Structural Geology and Tectonics" radically reorganizes the standard course outline, by integrating observation, theory and process, without losing sight of fundamentals. The primary goal of this new approach is to improve students' understanding and retention of key elements and processes in this area of study. An experiment with online posting is underway, allowing greater international access and lower prices (see earthstructureweb on Facebook).

Graduate student **Austin Boles (PhD Cand)** continues the development of H analysis as a proxy of fluid sources, most recently on samples from the Alpine Fault of New Zealand. **Erin Lynch (PhD Cand)** is similarly working on sources and timing of fluid history, focusing her efforts on the Cordilleran fold-thrust belts of S and N America. **Samantha Nemkin (PhD Cand)**, jointly supervised with **Rob van der Voo (Prof.)**, continues her work on the timing of remagnetization using the paleomagnetic fold test in limestones and fold dating of interbedded shales. Several undergraduate students are also involved in these projects. Various projects with former group members **Anja Schleicher (GFZ Potsdam)** and **Elisa Fitz-Diaz (UNAM)** are continuing as well. A project on dating deformation in the Canadian Rockies that started well over a decade ago (van der Pluijm et al., Nature, 2001), culminated in a regional study and synthesis of the Alberta Rockies that emphasizes the importance of short deformation pulses instead of long-lasting, continuous deformation (Pana and van der Pluijm, GSAB, 2015). These views are not embraced by everyone.

Ben and Lies continue to host UM alumni travel, most recently to the Barents and White seas, visiting Russian harbor cities like Murmansk and Arkhangelsk, seeing samples from the bottom of the Kola Peninsula deep hole (12 km!), and foggy Nordkapp and Tromsø in Norway, all of which with 24 hr daylight. Lastly, at the GSA-Baltimore session organized by PhD grads **Sam Haines (PhD '08)**,

Bernie Housen (PhD '94), **Eric Tohver (PhD '03)**, and **Arlo Weil (PhD '01)** celebrated Ben's 30 years of research and graduate mentoring at Michigan, and, gasp, his 60th birthday.

Nathon Sheldon (Assoc. Prof.) continues his work with **Greg Dick (Assoc. Prof.)** in their research on microbial mats found in the Great Lakes. This year, **Sharon Grim, Judith Klatt, Matthew Medina, and Kathryn Rico** took a trip to the Middle Island Sinkhole in October to collect microbial mat and sediment samples. The Middle Island Sinkhole (MIS) sits below 23m of water in Lake Huron. The water flowing out of MIS is low in oxygen and high in sulfur—more similar to the regional groundwater source than overlaying Lake Huron water. The compositionally distinct groundwater gives rise to a unique eukaryote-free ecosystem dominated by cyanobacterial mats, which reside in conditions similar to those in Earth's history after the Great Oxidation Event of ~2.4 billion years ago.

Visiting the sinkhole is a two-day trip, incorporating two 4-hour drives from Ann Arbor to Alpena, Michigan. On the first day, we collected water, mat, and sediment samples from an onshore sinkhole. After staying the night at NOAA's Thunder Bay Marine Sanctuary dormitory, we ventured out onto Lake Huron on a NOAA boat. Once stationed above the sinkhole, we prepared sample materials for sample collection, which NOAA divers then used to collect water, mat, and sediment samples. Mat material obtained from the trip are assessed for the communities present and the biogeochemical functioning of these communities, while water and sediment analyses focus on nutrient, ion, and metal cycling. Samples will continue to be collected regularly in the spring, summer, and fall, with the hopes of determining any spatial and temporal distinctions in the mat communities and biogeochemistry of the sinkhole system.



Matthew Medina enjoys the Lake Huron sunset after a long day of collecting cores for research.

Brian Arbic (Assoc. Prof.) and **Joseph Ansong (Asst. Research Sci)** traveled to Ghana, West Africa, to conduct a summer school in oceanography at the Regional Maritime University (RMU) from August 24-27, 2015. They were joined by Dr. Ebenezer Nyadjro of Naval Research Laboratory/University of New Orleans, and Winn Johnson, a chemical oceanography graduate student in the MIT/Woods Hole Oceanographic Institution Joint Program. Johnson lectured on chemical oceanography, Nyadjro lectured on satellite oceanography, Ansong lectured on ocean modeling, and Arbic covered basic physical oceanography. In addition, one lecture was given by RMU faculty member Mamudu Abdulai-Saiku. The project is funded by NSF grant OCE-1351837. About 35 participants attended most of the summer school lectures, and about 20 additional participants attended a small number of lectures. The participants included many RMU faculty, one KNUST faculty member and student from the department of mechanical engineering, many KNUST NIMS students, one Associate Oceanographer from the University of Ghana, and individuals from various governmental agencies and private-sector companies. We plan to return to Ghana in summers 2016 and 2017 and will incorporate participant feedback to improve the school. More information on the summer school can be found on the website https://secure.earth.lsa.umich.edu/groups/oceanmodeling/wiki/843cd/2015_Ghana_Oceanography_Summer_School.html.

