

Spring 2015

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UNIVERSITY OF
MICHIGAN

GEOSCIENCE NEWS

For Alumni and Friends of the Department of Earth and Environmental Sciences





Dear Alumni and Friends,

I hope this, my first letter as Chair, finds you well. The last year has been a busy and successful one for the Department. Following recent trends, we continue to see our undergraduate program surge to new heights (currently 155 declared majors and 69 minors); our external research funding grow to greater levels; and our faculty and students receive recognition for their outstanding achievements.

The last year has also seen new and exciting developments. In an effort to enhance the employment opportunities for our students, we established a fifth-year MS program with the first class of six MS students enrolling in the Fall. The initial response to the program has been overwhelmingly positive. We engaged in new activities to enhance the diversity of our graduate student and faculty populations. This Fall we collaborated with the Rackham Graduate School and the Department of Astronomy to develop our first-annual Fall Preview Weekend—a two-day recruiting event aimed at introducing our graduate program to non-traditional students. We also entered a partnership with Michigan Technological University (MTU) to preserve, curate and exhibit the Department's mineral collection. Our mineral collection has a very rich history dating back to 1838 when the Regents of the University authorized the purchase of the Baron Lederer collection, which included specimens from around the world that are no longer actively mined. Over the next one hundred years, the mineral collection gained some notable specimens including those from Douglas Houghton's expedition to Michigan's Upper Peninsula. Unfortunately, in recent decades, the mineral collection had been largely locked up and neglected as the intellectual pursuits of the Department shifted from mineralogy. Our partnership with MTU will bring new life to this unique collection.

Among new developments, I am very pleased to announce that Selena Smith (see profile on p. 12) has joined our tenure-track faculty as an Assistant Professor. Selena has been at the University of Michigan since 2010, first as a Fellow of the Michigan Society (from 2010-2013) and then as an Assistant Research Scientist. Selena's appointment is shared with our Department and the Program in the Environment. Selena is a paleobotanist with interests in plant evolution and ecology through Earth's history. She is an expert in angiosperms and particularly monocots—flower-bearing plants that have a single leaf when they sprout from seed and include grasses, bananas, ginger, onions, and garlic—and what their evolution can tell us about past environments and ecosystems. Selena teaches classes in ethnobotany and terrestrial biomes. We're looking forward to watching her career blossom!

It is with mixed feelings that I report that Rob van der Voo has announced his retirement as of January 1, 2016. Rob joined the faculty as a Visiting Assistant Professor in 1970, the start of a brilliant career stretching forty-four years—eleven of them as Chair of the Department! Rob is one of our most distinguished faculty members. He is a fellow of numerous professional societies, the recipient of many awards, an Arthur F. Thurnau Professor, and the Frank H.T. Rhodes Professor of Geological Sciences. And, in 2014, Rob was awarded the European Geophysical Union's Petrus Peregrinus Medal for outstanding scientific contributions in the field of magnetism and paleomagnetism. The good news for us is that Rob won't be going anywhere but plans to join the company of our very active emeritus faculty. Plans are currently being made to celebrate Rob's career in the coming year.

Among other news, we are also very excited to be planning the second phase of the Camp Davis renovation—but need your help to make this happen. Camp Davis has grown in both course offerings and enrollment in recent years to the extent that its aging infrastructure is no longer able to meet the demand. This second phase of the renovation will include the demolition of the existing student cabins and bathhouses and



the construction of thirty new student cabins with bathrooms, insulation, and heat. (Additional information about the renovation can be found on our website.) The new cabins will allow a greater number of undergraduate students to experience Camp Davis by increasing our student capacity and extending our camp season to the late spring and fall. Due to high supply costs and new safety requirements, the price tag for the renovations is steep—\$4.5 million. We need your help to reach this goal.

COVER PAGE PHOTO

In closing, let me thank you for your continued support of the Department and encourage you to keep in touch. In my first semester as Chair, my greatest satisfaction has come from getting better acquainted with our alumni and supporters. It is truly gratifying to learn about the impact that the Department has had on the lives and careers of our alumni. We wish you all the very best for 2015!

Petr Yakovlev (PhD Cand) *sampling in the high plains of Tibet. His research is focused on reconstructing the uplift history of this region under the direction of Professors Niemi and Clark.*

Warmest regards,
Chris

The capital campaign "**VICTORS FOR MICHIGAN**" is going strong. Our alumni continue to contribute to the Department's endowments to help us sustain through times of economic hardships, and grow during times of economic stability. The vast majority of funds derived from these endowments directly aid both our graduate and undergraduate students through field experiences, research opportunity, and fellowship and scholarship support.

Our priorities include: Graduate and Undergraduate Scholarship Support (*page 4*); funds for Field Excursions (*page 8*); and funds for the Phase II Renovation of Camp Davis facilities (*page 16*).

**Help Keep
MICHIGAN STRONG**

Please consider giving to VICTORS FOR MICHIGAN

Geoscience News is compiled periodically for alumni and friends of the Department of Earth and Environmental Sciences at the University of Michigan, Ann Arbor, MI 48109-1005

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Victors for Michigan

Undergraduate Research Experiences and Scholarships

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://www.lsa.umich.edu/earth/alumnifriends/victorscampaign>

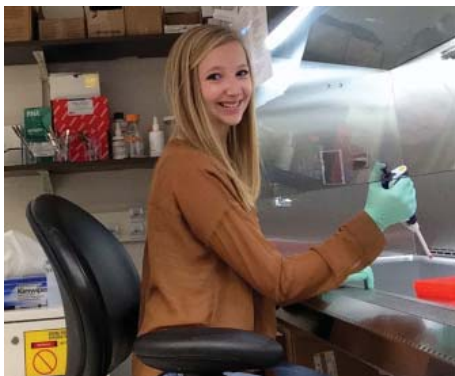
The undergraduate education received by students at Michigan sets the stage for their success in graduate studies and in their careers. Both the caliber and the numbers of our EARTH majors is increasing as is the need for scholarship support to aid the brightest and the most deserving. Similarly, laboratory and field experience is becoming more important to fully prepare them to be competitive in the academic and corporate realms. Here are a few examples of ongoing research projects being undertaken by some of our present undergraduates.

UNDERGRADUATE RESEARCH - VICTORS FOR MICHIGAN -



Allison Sharrar (BS'15) is working on a project in Dr. Greg Dick's Geomicrobiology Lab. Her project involves a primarily sulfur-oxidizing microbial community found in a fountain in Alpena, MI which draws water from an anoxic, sulfidic groundwater source. This same source feeds sinkholes in Lake Huron, causing them to be mostly anoxic. Using de novo techniques to assemble metagenomic data, she is comparing communities from the fountain and the aphotic sinkhole to determine the specific genes these bacteria use to oxidize sulfur and control other important metabolic properties. These anoxic sinkholes serve as analogs for the Precambrian world, where oxygen concentrations were much lower than today, and have the potential to shed light on the development of aerobic metabolisms.

Megan Wiltse (BS'15) is working in Sarah Aciego's laboratory to investigate loess/dust provenance. Loess deposits in the sedimentary record of the Late Paleozoic tropics are anomalous because Quaternary loess is commonly glaciogenic, and thus confined to mid-high latitudes. The only loess in the tropics today is associated with mountain glaciation. Given the icehouse conditions of the Late Paleozoic, tropical loess could perhaps reflect sourcing from glaciogenic weathering in the Central Pan-gaeen Mountains. Our goals are to constrain spatial and temporal variations in atmospheric "dustiness" and loess/dust provenance using Sm/Nd, Lu/Hf, and Rb/Sr isotope systems.



Danielle Boshers (BS'15) is working in Greg Dick's lab to investigate manganese oxidizing bacteria. The bacteria have been identified across a wide number of phylogenetic lineages in the bacteria domain, yet little is known about why bacteria oxidize Mn(II) to Mn(III or IV). She is studying a novel manganese oxidizer, *Agromyces* K9-3B with the goal to gain insight to the mechanism of Mn oxidation in this species. Lab work has included a variety of experiments to understand under which conditions Mn oxidation is promoted or inhibited. There is also a genome analysis portion, where metabolism and general features of the genome will be identified in addition to potential genes involved in manganese oxidation.



