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Geosciences Newsletter - 2016

Department of Geosciences

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Welcome to the 2016 Issue of Newsletter

The Department of Geosciences’ newsletter is published annually and distributed to alumni, emeriti and friends of the department. It is also available online at http://wmich.edu/geology and http://wmich.edu/geology/about/news
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Dear Friends and Alumni,

Over the past year, the faculty, staff and students of the Department of Geosciences have continued to deliver on all fronts, including research, education and outreach activities. We are particularly excited about hiring Dr. Matt Reeves, who joined us in July of 2016. Dr. Reeves is an experienced hydrogeologist who comes to us from the University of Alaska at Anchorage where he served as an associate professor. He received his Ph.D. in 2006 from the University of Nevada and served in the Division of Hydrologic Sciences of the Desert Research Institute as an associate research professor. His research interests are diverse and include both theoretical and practical investigations in fluid flow, heat and solute transport in various media with an emphasis on fractured systems. Dr. Reeves wears many hats: he is an aggressive researcher, as attested by his strong publication and funding record, and an experienced educator who has taught a wide range of courses. These courses include entry-level environmental courses, such as environmental geology and environmental methods, and lower- and upper-level hydrogeology courses, such as contaminant transport in groundwater and groundwater hydrology. His strong theoretical and applied background makes him the ideal candidate to lead our efforts to further develop our certificate program in applied hydrogeology and expand and refine our Hydrogeology Field Course that will now be offered twice, starting in the summer of 2017.

These two initiatives—the certificate program in applied hydrogeology and the expansion of the Hydrogeology Field Course—build on, and take advantage of, our existing Hydrogeology Field Course, which is the longest-running and most successful one of its kind in the nation. The students who attend the six-credit Hydrogeology Field course can, by enrolling in three additional online courses, earn the hydrogeology certificate. The offering of the Hydrogeology Field Course twice, instead of once a year, came as a response to an increasing demand. Over the past few years, all spots for our Hydrogeology Field Course were filled in just a few days, leaving behind many unhappy applicants. Starting in fall of 2016, the certificate will be offered at the graduate level, and we are working on offering it at the undergraduate level as well. We are also exploring possibilities for developing yet another Hydrogeology Field Course in Florida. Western has recently announced an alliance with Florida Southwestern State College that will allow WMU to offer several high-profile academic programs at FSW’s Charlotte County campus. High on the FSW’s priority list is the development of a Hydrogeology Field Course similar to the one offered in Kalamazoo.

The certificates and Hydrogeology Field Courses are not the only new programmatic initiatives that we are engaged in, however. An accelerated BS/MA program is also newly in place and was offered for the first time in fall of 2016. This program is the only one of its kind offered by any of Michigan’s geology departments; our undergraduates now have the opportunity to earn both a BS and an MA degree in record time: five years from start to finish!

Geosciences remain the only STEM unit on campus that is ranked by the US News. In the last year, our researchers secured over $500,000 in grants from federal, state and local funding agencies—the third largest research fund dollar amount collected by the 27 units of the College of Arts and Sciences! In just the first three months of the 2016-17 fiscal year, we earned approximately $1 million more. Half of these funds ($500,000) came from the State to support research projects aimed at assessing and developing Michigan’s natural resources. The State funding attests to the available expertise in Department of Geosciences and the Michigan Geological Survey; it is also an acknowledgement of the pivotal role that we are now poised to play in developing Michigan’s natural resources. The remaining funds came from federal, national and local agencies such as NASA, the National Academy of Sciences, the Department of Energy and the USGS. One of the main beneficiaries of the ongoing research activities and funding opportunities in the Department are our students. These funding activities offer unprecedented training and preparation opportunities for our students as they compete for academic, industry or governmental jobs. Moreover, it pays their way to collect their field data, present their work in national meetings and publish their findings.