Adam Simon (Assoc. Prof.) had a busy year that included being elected as a Councilor for the Society of Economic Geology, having two graduate students successfully defend their dissertations, one postdoctoral researcher move to a permanent position, welcoming two new international students, co-authoring with **Steve Kesler** the second edition of the textbook *Mineral Resources, Economics and the Environment* (Cambridge University Press), serving as the faculty advisor of the Student Chapters of the American Association of Petroleum Geologists and the Society of Economic Geologists, and leading two international field trips. And most significantly, being a dad to four incredible children. The book was the result of two years of continued effort by Steve and Adam and serves as the backbone for the course of the same name taught each fall. **Laura Bilenker (PhD '15)** is now in Vancouver, Canada where she will spend two years as a postdoctoral fellow with Professors Dominique Weis and James Scoates at the University of British Columbia. **Tom Hudgins (PhD '15)** is a visiting professor at the University of Puerto Rico Mayaguez. Postdoctoral fellow **Adrian Fiege (2013-14)** is now a permanent Research Scientist at the American Museum of Natural History in New York, U.S.A. Adam welcomed two new graduate students,

Nikita La Cruz from Guyana, and **Daniel Korfeh** (Liberia). These new students join second year students **Tristan Childress (PhD Cand)** and **Brian Konecke (PhD Cand)**. Together, the Simon group continues to investigate the genesis of different ore deposit types with the overall goal of sustainably supplying humanity with the natural resources that enrich and empower our wonderful social fabric.

Steve Kesler (Prof. Emeritus) is co-author on two books that were published this year. The first is *Ressources Minerales*, an introductory text on metal deposits, which was published in French by Dunod. Steve was third author on that behind Nick Arndt at Grenoble and Clement Ganino at Nice. The second book, which had the same authors but with Steve second behind Nick, is entitled *Metals and Society* and was published by Springer (in English). This is a more advanced introduction to metal deposits with a broader view that includes some societal issues. Both books are second editions, and Steve's involvement in them came about because he reviewed the first editions and was "invited" to help improve some shortcomings that he noted. We will have to leave it up to the next reviewers to see if that actually happened.

Kacey Lohmann (Prof.) continues his work on a range of topics which focus around the application of elemental and isotopic tracers to resolve the evolution of the sedimentary system, and reconstruction of Earth's temperature at key transitions in climate. As we all know the bulk of the research is really a reflection of the group of students and researchers who align themselves toward solving such problems. We currently comprise a very coherent group of two PhD students, **Kyle Meyer** and **Ian Winkelstern**, and a Postdoctoral Fellow, **Sierra Petersen** who derives from Harvard under the direction of Dan Schrag. This group is actively incorporating a new technique for determining absolute temperatures from carbonate by quantifying the relative abundance of uniquely bounded ^{13}C and ^{18}O within the carbonate mineral. One exciting area of focus is the possible application of this technique to dolomite, a very ubiquitous mineral through the stratigraphic record. This is combined with studies of the Cretaceous to reconstruct the latitudinal thermal gradient during periods of excessive warmth to benchmark current numerical model simulations of climate change. The strength of this group clearly reflects the contributions and insights of Sierra Petersen and her broad knowledge of geochemistry and paleoclimatology. If Lohmann ever decides to retire, she would be an excellent contributor to the Department and worthy of directing the Stable Isotope Laboratory and the efforts in Sedimentary Geology. But don't hold your breath.....Kacey is still feeling pretty young and has no immediate intention of abandoning the Department and its students.



Victors for Michigan

OUR #1 PRIORITY

RENOVATION OF CAMP DAVIS

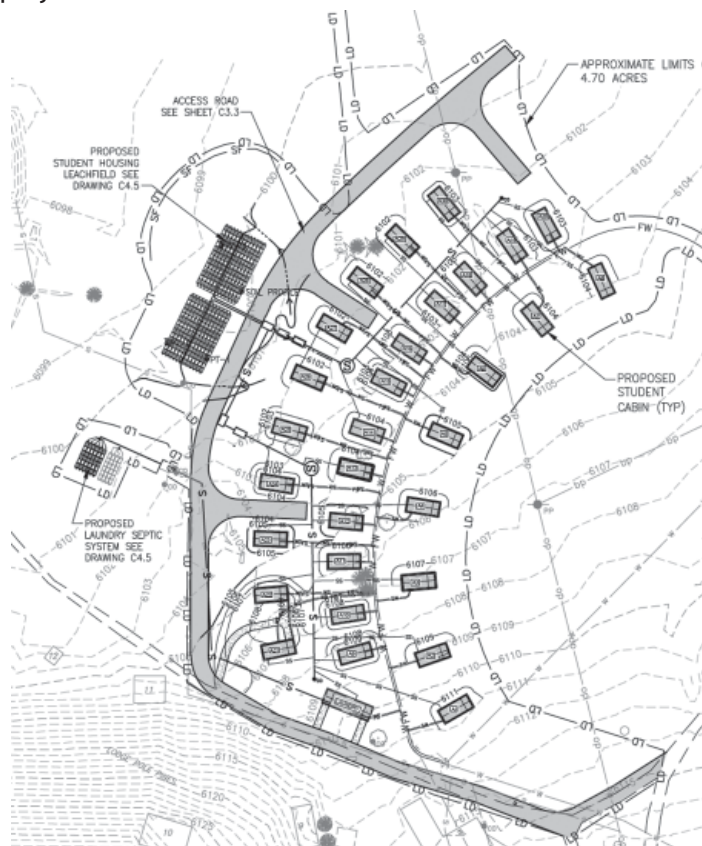
Since the update in the *Camp Davis Gazette* in last year's Newsletter about the need to renovate the student lodging accommodations at Camp Davis, plans for undertaking this major construction project have continued to move forward. The Department has made this project its top priority for funding and completion during the Victor's for Michigan capital campaign, and the Alumni Advisory Board committed to financially and logistically supporting this goal during their annual meeting in Ann Arbor in October.