A

We share some images of students in the field from the last year.

A: Alyssa Abbey taking notes on the transgressive surface of Cambrian aged Munising Fm., Pictured Rocks. **B:** Forest Gilfoy and his parents Terri and Diane on the Marquette float copper. They cooked us dinner and provided great camping space at their home. **C:** Peng Ni and Sarah Walker on the outcrop just south of Marquette, MI. **D:** Food in the field is always an exciting event. Here at the McClain State Park near Houghton, MI, a grand meal of chicken and classic bean burritos fills even the hungriest of the students' stomachs.



B



C



D

VISIONS FROM THE PAST YEAR

Michigan's Upper Peninsula Summer Field Excursion 2014



Students are engaged in discussion about the evolution of lower Paleozoic clastic depositional environments exposed on an outcrop along Lake Superior at Pictured Rocks National Lakeshore.

With summer coming to a close, Adam Simon and Kacey Lohmann led a field trip to the Upper Peninsula of Michigan with key localities on the Keweenaw Peninsula in August 2014. It has been many years, with the departure of older faculty who had conducted research in this region, since students have had the opportunity to visit this historic and geologically fascinating area. Working out of Houghton, MI, the itinerary of the trip was busy and quite diverse.

Beginning with a visit to an active mining company at the old Empire Mine, we got an overview of the nature of copper mineralization and an opportunity to examine core recently taken for redeveloping the White Pine Mine area. With this introduction and regional perspective, students had an opportunity to collect copper-containing specimens from several gangue piles associated with long closed mines. From the surface, we then proceeded on tour of the Quincy Mine just outside of Houghton after a filling lunch of locally baked "Pasties."

Perhaps most revealing on this trip was the long day excursion up to Copper Harbor to visit classic localities replete with stromatolites, lacustrine carbonates, and alluvial fan deposits. These outcrop stops were augmented by a short subsurface exploration of the Delaware Mine, long closed but illustrative of the structural character of the ore deposits interbedded within Portage Lake volcanic flows and of the style of early mining operations. In addition to the spectacular geological features in this Proterozoic sequence, students were most impressed by the magnitude of human excavation associated with the century-old mining activity. Current exploration efforts are renewing this region to one of active mining operations.



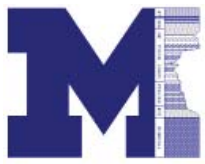
Describing the mechanisms of mechanical trapping of sediment by filamentous algae which form Stromatolites, Lohmann uses the "beard" analogy with David Levine.



Graduate Students Erin Lynch and Petr Yakolev recording details of the mineral occurrences present in samples of the Allouez Conglomerate exposed in the old mine rock piles.

Costs for this field experience were covered by a donation by Shell Oil Company, and also from the Field Excursion Fund which is supported by numerous generous donors. Thanks to all of you -- You make these educational events possible!!!





Victors for Michigan

National and International Field Excursions

VICTORS FOR MICHIGAN - FIELD EXCURSIONS

The experiences provided by the Department's annual field excursions represent the perfect integration of classroom-based instruction and the real world tasks of observation, documentation, and interpretation. Students at every level in their academic career have the option of participating on several of these trips during their tenure at Michigan. These represent an essential part of their maturation from student to geoscientist where field-based observations manifest into analytic solutions, and where interpretations derive from knowledge gained through on-campus lectures and laboratory training.



Heather Kirkpatrick and Megan Witse examine an outcrop at Jasper Knob of banded Iron formation near Ishpeming, MI



Jack Turan and Mary Gallagher examine Archean Intrusives and Metamorphic Rocks exposed near Marquette, MI during the recent "Yooper" trip.

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.

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://www.lsa.umich.edu/earth/alumnifriends/victorscampaign>

THE ALUMNI ADVISORY BOARD

Did you know that the Department of Earth and Environmental Sciences has an Alumni Advisory Board? The Board was initiated in 1982 by eight Department alumni and was chaired by John Greene (BA '63, MS '70). Since then over 50 alumni have volunteered their time to serve on the Board and attend its annual meeting which takes place in October. The Board members are selected to provide a balance of backgrounds with individuals from academics, government, non-profit sector and industry and typically serve a five year term. More information on the Board, including current members and past documents, can be found under the new Alumni Board link on the Department web page <http://lsa.umich.edu/earth> under *Alumni & Friends*.

The purpose of the Board is: 1) To provide a vehicle for enhancing communication among the Department alumni, faculty and students, 2) To advise the Department of developing economic and employment trends in government and industry, 3) To advise the Department on its research and instructional programs, 4) To assist the Department in the identification and solicitation of financial and other resources, and 5) To serve as an external advocate of the Department to the College and central university administrations.

The Board's 2014 Annual meeting was held on October 9-11 and 13 members attended. The Board's activities began on Thursday with a career panel (over 30 students attended) describing the various career paths taken by Board members after leaving Michigan. This was followed by a pizza dinner providing the opportunity for students to give their views about the Department. Friday was a full day meeting with presentations by the Department Chair and faculty to update the Board on the state of the Department. The Smith Lecture after the meeting is now dedicated to recognize Distinguished Alumni. This year's speaker was **Clarence "Tom" Tinker (BS'54, MS'55)** who spoke on his professional experiences and accomplishments, followed by a social gathering and dinner. Many of the Board members also attended a Saturday tailgate party and football game which brought back memories of student life in Ann Arbor!

This year's meeting was focused on the objectives of becoming a more active Board and communicating better with fellow Department Alumni. Towards that goal, the Board agreed to provide mentors for the new Master's Program, liaisons for student chapters of professional societies and this year the Board will focus Capital Campaign fund raising activities on Phase II of Camp Davis renovations. The Board also provided their views to the Department on the importance of ensuring the quality of undergraduate instruction as the number of majors continues to increase, provide guidance on what the new MS program requirements should be to best prepare students for industry jobs, and expressed continuing support for a new faculty position with a focus on sedimentology and stratigraphy. Discussions with students at the pizza dinner are also part of the Board's report and were generally positive especially with regards to interactions with faculty, field trips and the Smith lectures.

The Board would appreciate your help. If you do not get this newsletter via email, the Department does not have a current email address for you. Upcoming editions of a Spring newsletter will only be available electronically so please go to the Department website (Alumni & Friends, Profile Update) and update your information. If you are still in communication with friends from your years in the Department and they do not get the newsletter, please send their email addresses to Michigan-Earth@umich.edu. The Board is also in the planning stages for a 2015 Alumni reunion back at the Department this summer, so if we have your email you will be invited for a weekend of fun and stir up some old Ann Arbor summer memories.

Steve Henry (BS'73, MS' 78, PhD'81)

UPDATE YOUR ALUMNI PROFILE AND EMAIL

<http://www.lsa.umich.edu/earth/alumnifriends/profileupdate>

Clarence "TOM" Norman TINKER DISTINGUISHED ALUMNI AWARD 2014

Tom Tinker (BS'54, MS'55) is the second awardee of the Department's *Distinguished Alumni Award*. This award is given by the Department to recognize past and continuing contributions of our alumni to industry and the University. Though Tom considers himself to be "a very lucky man," we are the lucky ones; Tom is most deserving of this honor. Here are some excerpts from his lecture.

Lucky because, until I found Geology, I was barely making it through the University of Michigan. It took me two tries plus a summer school to even meet the foreign language requirement!

Lucky to even receive a BS degree because the 1954 Commencement was abandoned in a deluge when President Harlan Hatcher told us he was conferring all degrees "en masse" and to "go home, dry out and do good!"

Lucky to have been accepted by the Horace Rackham School of Graduate Studies only because Dr. Goddard and Dr. Briggs took a big chance and intervened on my behalf to pursue a Master's Degree in Geology.

Lucky because after four losses in a row, I finally got to see us beat Michigan State.

Lucky, above all, to have reconnected with Janice whom I had known since seventh grade, who had just graduated from Michigan State College and was teaching at Fordson High School in Dearborn.