The Department of Geosciences continues our efforts to improve the workspace environment for our students. Four of the six lab facilities in Rood Hall were renovated over the past five years, and plans are underway to renovate the remaining two labs by 2018.
We all realize the educational and outreach value of the Schmeltz Geology Museum and the Duncan Collection. The Geosciences Advisory Council, the College of Arts and Sciences and the Department of Geosciences are teaming together to give the Museum and the Collection a new look and make it more instructive and attractive. To this end, a committee is being assembled to oversee the project. Professional designs were completed, and a comprehensive three-stage plan was developed to renovate the Museum, the Collection and the entrance to Rood Hall. The projected expenses for the renovation are $400,000; the committee will be assisting with the fundraising.

The members of the Earth Sciences Remote Sensing facility (ESRS), now eight PhD students, a computer scientist, and a postdoc were quite productive. They published four articles in GSA Bulletin, Earth Science Reviews, Surveys in Geophysics, and IEE. In the GSA annual meeting in Denver, they had two oral presentations and one poster and in the AGU annual meeting in San Francisco, they had three oral presentations and five posters. Mr. Abotalib Farag, one of ESRS graduate students, earned his PhD and will start a post-doctoral appointment in the University of Southern California in spring of 2017 and Dr. Adam Milewski, alumnus of the ESRS, was tenured in the University of Georgia Department of Geology.

The funding for ESRS is healthy: the ESRS continues to be represented on the NASA Science team for the GRACE mission and we were awarded a three year grant from the National Academy of Sciences to investigate the hydrologic setting and groundwater potential of the Nubian Aquifer, and we continue to collaborate with the Saudi Geological Survey on projects of mutual interest. Members of the ESRS team are currently engaged in a wide range of environmental and hydrologic projects worldwide. Mustafa Emil is investigating the paleoclimate of the Arabian Peninsula and the nature of the Pleistocene wet climatic periods; Esayas Gabremichael is assessing the subsidence in the Nile Delta, the controlling factors, and the projected encroachment of sea water; Sita Karki is developing a remote sensing-based early warning system for landslides in southwest Saudi Arabia; Abdullah Osman is applying radar interferometric techniques to assess the natural and anthropogenic factors causing subsidence in northern and central Arabia; Hannah Pankratz is investigating the deformation associated with salt domes in southwest Arabia, and Karem Fatty is using GRACE and geophysical data to assess the response of aquifers in wet and dry periods. The team will be starting a new initiative in southwest Florida to assess the temporal and spatial distribution of algal blooms and to investigate the factors controlling their propagation.

I am honored to be a part of this coherent and cohesive Department. It is only through the collective efforts of the faculty (present and past), staff, students and those dedicated members of the Geosciences Advisory Council that the Department of Geosciences is able to continue to deliver on all fronts. We all work hard under difficult conditions to make this Department the flagship of the College of Arts and Sciences, which is under new leadership. Our new dean, Dr. Carla Koretsky has been, and will continue to be one of the Department of Geosciences’ most distinguished professors. She brings energy, dedication and innovation to the College. I had the pleasure of interacting with Dr. Koretsky for many years before she accepted the position of the Associate Dean of the Lee Honors College in 2013, and I would like to believe that being a part of the Geosciences family helped her acquire many of her wonderful traits and skills.

I am looking forward to meeting you all at our spring banquet on April 21, 2017. Our spring banquets provide valuable opportunities to celebrate our students’ achievements, connect with our alumni, emeriti and donors to discuss our plans for the upcoming years and get your feedback. Furthermore, your success stories inspire and instruct our students. Nothing would please us more than seeing you here with this spring. Please mark your calendars!