With the recent decline in the price of oil, construction costs in Wyoming have dropped, opening the door for the Camp renovations at a lower cost than anticipated when we began planning the project last year. The College has supported our efforts to get this project off the ground and is encouraging us to meet our goal of breaking ground in September 2016, with planned occupation of the new facilities in June 2017. Architectural plans, engineering diagrams, feasibility studies, and a variety of on-site tests for fire suppression, septic system installation, and domestic water supply have all been completed, and construction permits are being prepared for the City of Jackson to review and approve.

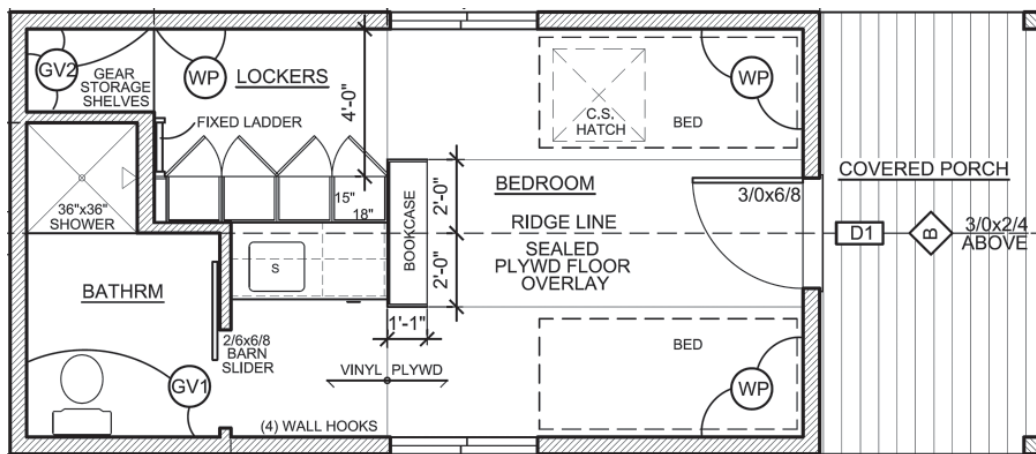
This renovation will result in completely new cabins and supporting infrastructure, resolving long-standing issues with annual maintenance, fire and building code compliance, and student comfort. Most importantly, however, the new cabins will increase our ability to offer the Camp Davis Experience to students each summer, as we will be able to extend our operating season earlier into the spring and later into the fall. As our number of majors grows, and as more and more students in other programs

desire an opportunity to participate in off-campus and experiential learning programs, demands on Camp's courses has greatly increased. This renovation project will mark a new chapter of learning opportunities in the 86-year history of Camp Davis.

We hope you will consider supporting this ambitious, much-needed, and incredibly exciting renovation project.



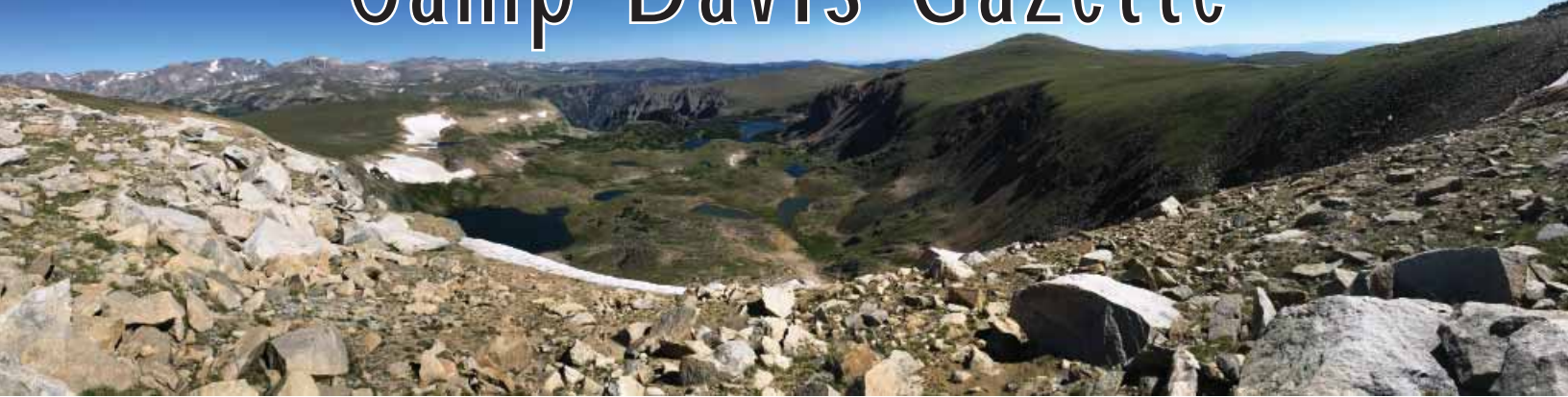
RENOVATION OF CAMP DAVIS



Above: Architectural plan for proposed student cabin wing at Camp Davis, showing placement of new cabins and infrastructure.

Left: Student cabin design for proposed renovation. Each cabin will sleep 4 students and have storage and bathroom facilities. These cabins will extend the teaching seasons in Wyoming, allowing us to accommodate greater student use of Camp Davis.