All of this good fortune, which began here in Ann Arbor, resulted in a fulfilling professional career that spanned four decades, produced three children and nine grandchildren, and 20 years of satisfying retirement. Who could be luckier than that?



Tom Tinker (BS' 54 MS'55) receiving the award from Kacey Lohmann at the Gandy Dancer following his lecture to students and faculty.

Lucky perhaps, but Tom's history encompasses a long list of experiences that helped shape him and those fortunate to work as his associates. He began his profession with Shell Oil Company in Houston, where he continued his training in the details for petroleum exploration, production and reservoir engineering. While there, they turned him into a computational powerhouse with the issue of an advanced circular slide rule. Following this "learning" stage, he then entered the real business of finding and producing the good stuff. This took him to new places and exploration challenges, in southern Illinois, Denver, Oklahoma and finally New York where he was chosen to manage people rather than rigs as the new head of employee relations. Finally getting back to what he really loved, he worked on problem fields ranging from Montana, Utah and eventually to Michigan where new slant-hole drilling was coming to be. These final years in his career were very rewarding; in his work, he made "Michigan as good as it could be." Tom retired after 40 productive and exciting years in the business. Tom shared these thoughts for success that he has learned from his odyssey:

- 1) Be very careful how you communicate and use language.**
- 2) Be involved in your professional societies ("each of you is destined to be ... the Leaders and Best").**
- 3) Stay involved with your University - "Share your wealth and never forget it all started here!"**

FACULTY NEWS

Most of us look forward to the change of pace that summers bring, but May seemed especially sweet this past spring for **Dan Fisher (Professor)**, because it brought some respite from the weekly cycle of meetings on the new Varsity Drive Collection Facility and the Biological Sciences Building that loom in the future of the paleontology program. Dan and graduate students **Mike Cherney (PhD Cand)** and **Joe El Adli (PhD Cand)** took this opportunity to travel to Greece for the VIth International Conference on Mammoths and their Relatives, where they gave papers, announced the opening of the UMORF website (check out rotating, texture-mapped 3D skeletal models at <http://umorf.ummp.lsa.umich.edu>); UM-Geoalum **Adam Rountrey (PhD'09)** who also contributed to this effort, met with international colleagues, and wrapped it all up with a memorable field trip to the island of Tilos, home of some of the best-known Pleistocene dwarf elephants. Returning to Ann Arbor and regaining traction on summer projects, Mike Cherney launched into what we expect will be his final year of dissertation research on the life history and isotope ecology of weaning and later juvenile development in woolly mammoths, while Dan and Joe prepared for the field season in Siberia. With colleagues from the Northeast Federal University of Yakutsk, they made a foray into the middle and upper Kolyma River basin, in eastern Yakutia. This is an area that has not attracted much scientific field work, although it has figured in the ever-growing commercial mammoth ivory market. The trip involved weeks of travel in small boats, which ordinarily seem relatively safe. They learned, however, that this depends on who handles refueling. In a sequence of events that can only be summarized as an instance of life being "stranger than fiction," one of their compatriots managed to set their boat on fire, requiring them to jump overboard, after which the boat was swallowed by the conflagration and sank. They lost their backpacks and most of their field clothes but luckily escaped without injury. Tempering such (mis-)adventures, they saw incredible landscapes, experienced culinary and cultural differences that rival time travel, prepared previously collected material for export and analysis, and helped recover specimens that gave hints of a late Pleistocene mammoth ivory-working technology. However, it turned out that the contemporary ivory trade had intensified to the extent that prospects for scientific collecting are grim at best, at least in this region. They will no doubt return to Siberia, but it is ironic that the same economic forces that challenge the survival of African and Asian elephants are now threatening even the scientific study of their extinct relatives.

Carbonates and Chemistry still seem to fascinate **Kacey Lohmann (Professor)** as his research continues to keep him excited with the science and active with his



Kacey Lohmann in the Stable Isotope Laboratory sampling a scallop for analysis.

students. During the last several years, his Stable Isotope Laboratory has diversified into "mass-47 clumped isotope" thermometry to augment the more conventional techniques. This has brought opportunities for new graduate student and post-doctoral colleagues who truly comprise the research powerhouse in sedimentary geochemistry. This includes **Sierra Petersen**, a recent Harvard graduate, who is helping mentor **Kyle Meyer (PhD Cand)** and **Ian Winkelstern (PhD Cand)** in their dissertation projects. All is progressing exceptionally well...and we will keep you posted on results in the next GeoSciences Newsletter.

Youxue Zhang (Professor) enjoyed summer travel to China, participating in a conference and visiting Nanjing University (NJU) and University of Science and Technology of China (USTC) at the invitation of two former students, **Hejiu Hui (PhD'08)** and **Huaiwei Ni (PhD'09)**. Both hold prestigious professorships in the two universities: Hejiu in NJU since 2014, and Huaiwei in USTC since 2013. Although there was some issue with smog in some Chinese cities, Youxue was delighted and impressed to see that both Huaiwei and Hejiu and their families are doing so well in China. In a short year, Huaiwei has already set up a huge lab and recruited a large research group: both the lab and research group of Huaiwei at USTC are larger than Youxue's at Michigan! Hejiu is busy setting up his lab too. In USTC, Youxue also saw **Xuan Guo (PhD'13)**, who just received a prestigious postdoctoral fellowship from Chinese Academy of Sciences and was very happy. It's a good time to do science in China now!

New Faculty - SELENA SMITH

Plant Paleobiology
PhD 2007 - University of Alberta

My research centers on investigating the plant fossil record. The data we gather then inform a variety of questions about plant evolution, biodiversity through time, and reconstructing past environments. Plants are vital for our survival, providing services today such as food, medicine, clothing, shelter, and clean air and water, and have strong links to climate, the carbon cycle, and other geological processes, so understanding their history on long time scales is an important aspect of understanding the Earth-Life system as a whole.



I am primarily focused on investigating Cretaceous and Paleogene records. These time periods encompass some dramatic changes on our planet, including the Cretaceous origin and diversification of angiosperms (the flowering plants, the most abundant and diverse plant group today), the assembly of modern ecosystems, and the early Cenozoic hyperthermal climate events that can inform us of how life and complex processes function in past warm worlds. In studying plant fossils, I use a variety of approaches (see figure below), including identifying fossil plants through comparative morphoanatomy, using X-ray tomography (conventional and synchrotron-based), documenting the phytolith (microscopic silica bodies) record to reconstruct environments, and combining data from the fossil record with DNA data from modern relatives to reconstruct evolutionary histories; these often combine lab-based and field studies. Currently, I employ all of these approaches in an NSF-funded project to investigate when, where, and how the bananas and gingers (order Zingiberales) evolved, which is a major focus of my lab for the next couple of years. Other current projects include: a NSF-funded project on floristic diversity, biogeography, and evolution on an isolated Indian continent at the end of the

Cretaceous; terrestrial paleoenvironments along the Cretaceous Western Interior Seaway; taxonomic and ecological significance of leaf architecture in monocot flowering plants; morphological and ecological diversification and spread of pines (Pinaceae); and Evolution of sedges (Cyperaceae).

You can read more about my research group and what we're up to at my website: <http://sites.lsa.umich.edu/smith-lab/> or my lab's blog: <http://plantsrocklab.tumblr.com/>.