Dr. Sultan, with his student and a colleague from Saudi Geological Survey, taking water samples in remote part of Saudi Arabia
2016
Faculty & Staff
Dave Barnes is a Professor of Geosciences at Western Michigan University in Kalamazoo, MI. He has specialized in Applied Sedimentary Geology since joining the faculty at WMU in 1986, and the 2015-16 academic year is Barnes’ 30th at Western. He spent most of his early professional life in coastal California, where he earned the B.S. (San Francisco State University, 1974) and PhD (University of California Santa Barbara, 1982) degrees in Geology. Barnes worked for the original Standard Oil Company (of Ohio) in San Francisco CA (1981-85) and Dallas TX (1986) in an in-house, special projects group with emphasis on North Slope, Alaska studies.

Upon arriving at WMU in 1986, Barnes undertook sub-surface, Michigan basin geological studies with emphasis on clastic reservoir characterization primarily using materials curated at the (then) Michigan Basin Core Research Laboratory. This work was done coincident with an upsurge in sub-surface/petroleum geology activity in Michigan focused on the “PDC” play (St. Peter Sandstone) in the early/mid-80’s. In 1989-90 he was privileged to participate in an Ocean Drilling Program (ODP) research cruise and subsequent ODP funded research activities on the geology of the Japan Sea.

During subsequent years (1990’s) he turned his attention to Great Lakes coastal geology and study of coastal change (“erosion”) on the Lake Michigan shore and the evaluation of shore protection technologies through contracts with Michigan State Legislature for funds in the early and mid-90’s. This work, done with the able assist-
ance of a number of very talented graduate and undergraduate students, resulted in some publications but was especially important in the development of expertise with spatial data analysis technologies, GIS and the like, and the eventual application of these digital data analysis tools to sub-surface geological studies in the Michigan geological basin.

Starting in the 2000’s, WMU became involved with a national initiative (DOE/NETL Regional Carbon Sequestration Partnership Program) to evaluate the feasibility of Geological Carbon Sequestration, a prospective greenhouse gas emissions mitigation technology, in the Michigan basin. Using the, now extensive, subsurface data resources available at the Michigan Geological Repository for Research and Education (MGRRE) at WMU (and a long term funding relationship with Battelle Memorial Institute, the Department of Energy (DOE)/National Energy-Technology Laboratory (NETL), and several other entities including Consumers Energy) Barnes has conducted numerous high resolution geological characterization studies, with a number of funded graduate student assistants, studying the sedimentary geology of the Michigan basin.

Barnes has supervised twenty or so MSc/MA graduate students and several funded, undergraduate research projects, primarily focused on sub-surface geology of the Michigan basin with the more recent emphasis on Geological Carbon Sequestration. He has published modestly through the years and been an active participant (dozens of professional presentations) in Professional Organizations, in particular the American Association of Petroleum Geologists (AAPG), especially the Eastern Section of AAPG. He was engaged as an advisory board member in a Midwestern Governor’s Association initiative to develop a Mid-West Cap and Trade program, until this initiative fell victim to the “Great Recession” in 2008. His most significant scientific contribution may be as co-Editor (with colleagues G. Michael Grammer and William B. Harrison, III) of a Geological Society of America, Special Publication entitled “Paleozoic Stratigraphy and Resources of the Michigan Basin”, scheduled for release in late 2016, which will include numerous papers by previous students and provide a modern compilation of Michigan basin subsurface bedrock geology. He has especially enjoyed working with graduate and undergraduate students in a research/mentorship context and has many students in the geosciences profession that he maintains fond personal contact with.
Greetings everyone!
I am very pleased to be the newest faculty member in WMU Geosciences. I began in July of this year after a 4,000 mile drive from Anchorage, Alaska. As an avid angler and outdoor enthusiast, I’ve been interested in water and what lies in the subsurface for a long time. My maternal grandfather was a miner in Butte, Montana (“aka the richest hill on earth”) and had a large collection of ore at his home that intrigued me when I was young, and my paternal grandfather was a nuclear engineer – both of these influences seemed to have come together in me as a hydrogeologist. I am originally from Missoula, Montana. I spent 13 years in Reno, Nevada where I was an Associate Research Professor at the Desert Research Institute, followed by 2 years at the University of Alaska as an