Camp Davis Gazette



The summer of 2015 was a busy one at Camp Davis, which saw 131 students enrolled in courses at our field station, followed by a graduate student summer school for an additional 32 students (see opposite page for more information on the summer school). The growth of our undergraduate program had a substantial impact at Camp Davis this summer, as we offered three sections of our 400-level courses to 63 upper level students (two sections of Earth 440, Field Geology and one section of Earth 450, Environmental Sciences in the Rockies). We anticipate continued pressure on the upper level offerings that fulfill the requirement for field experience in our major, and anticipate adding a fourth course at the 400-level next summer, oriented towards soft rock geology, surface processes, and paleobiology.

This does not mean that our lower level courses are being given short shrift, as we continue to offer introductory level Earth science courses at Camp, including Earth 116, Introductory Earth Science in the Rockies, and Earth 202, Introductory Environmental Science in the Rockies, as well as courses in Earth sciences for non-science majors, such as Earth 344, Energy and the Environment, and a course in the Literature of the American West.

Last year, through these courses, we engaged twelve faculty and one research scientist from Earth



Students presenting about the geologic and mining history of the Stillwater Complex in southwestern Montana.

Top: Beartooth Pass, Beartooth Highway, Montana.

and Environmental Sciences, three faculty from other departments at U-M, and three visiting faculty, all with past ties to the department, in the teaching effort at Camp Davis. Thus, Camp Davis continues to be a significant component of the educational experience of many undergraduates and a key focus of the department's teaching efforts.

We continue to work on improving the infrastructure at Camp Davis to provide the best possible student experience. Over the past year, we have replaced furnishings in the classrooms, upgraded the wireless network around Camp, rewired the 440 classroom building and acquired 30 new computers for teaching. We are tracking the progress of high-speed fiber optic internet as it snakes (no pun intended) its way south from Jackson. High speed internet lines are now at Hoback Junction, and we hope to be able to negotiate their extension into the Hoback Valley in the next year. Extending high speed internet to Camp will allow us to incorporate new technologies into teaching, including making use of a University pool of iPads for Camp instruction, accessing high-resolution imagery through Google Earth and other on-line sites, and more seamlessly integrating campus with Camp Davis, particularly for cloud computing, course tools, cloud computing, and library resources

SHOW YOUR SUPPORT FOR CAMP DAVIS

HELP REVITALIZE CAMP'S INFRASTRUCTURE

AND REBUILD THE STUDENT CABINS

VISIT

<http://lsa.umich.edu/earth/camp-davis/camp-renovations.html>



Mapping folded strata along the Snake River Canyon between Hoback Junction and Alpine, Wyoming.

We have also continued planning for the renovation of the east (student) wing of cabins at Camp Davis. The recent drop in oil prices has also lowered construction costs in Teton County, and we hope to take advantage of this lull to push forward with the renovations. Architectural and engineering plans for the renovation have been completed and we hope to submit them to the county and state for approval later this year, with an anticipated construction start in late summer of 2016, once classes are finished for the season.

This will be the largest project undertaken at Camp Davis, and I truly appreciate the many alumni who have made commitments to getting this project off the ground, and to the College of LSA who has stepped forward to fund the planning and permitting process for this project.

I look forward to talking to many more of our alumni about this project and ways to support it. As always, if you're in Wyoming this summer, please stop by and say hello.

Nathan Niemi, Camp Davis Director

Clouds fill Jackson Hole in late August and extend up Granite Canyon, north of Rendezvous.

Graduate Summer School at Camp Davis



Graduate summer school students on a field trip to Fossil Butte National Monument near Kemmerer, Wyoming.

This summer, Assoc. Profs. **Marin Clark** and **Nathan Niemi** organized a graduate summer school at Camp Davis entitled "*Mountain Ranges and High Plateaus: Their underlying geodynamic processes and their interaction with climate dynamics.*" The summer school fostered interactions between graduate students in the solid Earth and atmospheric sciences, and to cross-pollinate research efforts into the growth of high topography, its effects on regional and global climate, and how high topography is reflected in the geologic record through isotopic proxies associated with climate dynamics. Thirty-two graduate students participated in the summer school, arriving at Camp Davis from five continents. In addition to lectures, discussion sessions, and workshops, the students enjoyed field trips to Yellowstone National Park, Fossil Butte National Monument and the Grand Tetons (including a spectacular tram ride above the clouds [see photo below]). In addition to the UM contingent, faculty from the University of Washington, the University of Rochester, UC Berkeley, the University of Colorado and Brown University participated in instructing the course. Participation of the graduate students was supported by a grant from the Continental Dynamics program of the National Science Foundation. This is the second such summer school offered at Camp Davis in the past few years, and both have been great successes.



TRANSITIONS

PETER VAN KEKEN GOES TO WASHINGTON

After 21 years at the University of Michigan, Peter van Keken will retire as Professor of Geophysics in January 2016 to become a Staff Scientist at the Department of Terrestrial Magnetism (DTM) at the Carnegie Institution of Science in Washington, D.C..



While local citizens hear rumors about DTM being the 'magnetic house' as part of a clandestine operation of the CIA, and others assume it is a branch of the Federal Government, the Carnegie Institution for Science is in fact a privately funded research and non-profit research institution initiated by a \$10M donation by Andrew Carnegie in 1902, the year after he sold Carnegie Steel. The Carnegie Institution's budget is currently near one billion dollars which is used to support some 70 staff scientists and support staff across six departments. DTM shares the Broad Branch Road campus in Northwest D.C. with the similarly anachronistically named Geophysical Laboratory.