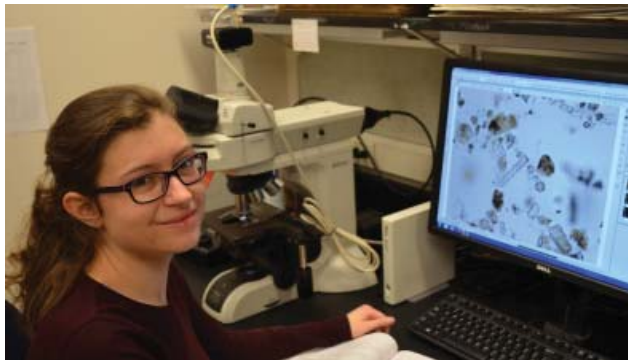


NEW FACULTY

Working with Undergraduate Researchers

Paleovegetation of Eocene Montana: *Symone Bawol BS'15*

Our ecosystems are being altered by climate change. One of the ways to study the impact of environmental changes, such as climate change, is to understand patterns of vegetative response. Within the fossil record are the results of millions of years of vegetative response to environmental changes that we can study. Currently, the response of vegetation to ecosystem variation at a small spatial scale (meters) is poorly understood, but is relevant to gain insights on broader patterns of vegetation variation. In order to approach these questions, I am studying fossil plant phytoliths from the Timberhills a locality in southwestern Montana that is dated to the middle Eocene (ca. 40 million years ago). Phytoliths, or plant biosilica, are readily preserved in fossil soils (paleosols). Plants naturally take up silica from their environment along with other elements, and deposit it within cells, with different phytolith shapes produced by different groups of plants. Thus it is possible to discern from a soil sample whether plants such as grasses (family Poaceae), gingers (order Zingiberales), palms (family Arecaceae), or woody dicots were present at the site, even millions of years in the past. Previous research at the Timberhills A site revealed vertical (i.e., temporal) variation in vegetation composition between different strata, but in this study I am examining spatial variation laterally within a paleosol. For each sample, I am counting the occurrences of the different phytoliths to reconstruct past vegetation. Preliminary data indicate changes from forested, closed-habitat vegetation to open, grass-dominated vegetation at relatively small spatial scales, which suggests that future studies of vegetation heterogeneity should include analysis of lateral variation for improved understanding of patterns of vegetation.



Symone Bawol working on phytolith identification

Understanding the Fossil Record of Gingers, Bananas, and Relatives

using Leaf Architecture: *Amanda Salvi BS'15*

Fossils provide a window into what the Earth was like millions of years ago. An important part of using fossils to understand the past is to correctly and precisely identify them, in order to understand evolutionary and ecological change over long time scales. With Dr. Selena Smith, I am working to find novel ways to identify fossils from a diverse group of flowering plants called the Zingiberales. Zingiberales include over 2500 economically and ecologically important species, including the commonly known gingers, bananas, and the beautiful bird-of-paradise flowers. Zingiberales fossils are found beginning in the Late Cretaceous period, and today grow in warm tropical climates like Central and South America, Africa, and Southeast Asia. I am looking at the leaves of living Zingiberales to evaluate and characterize leaf architecture, in order to find distinguishing characteristics among the eight families of Zingiberales. Understanding the extant leaves will help to interpret fossil leaves that form a good part of the Zingiberales fossil record. My results suggest that vein architecture and measured vein length per area (VLA) distinguish families of the order, and thus can be used to help identify Zingiberales fossils. For example, leaves of gingers have low VLAs and veins that form regularly spaced rectangular patterns, banana leaves have large VLAs and veins that create small square patterns, and leaves of the family Cannaceae have veins that create ladder-like patterns and a VLA between that of gingers and bananas. I am also examining features like the presence or absence of hairs on the leaf, the angle at which veins branch from the midrib, and architecture of stomata to further distinguish between families of Zingiberales. We can use these data to reinvestigate several fossils. Our preliminary results suggest the fossil *Canna flaccidifolia* does not actually belong in the family Cannaceae, as previously described; its low VLA and veins that form regularly spaced rectangular patterns suggest it may actually be a true ginger (Zingiberaceae) instead. Additionally, our findings are consistent with the placement of fossils called *Zingiberopsis* in the Zingiberaceae. This greater knowledge of the morphology of Zingiberales will allow us to more precisely identify the enigmatic leaf fossil record, so that we may better understand both their evolutionary history and their use in reconstructing past climates.



Amanda Salvi examining fossil Zingiberales

Penthouse Professors Emeriti

The Penthouse Professors, that quartet of eminent academics at the top of their game on the fifth floor of the C. C. Little Building, have been engaged in a wide variety of activities that fall both inside and outside the mainstream of Earth and environmental science.

Ted Moore is finishing up his work on the detailed record of the Eocene – Oligocene transition as recorded in the equatorial Eastern Pacific. One paper on productivity changes near this boundary has been published this year, and another on the detailed radiolarian stratigraphy of this interval is under review. Although one more cooperative paper comparing the impact of this major climate and oceanographic change on all the marine microfossil groups may be forthcoming, Ted has shifted his efforts to a land-based study that is proceeding in cooperation with Italian and Chinese colleagues. Its object is to date the youngest marine sediment at the suture between India and Asia in the Yarlung-Zangbo foreland basin and thus put an age constraint on the timing of collision. Although radiolarians in the marine shales are poorly preserved, thus far they seem to indicate an age of mid to late Paleocene. There are many more samples left to examine, so keep tuned for a progress report at a later date.

Steve Kesler joined Nick Arndt at Grenoble and Clément Ganino at Nice to write the second edition of “Resources Minérales: Nature, Origine et Exploitation”, a French language book on mineral deposits. The manuscript was delivered to Dunod, the publisher, on September 1, 2014. An expanded version in English, will be published by Elsevier and was submitted at the end of the year.

Phil Meyers participated in the IODP Workshop on Paleoceanography of the Brazilian Equatorial Margin that was convened in the coastal town of Mareasias, Brazil, in February. The purpose of this workshop was to generate proposals for scientific drilling of the equatorial Atlantic Ocean seafloor offshore of Brazil when the JOIDES Resolution is expected to be in this part of the world in 2017-2018. Phil’s particular interest in this region is to learn more about the paleocirculation of the Atlantic soon after

the separation of African and South America, which happened in the mid-Cretaceous. This interest is an outgrowth of his participation in ODP Leg 207 on the Demerara Rise some ten years ago. He also participated in the German IODP/ICDP Kolloquium that was held in March at Erlangen, Bavaria. This gathering is an annual event at which about two hundred German scientists and a handful of international invitees present and discuss the results of their studies of deep cores, mostly drilled from the sea floor and ancient lakes but also some from the continents. The Kolloquium also served as useful preparation for Phil’s participation in the proposal review panel for IODP Schwerpunkt Program review panel meeting held in May at the Deutsche Forschungsgemeinschaft offices in Berlin.

The year 2014 saw two of Phil’s long-running projects finally come to happy completion. In the spring, a compilation and interpretation of the Phanerozoic variations in the nitrogen isotope compositions of marine sediments that was assembled by (**Tom Algeo, PhD’89**) and now a professor at the University of Cincinnati, **Becky Robinson, PhD’01** and now an Associate Professor at the Graduate School of Oceanography at the University of Rhode Island, Phil, and a few others was published in *Biogeosciences*. The second long-term project, somewhat related to the nitrogen isotope paper, was to compile and to explain the curiously light organic carbon isotopic compositions of Phanerozoic black shales. It culminated in a paper that was published in the summer by Phil in *Geochemistry, Geophysics, Geosystems*.

A third project that was recently happily finished by Phil was his editing of a special issue of *Palaeogeography, Palaeoclimatology, Palaeoecology*



The Oldies but Goodies “Emeritus Professors” Henry Pollack, Steve Kesler, Ted Moore and Phil Meyers. (Photo: Dale Austin)

that showcases research being done in South America on climate changes since the last glacial maximum. Most of the 23 contributions were authored by South American scientists, which required Phil to do a fair amount of language editing in addition to the usual kinds of editorial duties guest editors take on. The special issue kept Phil pretty busy throughout 2014.

Henry Pollack continues to work with former Vice-President Al Gore's Climate Reality Project, which seeks to create awareness in ordinary citizens of the reality and costs of climate change. This program endeavors to train non-scientific volunteers to go out in their communities to talk about climate change, how humans are playing a big role in it, about the consequences both right now and in the future, and about how to mitigate and adapt to climate change. Over the past year Henry has been to Johannesburg, Chicago, and Rio de Janeiro to help with these trainings. He also was in New York in September, 2014 for the United Nations Climate Summit and the People's Climate March. The march was inspirational, peaceful, fun and HUGE – some 400,000 people made their way through the streets of Manhattan.