My research interests include applied and theoretical investigations of fluid flow, heat and solute transport in various types of porous media, with a specialty in fractured rock systems. I am excited to get my research underway at WMU, and to that endeavor, spent a good portion of September working towards understanding how the regional stress field may influence preferential transport of radionuclides through fractures and faults on the Nevada National Security Site. Another active research project involves the use of integrated surface water – ground water models to better understand how climate change may impact water resources within the Truckee river basin in California and Nevada, particularly under the influence of extreme climatic events. Ryan Cascarano and I have been busy formulating his Masters project which will involve the use dye tracers to better characterize the loading of contaminants from ground water into surface water bodies.

My family and I are really enjoying living in Kalamazoo. My wife Molly and I have two girls, Ellie and Zoe, ages 9 and 11. We loved Alaska – at least for half of the year when the sun was out – and had many great adventures mountain biking, camping, fishing, rafting, skiing and hiking. But we really enjoyed the warmer weather this past summer while boating and swimming in Michigan’s lakes.
My first 6 weeks at Western involved participating in the Hydrogeology Field Course (HFC). Course attendance for the week-long modules averaged 28 students, which is above our target of 24.

I was immediately impressed by the quality of the different modules and commitment of the instructors and staff. The logistics of the HFC can be formidable at times, and Tom Howe ensured that things ran smoothly through the 6-week duration of the course. Students were mostly undergraduates and represented many Colleges and Universities across the U.S.

I feel fortunate to be involved in what I and many others consider the best applied hydrogeology field course offered anywhere. There are several new changes that have occurred over the last year or are in the works. First, the HFC has been expanded and the full 6-week course is offered twice this summer over Summer I and II sessions. The Graduate Certificate Program in Applied Hydrogeology is now active, and it is anticipated that our proposed Undergraduate Certificate in Applied Hydrogeology will be accepted by the time of the newsletter. Online courses are currently being developed to support the educational needs of our current students and to support the Certificate Program. Last November, Dr. Sultan and I travelled to Florida to form educational and research partnerships, and to evaluate the potential for a second hydrogeology field course specific to Florida. This would allow WMU to offer applied training in other areas of hydrogeology specific to Florida, including coastal hydrology, salt water intrusion and karst hydrogeology, and would serve to further expand the Certificate Program in Applied Hydrogeology.
Much has happened in the last year. In terms of creative work, I was fortunate to be invited by the Arts Council of Greater Kalamazoo to exhibit my scientifically-related acrylic and digital artwork during Art Hop events in November & December of 2015 and January & March of 2016, all at different venues downtown. Also in summer of 2016, I was awarded third place in the furniture competition of Palletpalooza; an art competition event sponsored by local businesses, in which objects created from discarded pallets are judged in competition. My submission was a worm-bin composter for the back porch or patio. In spring of 2016, I started bee hives on my estate using hives I built from scavenged pallet wood, and so far the bees are doing well and I will be harvesting some honey soon. Meanwhile the chickens are doing well and went through their first molt this summer. Also this summer saw a successful season for a new sustainability initiative I sponsored as faculty; the WeGrow to Give Community Project, which was supported by the Student Sustainability Fund to grow vegetables at WMU’s community garden for sale at cost at the Peace House in Kalamazoo.

In other pursuits, I ran the 2016 Kalamazoo half-marathon in May, and the weather was perfect. Over the course of summer I also undertook several training opportunities at Kalamazoo’s Public Media Network, an organization funded by local municipalities to promote locally-produced media for TV and internet broadcast. I am interested in developing online course content to promote improved public understanding of science, and I have started converting some of my lecture content to video format for this purpose. My aim is to produce useful and informative video content for the public, posted under a creative commons license to maximize availability and accessibility. At present, I’m spending a lot of time on voiceover work and film editing as I translate my lectures into video format.