DTM was founded as a department to study the Earth's magnetic field on the continents and oceans. While it has retained its founding name, the research focus of the 15 scientists at DTM is presently on the geochemistry and geophysics of the Earth and planets, the nature of extrasolar planets, and planetary formation (dtm.carnegiescience.edu). Van Keken joins the geophysics group in DTM and will further develop his interdisciplinary research on the dynamics and thermal structure of subduction zones, the evolution of the Earth's mantle and the continental crust, and the nature of terrestrial heat loss.

Van Keken looks back on his tenure at Michigan with satisfaction and happiness. "I have been fortunate to work with many great colleagues and students over the last two decades. The Department and University have provided a supportive research environment that has allowed me to develop a strongly collaborative and cross-disciplinary research program. I've been happy being part of a strong rejuvenation of the faculty and strong growth of excellence in teaching across the department that I think has been an important component of the growth of the undergraduate program with a near quadrupling of the number of majors in recent years." Van Keken was Associate Chair for Curriculum and Undergraduate Education from 2011-2015. He is the author of more than 70 articles and book chapters. With collaborators he has raised nearly \$5M in federal funding including a \$1.2 million grant to support the *GeoPRISMS* community effort (geoprisms.org) for three years at Michigan.

The department wishes Peter all the best in his new career. He will be missed and his contributions to the Department and its students will be evident in the coming years.

BON VOYAGE, PETER!!

Charles "Chuck" Wooden passed away on July 30th from complications of a broken hip he suffered last winter. After visiting Wyoming on vacation he decided he would raise his family in Jackson, and took the job as Camp Superintendent in 1972. Chuck continued both as full time until 2002 and then part-time until 2009. We all have memories of how he kept camp going, the "kids" safe, and the faculty in line (as best he could). Living at Camp throughout the year, he worked to maintain the infrastructure to make it habitable for students during the summer. We will all miss his keen sense of humor, his wry laugh, and how he shaped the memories of so many in his role at Camp Davis.



Charles F. "Chucky" Wooden died in early November at his home from a heart attack, only 3 months after the loss of his father. Chucky was the senior staff investigator for the Spence Law Firm in Jackson, Wyoming since 1986 where he investigated and researched thousands of personal injury, products liability and wrongful death cases. For those of us that worked or studied at Camp Davis during the 70's and 80's, Chucky was the car-loving, young son of the Big Chuck, and one many of us came to love.



TRANSITIONS: ROB VAN DER VOO RETIRES

Between 25 and 27 August, 2015, several of Professor Rob Van der Voo's former PhD students, many research colleagues, and many long-time admirers, converged in Ann Arbor for a "Voo Fest" (officially named The Evolving Earth from Top to Base: 75th Birthday and Retirement Party), in celebration of Rob's 75th birthday and upcoming retirement (end of December 2015), from the University of Michigan, after 45 years of dedicated and superlative effort, in so many, many ways.

The celebration began with an informal and most festive event in the backyard of the Van der Voo residence on Tuesday evening, the 25th. Much merry-making was had, and many stories told, and some even wore versions of the many editions of UM Paleomagnetism Laboratory T-shirts (yours truly wearing a 1976(?) version). Things got serious, early Wednesday morning, when a day-long session of talks was held in Angell Hall (whoa, I had not been in that lecture room since Greek History, when I think that Greek History was still happening). In total, following the splendid synopsis of Rob's career by Department Chair Chris Poulson, a total of 23 papers were presented on Wednesday and the following Thursday morning, by friends from all over the world. I went second, and it was a true struggle to keep the tears of joy, thankfulness, and appreciation from overpowering me. Late Wednesday

afternoon we strolled over to the Rackham School of Graduate Studies for a truly lovely reception, with the number of Rob and Tanja friends and colleagues expanding and involving an even greater number of the University/Ann Arbor community. If that was not enough, we then strolled over to the Michigan Union for an unforgettable evening of good cheer, good beverage (of course), good food, and fond memories being expressed by friends, colleagues, and the "band of brothers and sisters," who had many classic comments concerning "that look" of Rob's PhD students. Finally, to top it off, we were treated to some elegant words of wisdom, and certainly not the last of them (!), from the master himself. Personally, upon leaving the Union late that night, with Professor Lohmann and (ahem) his new wife, heading to our favorite watering hole for further celebration, I could only think how very appreciative I will always be to be a member of a truly GREAT institution of Public Higher Education, in the World, and the night was living proof of that fact.

The celebration continued at the Annual Meeting of the Geological Society of America where a special Topical Session (T64) was held in Rob's honor. That session, very cleverly titled by Professor Joe Meert (University of Florida), was titled: "Rotations, Oroclinal Bending, Variscan-Alleghenian Nondipoles, Diagenetic Enigmatic Remagnetizations, Vignettes of Orogenies and Oceans: A Celebration of Rob Van der Voo's Career". Of note, a Special Issue of the Geological Society of America journal *Lithosphere* that will honor Rob's career is in the planning stages.

Finally, it is with much appreciation that I thank Ms. Jennifer Robson-Tronnes and Trond Tosvik (Center for Earth Evolution and Dynamics (CEED), University of Oslo, Norway) and Ms. Anne Hudon (Earth and Environmental Sciences, UM) for their tremendous efforts in organizing the joyful event!



Arlo Weil (MS '97, PhD '01), Eric Tohver (PhD '03) and Alexandra Abrajevitch (PhD '08) share interesting memories of Rob as a mentor.