Another project in which Henry has been engaged is a multi-media installation about climate change. The production, a collaboration with two colleagues in the U-M School of Music, is titled *A World Without Ice*, taking its name from Henry's book. It is an audio/video production comprising a visual stream of polar and ice photos displayed on a huge curved screen, along with a recorded sound track composed especially for the installation. A third component is a row of snare drums, each with a dome of melting ice suspended above, and as each falling melt drop hits one of the drums it emits a sound. This random tattoo superposes on the visual stream and the ongoing musical composition. The whole thing stands unattended in a darkened room, and loops continuously. It lasts for about a half hour, and is a very meditative engagement with climate change. For a brief glimpse of the content go to:

http://www.lsa.umich.edu/lsa/i.musicandmeltingice_ci.detail

Another endeavor with which Henry has been associated is a full length film documentary called *PROJECT: ICE*. This film is about the role of ice in the history, culture and future of the Great Lakes of North America. It won an Award of Excellence in the

Canadian International Film Festival in Vancouver, and was selected for and featured at the Detroit Free Press Film Festival. It is making the rounds of other film festivals around the country and accruing laurels in many different venues. To see the trailer, go to

<http://projecticemovie.com/> or
<http://vimeo.com/59874619>.

The Penthouse Professors frequently gather for lunch on the fifth floor, where they address the major issues of the day in wide-ranging and spirited discussions and tell stories from days long past. If you are in the neighborhood, feel free to join them.

EARLE KAUFFMAN RECEIVES PALEONTOLOGICAL SOCIETY 2014 MEDAL

Emeritus Professor Erle Kauffman (BS'55, MS'56, PhD'61) was awarded the prestigious Paleontological Society 2014 Medal for his significant contributions to the advancement of knowledge in



Paleontology. Earle's contributions stem from his studies of Cretaceous stratigraphy and sedimentology while employing his expertise in paleontology. He began his work at Michigan under the direction of **Prof. Stumm (1947-69)** and soon focused on Cretaceous research while working with **Prof. Kesling (1949-85)**. From this,

he continued his PhD research under the watchful eye of **Prof. Dorr (1952-85)** as he extended his work into Middle and Upper Cretaceous units in Colorado which "truly cemented what was to become a passionate, career-long, love affair with the Cretaceous System and its Biotas".

"I record my deep indebtedness to the University of Michigan for all I learned there in my early years."

Excerpt from Earle Kauffman's acceptance speak which is available on the Indiana University website.

Camp Davis Gazette

The summer of 2014 again saw high demand for field-based Earth sciences courses at Camp Davis, with strong enrollments at both the lower-division and upper-division levels. In fact, the two courses that satisfy the field requirement for an undergraduate degree in the Department, Earth 440, Field Geology, and Earth 450, Environmental Sciences in the Rockies, both had wait lists for enrollment, and dozens of guest students from other universities were unable to find a spot in these courses because they were filled with our students. Given our current enrollment trends, we anticipate the number of students interested in Camp courses to increase for the foreseeable future.

One of the problems we will wrestle with as we increase the number of students at Camp each summer is how to accommodate this growth, both programmatically and within the constraints of our facilities. We expect to increase the number of upper-level field-based courses for our majors to as many as four over the next couple of summers, to provide field experiences for all of our students.

We have also begun addressing Camp infrastructure, increasing Internet capacity and wireless coverage to meet the needs of the digital age; renovating classrooms and upgrading electrical service; replacing kitchen equipment and refurbishing and re-pouring decades-old concrete floors. All of these changes improve the student experience at Camp Davis. However, as I noted in last year's Newsletter, student residence hall improvements remain the single biggest renovation need at Camp Davis.

While the existing student cabins have charm, memories, and are a historical link to the Camp's 85 summers of instruction, they have long surpassed their usable lives.

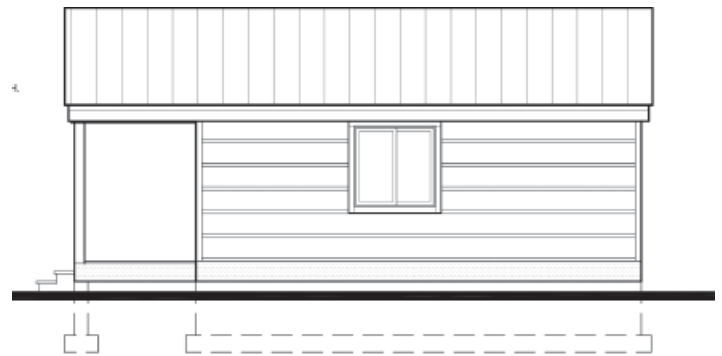
Grand Teton from Cody Bowl, Teton Range, Wyoming.

Through the years, heaters in the cabins have been forbidden by fire officials, the electrical and plumbing infrastructure are obsolete to the point where we can no longer perform maintenance on them, and the water and sewer supply lines are shallowly buried to the point where they put constraints on when Camp can open and close to avoid sub-freezing weather.

Renovating the student residences will alleviate all of the above issues, lower Camp operating costs, and lead to a much improved Camp environment (through installation of a modern septic system), and increased student safety and comfort.

For the past year, we have embarked on a detailed planning project for new student cabins at Camp Davis, considering carefully construction costs, long-term maintenance costs, building code requirements in Teton County, and the constraints placed on our development efforts by the

Exterior view of proposed student cabins. Cabins will be sided with cement-board and metal roofs, which have proven durable and low maintenance on our new cabins on the south side of Camp Davis.



Camp Davis Instructor Drones On and On...



Aerial view of the Twin Sisters at City of Rocks National Preserve, Idaho, from a GoPro camera mounted on a remote-controlled helicopter.

Sarah Aciego (Asst. Professor) took to new heights this summer at Camp Davis while teaching Earth 116, Introductory Earth Science in the Rocky Mountains. Prof. Aciego deployed lightweight GoPro video cameras as part of the course, fastening some of them to student hats and backpacks, and others to a lightweight, remote controlled helicopter. Footage from these cameras was downloaded and edited each evening by a graduate student “pilot” and videographer, and short videos of the previous day’s field work were then made available to students in the class. The videos let them virtually revisit field sites to remind themselves of what they had seen, or to check if they had performed experiments as they recalled. The aerial footage brought a new perspective to what they had seen from the ground, illuminating the geology of Hoback Canyon, the Lavender Hills and City of Rocks National Preserve, among other localities. Videos of the students, and the helicopter, in action are available on-line at: <http://goprouninthefield.wordpress.com/>.

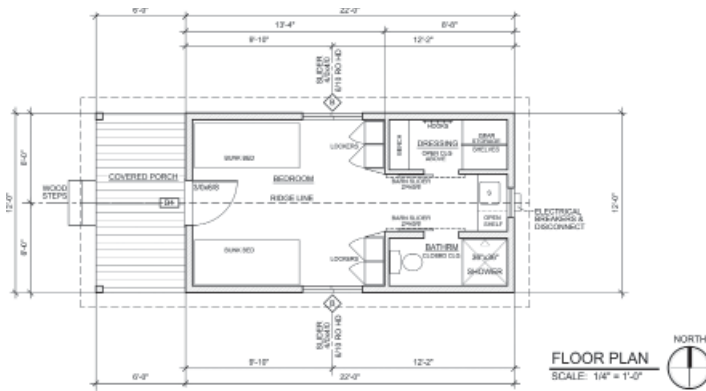
Camp Renovation Camp Scholarships and Need-Based Aid

Both our alumni and our corporate friends continue to provide financial assistance to students attending the summer field courses at Camp Davis. With the growth of our undergraduate program and the pressing needs for Camp renovation, we hope that you can provide the needed additional support to help us achieve our goals.

CONSIDER DESIGNATING YOUR GIFT TO THE CAMP DAVIS STRATEGIC FUND

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

<http://www.lsa.umich.edu/earth/alumnifriends/victorscampaign>



Proposed floor plan for new student cabins at Camp Davis. These cabins will each house four students, and will have areas for gear storage and personal belongings, along with restroom facilities.

Conditional Use permit we operate under from the City of Jackson. The project has involved the Camp Davis personnel, the College of Literature, Sciences and the Arts, and an architect from Hoback Junction who developed the plan for the first phase of renovations on the east side of Camp.