In August, Olivia and I took a road trip out West to see Rocky Mountain National Park, Dinosaur National Monument, Yellowstone National Park and the Badlands, and do some backpacking, car-camping and AirBnB-ing. The weather was great and we got to see a lot of the mountain West, and I took some scenery footage along the way that may prove useful in my development of online video content about geology.
Greetings friends and alumni!

It was a very productive and satisfying year. Five of the nine students that kept me busy serving on Masters committees graduated this past spring semester. Three of them are now employed full-time (Jon Garrett, Nate Erber and Andrew Sasso), one is doing a summer internship with excellent employment potential (Ben Hinks), and one (David Gold) is “on the search” after finishing with an M.A degree. The other four are still making progress. I expect one student (Nate Charlton), already working for the U.S. Parks Department, to graduate at the end of this fall semester, one student (Sarah Vandermeer) to graduate next spring semester after an extensive PhD mapping project at Pictured Rocks National Lakeshore, and two students (Nick Panyard and Chris Roth) to tear themselves away from work for a few days to return and tie-up lose-ends, hopefully “soon.”

I led the “Early Pennsylvania Oil” field trip once again, this time for The American Association of Petroleum Geologists (AAPP) Student chapter at Grand Valley State University (GVSU). All the WMU AAPG Student Chapter students had already either taken the trip, or graduated and left campus, so it ended up being just the GVSU contingent. However, it was a gung-ho group of students, and it was great getting better acquainted with fellow professors Dr. John Weber and Dr. Kevin Cole from GVSU. Hopefully, we’ll see some of these GVSU students apply to our WMU Geosciences graduate program in the future.

Teaching assignments continue to shift; however, I’m still doing my usual GEOS 1000 “Dynamic Earth” and GEOS 3220 “Ocean Systems” (both classroom and on-line) this semester. Student group dynamics seem to be significantly changing this year as the “millennials” morph into the next demographic group (what-ever they will be called). Challenges keep evolving, and there is always something to revise, update, or correct (it seems that there is always some little thing that can be done better - “Kaizen” as the Japanese call it - a philosophy that made “Toyota” what it is today). But, that’s part of the challenge, and a lot of the fun.

This past summer was the ninth time for me to co-teach the GEOS 4380/90 field course, my second time to teach it with Dr. Joyashish Thakurta and my third time to teach it for “the last time.” We had 16 students total, including more GEOS 4380 (science teaching) students this year compared to last. So, it was back to a more normal student make-up for the class. Once again, the department had to scamp with last-minute student enrollments to figure out how to adjust the teaching responsibilities in the light of varying class composition, reduced budgets and available faculty. So – one more time. I wonder what next year will bring?

The “new/getting older” house constantly provides me with that “free,” vigorous, exercise program. Not only is the usual “wood-splitting” and “fun-with-leaves” season once again upon the horizon, but this year’s activities will also include an “up-close-and-personal with rocks” event as I combat a bit of stream erosion where one of the cut banks is starting to meander out of control. Be careful what you wish for.
The 2015-2016 academic year began on a very watery note for me. I was in the Indian Ocean off the northwest coast of Australia on the R/V JOIDES Resolution. We were drilling the top kilometer or so of sediments (generally less than 5 Ma sediment) above several oil-rich basins (in Cretaceous or older sediments). The goal was to better understand the history of ocean currents, Australian paleo-climate and the apparent rapid subsidence of the lithosphere in the last few million years. Of course the secondary goal was to see as many whales as possible (ideally while off-shift) as they migrated to their summer breeding grounds in the tropics. That and the sea snakes that filled the sea at night and effectively eliminated any interest I might have had in swimming. Two months at sea ended with a two week trip down Australia’s Red Center, from Darwin to Coober Pedy, including a visit to Ayers Rock (Uluru). Among other things I learned that the groundwater follows a similar route, entering the aquifers during the monsoon season in the Darwin regions (which I experienced my last evening there) and flows south, providing water to Alice Springs.