Enjoy Retirement, Rob and Tanja!

By John Geissman (BS '73, MS '76, PHD '80)

*Professor Emeritus, Earth and Planetary Sciences
University of New Mexico*

Professor and Department Head, Geosciences

The University of the state east of New Mexico at Dallas

I LIKE IKE!!

IN MEMORIAM - IKE SMITH: A LEADER AND BEST

The Department received the sad news recently that Charles (Ike) Smith, passed away on June 19, 2015. He graduated from Baylor University in 1952 with a BS Degree in Geology, a MS Degree from LSU in 1955, and PhD from University of Michigan in 1966 before joining the faculty and ultimately serving as chair from 1971-1977.

Ike was an expert in Cretaceous stratigraphy of North America and taught sedimentology on campus and at Camp Davis. And despite his many years at Michigan, Ike had an affinity for West Texas. According to Rob Van Der Voo, nobody on the faculty at the time could say "lick'em 'n look'em" on the outcrop like Ike. Ike left U-M in 1977 to become chair at University of Texas at Arlington, from which he eventually retired in 1993.



In this field photo -- IKE STARTS WITH A CLEAN SLATE. Amongst his many accomplishments, Ike was best appreciated for his diligence in teaching of students at all levels through their time at Michigan.

"My interest in doing geology in the field didn't need any cementing (already totally sold) but Camp Davis sure put the cherry on the top with that experience... (and) in the dedication and enthusiasm that the instructors brought to 440."

Phil Brown (MS '76, PhD '80, Camp Davis '76)

"My most memorable recollections of Ike are of how he could walk the line between being a caring and supportive teacher and his ability to enforce rules and discipline at Camp Davis. I always felt that he could make difficult decisions that he knew would not be popular with some students, but that he could do so in such a way that usually brought the students into line while earning their respect and admiration."

Bert Reuss (MS '67, PhD '70)

“Winner, winner, chicken dinner, just so everyone knows: Ike Smith made the best freaking barbecued chicken ever.”

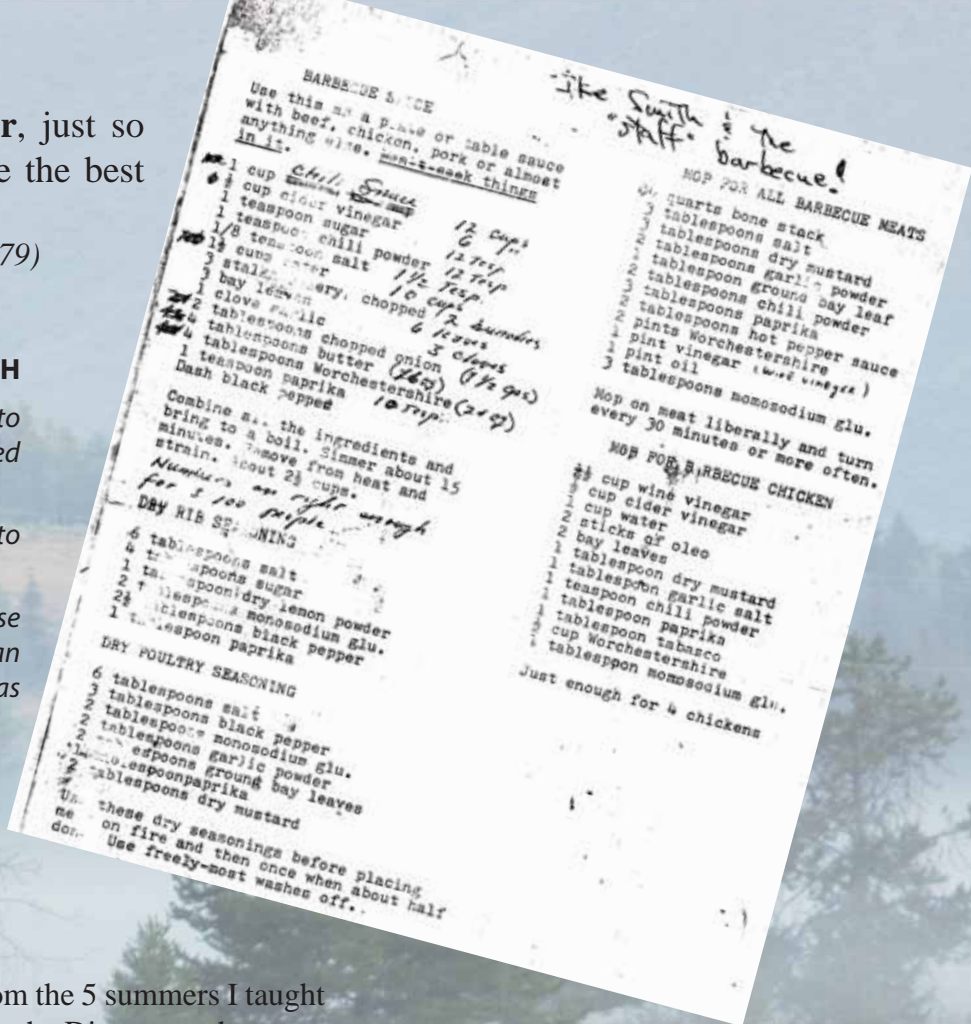
Wendy (Gordon) Sheridan (BS '76, MS '79)

FAMOUS BBQ RECIPES FROM IKE SMITH

In searching our archives, we were blessed to find this copy of the recipes that Ike created for the the “End of Camp Barbeque”

This scan also includes the quantities to ramp of volume for 100+ people.