Architectural drawings of the working design are shown here, both exterior views (at left) and the floor plan (above). Thirty new cabins are envisioned to house up to three courses at Camp at a time. The design of the cabins will allow for full three-season use, so that we can extend the season at Camp, to accommodate our growing numbers, and opens the doors to new academic programs at Camp that we couldn’t have considered previously, such as a “semester abroad” in Wyoming.

The new cabins will be constructed with high efficiency insulation, electric heat, and en-suite restrooms. Combined with new infrastructure (water, sewer, septic, underground electrical, and fire lines), this is the most ambitious renovation and infrastructure improvement project that has been undertaken at Camp Davis. This is a project that is necessary to maintain the high standards of the academic program that the Department is committed to offering at Camp Davis every summer. The Phase I renovations on the east side of Camp was highly successful and resulted in dramatically improved living accommodations and has also reduced maintenance costs. Phase II renovation is an objective that we are sure we can accomplish, and one that is best for preservation and growth of Camp Davis. I fully expect that the students of the class of 2100 will attend Camp Davis and say: “Can you believe that these cabins have been here since 2015?”

I look forward to talking to many 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

Honors and Awards

Departmental Graduate Awards 2014-15



John Dorr Graduate Academic Achievement Award

2014	Jennifer Cotton
2015	Ethan Hyland
2015	Karthik Anantharaman

Outstanding Graduate Student Instructor Award

2014	Carli Arendt
2015	Petr Yakovlev

GeoClub Awards 2014-15

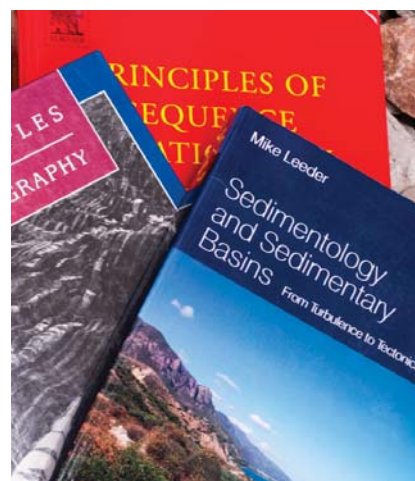
GeoClub continues its tradition of honoring students and faculty through teaching awards, and to help undergraduates defray the costs of textbooks and field equipment. The GeoClub is supported by the John and Jean Greene Student Activities Endowment and a grant from Shell Oil Company.

Best GSI Award

2014	Kate Turner
2015	Trever Hines

Best Professor Award

2014	Kyger C Lohmann
2015	Eric Hetland



Scholarships/Fellowships Fall 2014 - Winter 2015

Camp Davis Scholarships

BP Camp Davis Scholarship: K. Comastro, S. Vorva,
Shell Camp Davis Scholarship: W. Afonso, M. Begin, I. Birsanescu, D. Boshers, L. Conklin, J. Demars, D. Den Uyl, N. Diroff, H. Fudge, T. Fuentes-Afflick, M. Gladys, F. Gilfoy, K. Grace, J. Hicks, H. Kirkpatrick, P. Hoerschner, S. Kriss, T. Kwapisz, P. Lau, R. Liebschutz, V. Liendo, A. Loiacano, A. Marquez, J. McHugh, J. Miller, A. Rapaport, D. Rodriguez, R. Sheerin, C. Shoffner, A. Simon, M. Taylor, R. Thorpe, R. Veresh, T. Walker
Kornfield Family Camp Davis Fund: A. Birkbeck, S. Fasel, L. Ford
Judith H. Turneure Memorial Student Aid: G. Carbeck, T. Clay, T. Clay, E. Eberhard, K. Finnegan, K. Graves, K. Laudicina, S. Marshall, J. Ye.

Graduate Fellowships

British Petroleum Fellowship: V. Syverson
Chevron Fellowship: S. West
Denning Fellowship: S. West
Joseph and Anna Drobeck Trust: A. Abbey
W.H. Hobbs Fellowship in Geology: S. Aarons, M. Robbins
Susan M. Kruger Scholarship Fund: E. Lynch, A. Tye
Russell C. Hussey Scholarship: M. Robbins, V. Syverson
Ernest A. Novak Scholarship Fund: A. Abbey, M. Calogero, S. Grim, J. Jolles, Y. Niu, S. Taylor, K. Lowe
Henry N. Pollack Graduate Fellowship: A. Abbey, R. Fiorella, K. Rico, S. Washburn, S. West
Shell Oil Company Fellowship: K. Purens, J. Swanka
Chester B. Slawson Memorial Fund: W. Bender, Z. Li, S. Taylor, Y. Kim
F. S. Turneure Fund In Geology: A.
Stewart R. Wallace Fellowship: J. Frominos, D. Lowry, T. Smiley, M. Taylor, S. West
Violeta Pena y Lillo Scholarship: K. Lowe

Departmental Undergraduate Awards 2014-15

The Department recognizes its undergraduates with four awards each year. The *Academic Excellence Award* recognizes a senior for academic achievement. The *Camp Davis Field Geologist Award* is given to the student with the strongest performance in the EARTH 440 Geology Field Course. The *Singer Award for Academic Excellence in Geology* is awarded annually to a student of junior standing who has demonstrated the highest level of academic achievement in their class. The *Alumni Undergraduate Award* is given to a student who has made outstanding contributions to the Department through spirit and service.

Academic Excellence Award

2014	Andrea Davila
2014	Madeline Dibble
2014	Chris Whalen
2015	Allison Sharrar

Eugene an Elizabeth Singer Award

2014	Kevin Roback
2014	Alex Thompson
2015	Jesse Fenno

Alumni Undergraduate Award

2014	Anna Clinger
2015	Aaron Kurz

Camp Davis Field Geologist Award

2014	Chris Whalen
2015	Ryan Gabelman



JAMES LEE WILSON AWARD SEDIMENTARY GEOLOGY

Nathan Sheldon (Assoc. Professor) received SEPM's James Lee Wilson award in recognition of excellence in sedimentary geology by an early career scientist. This is a great honor and speaks to the continuation of the Department's efforts to strengthen the areas of sedimentary process, stratigraphy and sedimentology. Given the contributions that James Lee Wilson made to the Department during his tenure at Michigan, this award is particularly heartfelt.

NATIONAL GEOGRAPHIC YOUNG EXPLORERS AWARD

Allyson Tessin (PhD Cand) received a *National Geographic Young Explorer Award*. The award is for her research on carbon burial in the Western Interior Seaway and will fund fieldwork in Canada. This is a very competitive award with only about 20 given out per year in all fields of science and outreach. Congratulations!

SOCIETY OF VERTEBRATE PALEONTOLOGY

Catherine Badgley (Research Scientist) received the Joseph T. Gregory Award for "outstanding service to the welfare of the Society of Vertebrate Paleontology".

Jerry Smith (Emeritus Professor) received the honorary Member Award in recognition of his "distinguished contributions to the discipline of Vertebrate Paleontology".

GEOLOGICAL SOCIETY OF AMERICA Fellow of the Society

Nathan Niemi (Assoc. Professor) was elected as a Fellow in the Geological Society of America.

Research Grant Recipients 2014

Molly Blakowski, Mark Robbins, Meghan Taylor and Allyson Tessin (current graduate students) received research grants from the Geological Society of America.

Anna Clinger, a student concurrently enrolled in the MS graduate and BS undergraduate programs, received a research grant from the North-Central Section of the Geological Society of America.

ALUMNI NEWS

Susan Beck (PhD'87) was elected a Fellow of the American Geophysical Union, and will present the Gutenberg Lecture at the 2014 Fall AGU Meeting.

Steven Bohlen (PhD'79) has been appointed supervisor of the California Department of Conservation Division of Oil, Gas and Geothermal Resources. Steve has been program director at the Lawrence Livermore National Laboratory since 2013, where he was deputy program director from 2011 to 2013. He was a research professor and interim director of the Integrated Ocean Drilling Program at Texas A&M University from 2008 to 2010, chief executive officer at Joint Oceanographic Institutions from 2000 to 2008, and a consulting professor at Stanford University from 1995 to 1999. Previously he held multiple positions at the U.S. Geological Survey from 1988 to 2000, including associate chief geologist and research geologist. Steve will be on loan to the State of California from the Lawrence Livermore National Laboratory.