By mid-October, I was back at my desk in Kalamazoo, providing advice to students and dealing with the Academic Review process that is proceeding at WMU. In the spring, that work continued along with teaching Ocean Systems (very watery) and working with Katie Dvorak as she prepared and then defended her dissertation proposal. She has been hard at work making it happen over the summer, trying to answer the knotty tectonic questions that arose from my 2009 IODP expedition 317 to the Canterbury Basin, New Zealand. In summer I taught online ocean systems and began work on the data from Australia’s Northwest Shelf. I have help from Masters student, Khalid Majeed Haji Omar, who is converting old Australian oil-well logs into data sets for backstripping analysis. What does it all mean? Stay tuned, we just might find out.
Hello alumni/friends,
I am pleased to say that my first year at WMU has been very rewarding (and busy). I am now firmly settled into my office and the research lab is operational. My return to the classroom in the spring offered a much needed breath of fresh air. WMU students continue to amaze me with their academic abilities and drive to learn. On that note, I was fortunate enough to recruit a handful of talented graduate students from around the country, and I am looking forward to impending interactions with these gifted individuals. I am happy to report that my current students are already making great progress toward their research objectives. In fact, three of them: Matt Hemenway (M.S.), Cameron Manche (PhD), and Matt Rine (PhD) proudly represented the department by presenting their work at the AAPG meeting in Calgary this past summer (notably, Matt Rine won an SEPM award for best student poster!). The incoming graduate students will, no doubt, have talented peer-mentors, and my expectation is that these new

During the last year, the stable isotope laboratory made steady progress with one of my students Chance Ford (Main Adviser Duane Hampton) graduating based on his isotope work and then joining Michigan State University for his PhD work. Another of my student Abdel Mohammed (Main advisor Dr. Alen Kehew) also completed his PhD defense and spent five months working in the isotope lab that resulted in the submission of a manuscript. Shelby Hurst finally took the plunge and joined me as a PhD student and is doing some really exciting work. I had the pleasure of visiting United Arab Emirates University, Al Ain, in the United Arab Emirates. I was invited by my PhD student Ahmed Murad, who is now the Dean of the College of Sciences in that flagship university. He invited me as a Distinguished Speaker, paid my travel and put me in a five-star hotel! I had never been to that part of the world and it was worth every minute, their hospitality and love. I also visited India and gave an important talk at the famous Indian Institute of Technology, Kharagpur. But what lingers in mind is my involvement as the Chief Guest at an international school in the South Indian city of Chennai (formerly Madras). I inaugurated their annual science fair, went through about 200 exhibits and judged the prize winners! It was a day long commitment but the treatment I received befitted that offered to Indian dignitaries who run the country!

The past academic year has focused heavily on research, publishing, and graduate students. Earlier this summer, my NSF-funded Geo-Needs project (http://serc.carleton.edu/geoneeds/index.html) released our meeting report exploring barriers and opportunities for expanding access to geoscience courses and programs at two-year colleges and minority-serving schools. We held a follow-on workshop at the 2016 Earth Educators Rendezvous in Madison, WI where we supported 18 faculty and instructors in developing courses, curricula, and programs designed to recruit and retain minority students in the geosciences. Materials from the Rendezvous workshop will appear on the Geo-Needs project website this fall. In addition to this work, I am collaborating on several research projects exploring spatial thinking in the geosciences in the field and in the classroom. I remain involved in teacher education – through the National Association of Geoscience

Broncos will continue to elevate the productivity of the team. Personally, I had a busy year traveling the globe giving numerous talks and seminars on various research topics such as dolomite nucleation and growth kinetics and the origin of limestone microporosity. I also stayed busy by serving as an associate editor for the Journal of Sedimentary Research, various departmental committees, and building upon my research program. I have an equally busy (and fun) schedule lined up for the fall. Here are a few other 2015-2016 highlights I’d like to share. First, two papers were accepted for publication and four other are in various stages of review/revision. Second, the National Science Foundation instrumentation proposal that I coauthored with Andrew Caruthers was funded ($76,771). The award will allow us to acquire a portable X-ray fluorescence spectrometer, which will support various activities in the department including geologic research at MGRRE, MGS sponsored projects, and CoreKids.