We hope that when you recreate these masterpieces, you remember that “Old Texan that never lost his drawl”, and his heritage as a Leader while at Michigan.



“I remember Ike most vividly from the 5 summers I taught with him at Camp Davis. He was the Director at the camp and was a natural born leader, both of the faculty and students. I was not the first to find that he could work an outcrop or stratigraphic section with a group and wet our feet in the Cretaceous seas. His many years of field work with Shell provided a rich background to share with all of us and his easy going style of teaching drew us all in to the science.” Lisa Fisher (BS '78)

“Ike was a teacher’s teacher, a student’s teacher, and (at least to a graduate student and young faculty member) an administrator’s administrator. Michigan had a wonderful cast of characters among the faculty and students in the Geology program of the late 60’s and Ike was among the very best of them. Those who knew him will surely miss him.”

Bert Reuss (MS' 67, PhD' 70)

As the Monthly E-Newsletter broke the news of Ike Smith’s passing, we received a wonderful outpouring of memories and stories from our alumni. We hope that such interactive responses continue and urge you all to contribute your thoughts to the Department’s Facebook page.

Make “Michigan Earth” your friend.

or visit the Ike Smith page at:

<https://www.facebook.com/MichiganEarth/posts/916727331745038:0>



HONORS AND AWARDS

Research Grant Recipients 2015

Alex Tye (PhD Cand), Timothy Gallagher (PhD Cand), Kathryn Rico (PhD Cand), and Ian Winkelstern (PhD Cand) received a research grants from the Geological Society of America.

Tristan Childress and Brian Konecke (PhD Cands) received research grants from the Society of Economic Geology.

Scholarships/Fellowships 2015

Camp Davis Scholarships

Kornfield Family Camp Davis Fund: A. Cain, R. Dzombak, C. Genter, J. Gerow, N. Hite, N. Huntley, A. Kurz, C. Lang, A. Leppek, H. Maier, S. Rice, K. Schissler, C. Singleton, M. Wiltse

Judith H. Turneure Memorial Student Aid: M. McMillin, L. Pollock, S. Smith

Shell Camp Davis Scholarship: J. Bennett, L. Blanchard, A. Elias, B. Kennedy, H. Knouff, A. Ashley, A. Simon, D. vander Weele, L. Yang, B. Yost



Graduate Fellowships

Susan M. Kruger Scholarship Fund: A. Tye

Earnest A. Novak Scholarship Fund: M. Calogero, S. Grim, K. Lowe

Henry N. Pollack Graduate Fellowship: K. Purens, K. Rico, C. Tilevitz

Chester B. Slawson Memorial Fund: W. Bender, S. Taylor, Y. Kim

Stewart R. Wallace Fellowship: J. Fronimos, M. Taylor

Violeta Pena y Lillo Scholarship: K. Lowe



Austin Elliott (BS '16) sampling the Eocene Ocala Limestone at Haile Quarry near Tallahassee, Florida. Major surface karst in this region created large cavities that often contain abundant terrestrial fossils including turtles, alligators, large sloths and other vertebrates.

ROEBLING MEDAL

MINERALOGICAL SOCIETY OF AMERICA

Rod Ewing (Prof. Emeritus) was awarded the prestigious 2015 Roebling Medal by the Mineralogical Society of America, which is the highest award bestowed by MSA for scientific eminence as represented primarily by scientific publication of outstanding original research in mineralogy. This award specifically recognizes the significant original research accomplishments of Rod's career.

GARVAN-OLIN MEDAL

AMERICAN CHEMICAL SOCIETY

Annie Kersting (MS '88, PhD '91), the Director of the G.T. Seaborg Institute at LLNL has been selected to receive the 2016 American Chemical Society's Francis P. Garvan-John M. Olin Medal for distinguished service to Chemistry. The medal recognizes outstanding scientific achievement, leadership, and service to chemistry by women and is a national award open to all chemists who are citizens of the U.S. This award was started in 1936, and is ACS's second oldest award.

DISTINGUISHED UNIVERSITY PROFESSOR

Joel D. Blum, the Jerry Keeler Distinguished University Professor of Earth and Environmental Sciences was named Distinguished University Professor in recognition of his significant impact as a member of our faculty. Joel is one of only nine professors to receive this prestigious honor.

WILLIAM GILBERT AWARD AMERICAN GEOPHYSICAL UNION

Mike Jackson (MS '84, PhD '86) was awarded the William Gilbert Award in 2015 and became a fellow of the American Geophysical Union. This recognizes his contributions to Geomagnetism and Paleomagnetism during his career. at University of Minnesota.

STEPHEN LAUBACH AWARD GEOLOGICAL SOCIETY OF AMERICA

Austin Boles (PhD Cand) was this years recipient of the Stephen Laubach Award which was given at the Sedimentary Geology Limnology Awards Ceremony at the Geological Society of America Annual Meeting in October 2015.

ALUMNI NEWS

Susan Beck (PhD '87) is the Chair of the Honors Committee of the Tectonophysics Section of AGU. She also became a Fellow of the Geological Society of America.

Bruce Clark (Prof Emeritus) is saluted for his 50 year membership in the Geological Society of America.

Tracy Frank (MS '92, PhD '96) became a member of the Geological Society of America for her integration of carbonate petrology, sedimentology and geochemistry in her research.