Bruce Clark (Faculty 1968-77) was elected Treasurer of the Geological Society of America.

After struggling financially to pay for her final required credits (she wanted to pay her own way through college), **Stephanie Davis (BS'14)** graduated and found a great



starting job at Neset Consulting in Tioga, North Dakota. She keeps "her eyes on the bit" during drilling operations. And congratulations!!! Shown here is her fiancée who graduated from UM School of Education in 2012.

Larry Edwards (MS'86) is currently the 3rd most cited Earth scientist worldwide for the past decade. He has ~7700 citations of papers published in this time period. Larry was highlighted in January 2013 issue of Smithsonian Magazine for his work on paleoclimatic reconstructions from carbonates in caves. Larry, the Robert D. and Carol C. Gunn Professor at the University of Minnesota, was also elected a Geochemical Society Fellow in 2014.

Jeanne Harris (MS'75), co-owner of G&H Petroleum in Denver with husband Robert, was awarded the first Professional Excellence in Industry by the Association for Women Geoscientists. Jeanne was a founding member of the national AWG, president of the Denver branch, National Vice-President, and President of the AWG Foundation.

Suzanne Hurter (PhD'92) is the University Projects Coordinator/Manager for BG Group (former British Gas) as part of a technology development team based in Brisbane, Australia. One of her major tasks is to intensify collaboration between Australian and Brazilian universities. The Brazilian government stipulates that 1% of the gross oil/gas revenue from hydrocarbon fields of a certain size have to be spent on R&D in Brazil or used to send Brazilian students and post-docs overseas (Science without Borders program). Brazil's ambition is to send one hundred thousand students overseas in the next 4 years, and Suzanne coordinates this activity in Australia.

Cheryl Peyser (MS'06) received a Chevron Student Scholarship at the University of Arizona

Icaro Vitorello (PhD'78) has been elected to the National Academy of Sciences in Brazil.

Lowell Waite (BS'79) remains active in the oil business, currently with Pioneer Natural Resources, where he is working on the Eagle Ford exploration and in the Permian Basin. In addition to his commitment and skills in the petroleum profession, he is developing his other talents. Lowell has a really great band -- RO-65. Check them out on iTunes as their music is spectacular. Albums include *True*, *Getaway*, and *Heading West*. To get a taste of their music style and variety, visit their site -- www.ro65music.com

Shije Zhong (PhD'95) was elected a Fellow of the American Geophysical Union.

TRANSITIONS

PHILLIP GINGERICH RETIRES IN 2015



Phil Gingerich (Professor) retired this year after nearly 40 years at the University of Michigan as a valued colleague of the Department and of the Museum of Paleontology. His professional contributions to the University and scientific community have been recognized through his many awards and honors which include: Fellow of the Paleontological Society; Fellow of the Geological Society of America; Fellow of the American Association for the Advancement of Science; the Schuchert Award and Presidency (Paleontological Society); Henry Russell Award, Distinguished Faculty Achievement Award, Ermine Cowles Case Collegiate Professorship (University of Michigan); Romer-Simpson Medal (Society of Vertebrate Paleontology); and innumerable honorary memberships in national and international societies.

His devotion to the study of mammals is unsurpassed, where few have exhibited such care in the collection and curation of new specimens, exacting analysis and interpretations, and prolific publications of his results. Perhaps more significantly, Phil will be most appreciated for his enduring support of the many graduate students whose futures derive from his dedicated mentoring and sharing of his scientific vision. The Department, The University, The Scientific Community all recognize the legacy that he has created and will miss his contributions.

Brett Baker (PhD'14), who completed his dissertation under the direction of Prof. Greg Dick, recently joined the faculty in a tenure-track Assistant Professor position at the University of Texas at Austin Marine Science Institute.

Ethan Hyland (PhD'14) was named to a competitive post-doc position in the "Future of Ice" initiative at the University of Washington. He will work with faculty in the Earth and Space Sciences and the Burke Museum on studies of Eocene polar climate.



IN MEMORIAM

David E. Willis (PhD'50), passed on 2 February 2014, at the age of 87. Dave was a long-time faculty member at the University of Wisconsin – Milwaukee as a Professor of Geophysics where remained as an Emeritus Professor. In addition to his contributions to education, he had a productive career in the military and petroleum industry.



Generous Supporters of the Department 2010-2014

*The Department would like to acknowledge the generous corporate, foundation, and individual gifts it has received over the last three fiscal years (July 1, 2010 – June 30, 2014). These gifts are invaluable in supporting our graduate and undergraduate programs, our education and outreach efforts, and for attracting and retaining the highest quality faculty and staff. To all those that have given -- **Victors for Michigan --THANK YOU AND GO BLUE!***

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Dr. Liane Sher and Mr. Mitchell K. Freedman
Dr. Philip D. Gingerich and Dr. Bennett H. Smith
Mr. and Ms. Patrick A. Smith
Mr. Donald L. Sprague and Ms. Donna Wisnyi
Dr. Andrea M. Stancin
Dr. Edward C. Stoever Jr.
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Mr. and Mrs. John M. Sweet
Mr. and Mrs. Derek B. Tatlock
Mrs. Alice S. Teachout
Mr. and Mrs. C. N. (Tom) Tinker
Mr. Robert Traill Jr.
Dr. John H. Tyler
Ms. Kelly K. Umlauf
Dr. and Ms. John W. Valley
Prof. Emer. Kenneth J. Van Dellen
Professor and Mrs. Rob Van Der Voo
Professor Peter E. van Keken and Ms. M. Colleen Currie
Mr. Kevan K. Vander Wahl
Dr. Edmond H. Vanhees
Dr. and Mrs. Richard W. Vian
Mr. and Mrs. Lowell E. Waite
Dr. Stewart R. Wallace*
Mr. Matthew S. Wasson
Dr. Stuart A. Weinstein
Mrs. LeeAnne Wolanyk
Mr. and Mrs. George L. Worden
Ms. Sara Worsham
Dr. Richard V. Wyman
Dr. Weixin Xu
Mr. and Mrs. Donald M. Zdeba
Mr. William G. Zempolich
Professor Youxue Zhang and Dr. Zhengjiu Xu
Dr. Shijie Zhong
Mr. Weiming Zhou
Mr. Carl L. Zimmerman
Ms. Jessica A. Zinger

*deceased

Recent Bachelors Degree Candidates

Majors

Walter Afonso	<i>Geological Sciences BS</i>
Carli Balogh	<i>Earth & Environmental Sci BS</i>
Lauren Banish	<i>Earth & Environmental Sci BS</i>
Michael Begin	<i>Earth & Environmental Sci BS</i>
Molly Blakowski	<i>Geological Sciences BS</i>
Jillian Cellini	<i>Earth System Science Honors</i>
Peter Chutcharavan	<i>Geological Sciences BS Honors</i>
Peter Cook	<i>Earth & Environmental Sci BS</i>
Andrea Davila	<i>Earth & Environmental Sci BS Honors</i>
Madeline Dibble	<i>Earth & Environmental Sci BS Honors</i>
Kess Emekpe	<i>Earth & Environmental Sci BS</i>
Evan Everson	<i>Earth & Environmental Sci BS</i>
Caleb Fogel	<i>Geological Sciences BS</i>
Jonathan Garrett	<i>Earth & Environmental Sci BS</i>
Kyle Grace	<i>Earth & Environmental Sci BS</i>
Emerson Hendry	<i>Earth & Environmental Sci BS</i>
Krista Hoffman	<i>Earth & Environmental Sci BS</i>
Jordan Hood	<i>Earth & Environmental Sci BS</i>
David Hunt	<i>Earth & Environmental Sci BS Honors</i>
Maya Ilyashov	<i>Earth & Environmental Sci BS</i>
Benjamin Jackson	<i>Earth & Environmental Sci BS</i>
Bradley James	<i>Earth & Environmental Sci BS</i>
Matthew Karl	<i>Earth & Environmental Sci BS</i>
Kathryn Kelley	<i>Earth & Environmental Sci BS</i>
Kaitlin Ma	<i>Earth & Environmental Sci BS</i>
Raymond Mahaffy	<i>Earth & Environmental Sci BS</i>
Caitlin Meadows	<i>Earth & Environmental Sci BS Honors</i>
Chelsea Mervenne	<i>Earth & Environmental Sci BS</i>
Tess Nugent	<i>Geological Sciences BS</i>
Rachel Palmer	<i>Earth & Environmental Sci BS</i>
Sara Rivera	<i>Geological Sciences BS</i>
Roderick Sheerin II	<i>Earth & Environmental Sci BS</i>
Chari Singleton	<i>Earth & Environmental Sci BS</i>
Alexandra Skrivanek	<i>Earth & Environmental Sci BS</i>
Patrick Temple	<i>Earth & Environmental Sci BS</i>
Sarah Townsend	<i>Earth & Environmental Sci BS</i>
Michelle Tracy	<i>Earth & Environmental Sci BS</i>
Catherine Vatsis	<i>Geological Sciences BS</i>
Renee Veresh	<i>Earth & Environmental Sci BS</i>
Jennifer Von Voigtlander	<i>Earth & Environmental Sci BS</i>
Timothy Walker	<i>Earth & Environmental Sci BS</i>
Christopher Whalen	<i>Geological Sciences BS Honors</i>