John Geissman (BS '73, MS '76, PHD '80) and member and chair of Alumni Advisory Board is the new editor in chief of Tectonics, and chair of the department at U-T Dallas.

Dan Horton (PhD '11) recently accepted a tenure track assistant professor position at Northwestern University.

Linda C. Ivany (Former Michigan Fellow) became a Fellow of the Geological Society of America.

Tom Hudgins (PhD '15) escaped the impending Michigan winter to spend the academic year at the University of Puerto Rico Mayaguez where he was recently hired into an assistant professor position in igneous petrology. Tom is making great use of the natural environment by taking students on field trips to see all aspects of igneous petrogenesis, from the examination of a partial ophiolite sequence to an investigation of fractional crystallization in granitic plutons. We expect that in the future, his presence in Puerto Rico will offer the possibility of field excursion to the islands for both our faculty and students.



On a field trip to the San Lorenzo batholith, students examined cross cutting relationships in large granitic boulders to identify the sequence of events and use the mineralogy of the dikes/veins to determine if they were related by fractionation.

Alexander Voorhies (PhD '14) is currently working as a Post Doctoral Fellow at the J. Craig Venter Institute tracking changes to the microbes and viruses that live in and around astronauts spending six months to one year at the International Space Station (ISS). During a mission to space, astronauts are subject to many stressful conditions (g-forces, radiation, microgravity, anxiety, etc.) that can have a negative impact on their health. Several studies have demonstrated that space travel affects the astronauts' immune systems and have shown some evidence suggesting that changes in their microbiomes occur as well. Because the human microbiome plays a key role in human health, it is important to assess the effect of long duration space exploration on the microbial population that inhabits the human body. This study will carry out a thorough evaluation of how long-term space travel impacts the human microbiome and ultimately human health, and it will form the basis for further studies towards the design of therapies to mitigate any microbiome changes or related health issues found as a result of this project. Therefore, this study has the potential to lower the risks to human health for future space explorations.

Carli Balogh (BS '14) is working on her M.S. in Economic Geology at the University of Nevada Reno with another UM alum **John Muntean (MS '89)**. Carli spent this summer mapping in the Eastern Sierras. Carli presented her MS research at the annual meeting of the Society of Economic Geology in Hobart, Tasmania in September, 2015. Carli hopes to enter industry in 2016 so be on the lookout for her.

Lauren Banish (BS,14) is currently working for Blue Mountain Minerals, a limestone and dolomite mine in Columbia, CA in the Sierra Nevada foothills. She started in April 2015 after leaving the oil industry and enjoys the work and loves living and hiking in the mountains.

Below: Lauren and Carli at Sawtooth Pass in Sequoia National Park keeping their love of geology alive.



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Lydia Staisch	<i>The Tectonic Evolution of the Hoh Xil Basin and Kunlun Shan: Implications for the Uplift History of the Northern Tibetan Plateau</i>
Valerie Syverson	<i>Predation, resistance, and ecological escalation in sessile crinoids</i>
Elizabeth Tanis	<i>Constraints on the ability of Cl- and F- bearing aqueous fluid to dissolve and transport trace elements (Y, Nb, Zr) in subduction zone environments</i>
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Laura Bilenker	<i>Elucidating Igneous and Ore-Forming Processes by using Iron Isotopes through Experimental and Field-Based Methods</i>
Patrick Donovan	<i>Tracing Legacy Mercury Sources in Aquatic Ecosystems using Mercury Stable Isotopes</i>
Ran Feng	<i>Detangling climate and topographic history from Cenozoic proxy records: Examples from western North America and the Andes-eastern tropical Pacific</i>
Thomas Hudgins	<i>Magma Genesis, Degassing, and Mixing in Rifts and Arcs</i>
Sae Yun Kwon	<i>Mercury isotopes as biogeochemical and ecological tracers: Assessing mercury sources and exposure pathways in food webs</i>
Zeyu Li	<i>Mantle carbon and hydrogen cycles from melting and phase equilibrium experiments</i>
Jiachao Liu	<i>Crystal Chemistry, Elastic Properties and Melting Behaviors of Iron-Bearing Materials in Earth and Planetary Interiors</i>
Yi-Wei Liu	<i>Environmental Controls to 11B in Unconventional Biogenic Carbonate Archives</i>
Lorena Medina Luna	<i>Constraints on Crustal Stress from Coseismic Slip Models and Focal Mechanisms</i>
Meghan Taylor	<i>Ocean/atmosphere interactions and trace metal geochemistry in ocean and sea ice sediments</i>
Sandra Taylor	<i>Actinide sorption and reduction on iron and aluminum (oxyhydr)oxides</i>
Collin Ward	<i>Photochemical oxidation of dissolved organic matter in arctic surface waters</i>
Petr Yakovlev	<i>Evolution of the Indo-Asian orogen: Insights from the deformation of northern Tibet, mass balance calculations, and volcanic geochemistry</i>
Ke Yuan	<i>Electrochemical investigations of redox reactions of uranyl(VI) on magnetite and computational modeling of the UO₂-HfO₂ solid solution</i>

Recent Masters Theses

Jennifer von Voigtlander	<i>P-wave velocity of weathering profiles from a basalt climosequence: Implications for weathering on the mechanical properties of the critical zone</i>
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A view of El Tatio in Chile visited during the international field excursion lead by Adam Simon. Photo by Peter Knoop

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Opposite Page: *Students on the Soft Rock Field Trip are seen discussing beach processes near Jacksonville, Florida. Photo by Peter Knoop*

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