Recent Doctoral Dissertations

Karthik Anantharaman	<i>Geomicrobiology of hydrothermal plumes: Elucidating the role of microorganisms in deep ocean carbon and sulfur biogeochemical cycles</i>
Brett Baker	<i>Harnessing Omic Approaches to Understand how Carbon, Nitrogen, and Sulfur Cycling are Partitioned in Deep Sea and Sediment Microbial Communities</i>
Will Defliese	<i>Development of the Mass-47 Clumped Isotope Paleothermometer: Methods, Theory, and Application to Climate and Diagenetic Reconstructions</i>
Ethan Hyland	<i>Multiproxy terrestrial records of climatic and ecological change during the Early Eocene Climatic Optimum</i>
Lorena Medina Luna	<i>Constraints on Crustal Stress from Coseismic Slip Models and Focal Mechanisms</i>
Kristopher Puren	<i>The Fossil Record of Comatulid Crinoids: Methods and Results for Coping with the Extremely Imperfect</i>
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>
Valery Syverson	<i>Predation, Resistance, and Ecological Excalation in Sessile Crinoids</i>
Elizabeth Tanis	<i>Constraints on the ability of Cl- and F- bearing aqueous fluids to dissolve and transport trace elements (Y,Nb, Zr) in subduction zone environments</i>
Megan Wagner	<i>Silver as a Novel Tracer for Late Quaternary Southern Ocean Biological and Geophysical Processes</i>
Laura Waters	<i>The Effect of Degassing of H₂O on Crystallization and Oxidation in Highly-Evolved Magmas: Implications of the Origin of Rhyolites</i>
Alexander Voorhies	<i>Investigation of Microbial Interactions and Ecosystem Dynamics in a Low O₂ Cyanobacterial Mat</i>

Recent Masters Theses

Carli Arendt	<i>Sequential Separation of Uranium, Hafnium and Neodymium from Natural Waters Concentrated by Iron Coprecipitation</i>
Sang Chen	<i>A High-resolution Speleothem Record of Western Equatorial Pacific Rainfall: Implications for Holocene ENSO Evolution</i>
Patrick Donovan	<i>An Isotopic Record of Mercury in San Francisco Bay Sediment</i>
Joseph Friedmann	<i>Fracking: Formulation of Appropriate State Regulation Of Waste Disposal</i>
Vera Hehn	<i>Uplift and Subsidence at the Long Valley Caldera and Casa Diablo Geothermal Power Plant, California</i>
Zhangyi Hu	<i>The Effects of Differentiated Heat Production and Transition Zone on the Stability of Deep Dense Pools at the Core-Mantle Boundary</i>
Daniel Lowry	<i>Thresholds for Paleozoic Ice Sheet Initiation</i>
Emile Moacdieh	<i>Patterns in Sauropod (Dinosauria) Cervical Centrum Length Variation</i>
Katlyn Turner	<i>High-Pressure Response of Uranyl Nano-cages</i>
Tao Wen	<i>Constraining Groundwater Flow in the Glacial Drift and Saginaw Aquifers in the Michigan Basin through Helium Concentrations and Isotopic Ratios</i>
Susan West	<i>Investigating the Effects of Recorded Ground Motion Noise on Source Parameter Solutions using Bayesian/Monte Carlo Techniques</i>

Corporate Connections



AMERICAN ASSOCIATION OF PETROLEUM GEOLOGISTS LONDON, ONTARIO 2014

In 2014, we initiated a new student chapter of the American Association of Petroleum Geologists (AAPG) at UM. The efforts were led by several enthusiastic undergraduate students (Peter Cook, Alex Wong, Forrest Gilfoy) and faculty member Adam Simon. We hope to use the student chapter as a vehicle to increase awareness of career opportunities, to connect our students with our vast alumni network, and to invite alumni to campus each year to participate in seminars and short courses aimed at fostering development of industry specific skills for our students. In September, the department sponsored a group of students to attend the AAPG Eastern Section meeting in London, Ontario where they spent several days absorbing science and networking.

The Michigan AAPG 2014 Crew. As our undergraduate majors expand, and the Department's commitment to industry is rekindled, student interest in pursuing careers in the petroleum industry has dramatically increased.

PROSPECTORS & DEVELOPERS ASSOCIATION OF CANADA TORONTO, ONTARIO 2014



The undergraduate student attendees at the PDAC meeting. Learning the ropes about mining and prospect development.

An impressive cadre of undergraduate majors and Associate Professor Adam Simon attended the Prospectors and Developers Association of Canada (PDAC) meeting in Toronto from March 2 to 5. This conference attracts annually over 30,000 attendees from the industry, academia and numerous government agencies, all of whom are involved in some stage of exploration and production of natural resources demanded by society. The students participated in several student - industry networking events and also attended talks that covered a range of topics, from working with indigenous communities in emerging economies, to the economic viability of mining in central Asia. Simon hopes to make this an annual event for interested students. We plan to capitalize on the growing interest in mineral resources and initiate in 2015 a student chapter of the Society of Economic Geology.

Back Cover Caption: The Michigan Spirit Prevails: Students during 2013 Field Excursion to the Permian Reef Complex, West Texas.



While in Marquette, MI students embraced the “Largest Float Copper” found in Michigan.”

Chair: Chris Poulsen

Faculty: S. Aciego, B. Arbic, J. Bassis, T. Baumiller, U. Becker, J. Blum, R. Burnham, G. Burton, M. Carroll, C. Castro, L. Cathles, M. Clark, R. Cory, G. Dick, D. Fisher, M. Flanner, I. Hendy, E. Hetland, R. Lange, J. Li, K.C Lohmann, N. Niemi, J. Ritsema, L. Ruff, N. Sheldon, A. Simon, S. Smith, A. Steiner, B. van der Pluijm, R. Van der Voo, P. van Keken, J. Wilson, Y. Zhang.

Visiting Faculty, Research Faculty and Postdoctoral Fellows: J. Alt, J. Amalberti, J. Ansong, K. Aramugam, A. Arribas, C. Badgley, J. Benedict, C. Chaves, J. Demers, A. Ferot, A. Fiege, S. Gallen, J. Geissman, T. Giachetti, J. Gleason, C. Hall, S. Huang, D. Jiang, B. Kennedy, L. Kinsman, K. Meyer, A. O’Rourke, S. Petersen, C. Skinner, F. Zhang.

Lecturers and Adjunct Faculty: M. Arnaboldi.

Emeritus Faculty: C. W. Beck, R. Ewing, P. Gingerich, W. C. Kelly, S. E. Kesler, P. A. Meyers, T. C. Moore, S. B. Mukasa, J. R. O’Neil, S. I. Outcalt, R. M. Owen, D. R. Peacor, H. N. Pollack, D. K. Rea, G. R. Smith, J. C. G. Walker, L. M. Walter, B. H. Wilkinson.

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GIVE Generously to help define the future of Michigan

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