Teachers (NAGT), I co-hosted a webinar about supporting elementary teachers with implementation of the Next Generation Science Standards. Currently I am working with a team on a new project seeking to reform the preparation of teachers at WMU through creation of a summer program involving scientific research, teaching preparation, and teaching practice. I continue as the department’s Graduate Advisor, and am looking forward to rolling out our new accelerated Masters program this fall. My work as Editor for Curriculum & Instruction of the Journal of Geoscience Education, as well as my current graduate students – Andrew Bentley (PhD), Nate Charlton (MS), Peggy McNeal (PhD), and Laura Tinigin (MS/PhD) - keep me busy. Nate and Laura successfully passed their thesis proposal defenses last year, and Peggy and Andrew plan dissertation defenses in the coming year. Both Peggy and Andrew have journal articles in review. I look forward to their continued successes in the coming year!
Economic geology and igneous petrology are the two principal areas in which I have been working along with my graduate students. We have several projects in the western Upper Peninsula of Michigan which involve the exploration for new economic sulfide deposits and description and characterization of the known deposits. Most of the magmatic and hydrothermal sulfide deposits in the area are associated with the 1.8 Ga Penokean Orogeny and the 1.1 Ga Midcontinent Rift events.

In Fall 2015, Anthony Boxleiter defended his thesis on the Back Forty volcanogenic massive sulfide deposit and Jonathan Haynes defended his thesis on the occurrence and geological significance of the Sturgeon Falls Sill. In Spring 2016, Benjamin Hinks completed his thesis on the sulfur isotope studies of the magmatic sulfide mineralization in the Eagle deposit in UP Michigan. Andrew Sasso also defended his research on the occurrences of peridotite and plateaus. It is certainly different today, with a company town (Carajas) and jet airport on another of the plateaus. That DC-3 is now a monument in front of the airport terminal.

My “no-time” Spring semester again allowed us to escape to Brazil for January, February, and into the first week of March. For the first two weeks we hosted John Yellich and Karen to give them a taste of NE Brazil. We went on a 19-hr rail trip from Sao Luis to the Carajas mining district, west of the new city of Parauapebas (try to pronounce that). I had done field work there in the mid-1970’s when it was so deep into the Amazon forest that access was only by the mining company DC-3’s from Belem that landed on a hematite gravel airstrip on top of one of the iron ore body plateaus. It is certainly different today, with a company town (Carajas) and jet airport on another of the plateaus. That DC-3 is now a monument in front of the airport terminal.

Spring provided trips to CA, and the Denver SAGEEP conference. By June it was time to visit Sarah VanderMeer and her mapping project in the UP. This time I helped her to confirm the discovery of the deep bedrock valley with several gravimeter profiles. From there we went directly to MN to visit friends and family for another week. Just FYI, Kelly and I now have a combined 20 grandchildren and one great grandson. Later in June I conferred with Scott Feldpausch (Barry Co.) and Evan Jensen (Asylum Lk. Property) about their thesis work involving the HVSR method using the Tromino passive seismic instrument. I also used that device in Cass Co. to help Yellich and Kelew in mapping the Jones quadrangle, so the Tromino is getting lots of use. In July I volunteered again to help Dale Werkema with the geophysics module of the HFC. It was again full with 29 or so students, so it was a challenge to keep them from getting tangled in the measuring tapes, ropes, seismic cables, and resistivity wires.

As a part of the Statemap project of the USGS, in 2014-2015, we prepared the surficial geological map of the Vulcan quadrangle in Dickinson County. Andrew and Jon worked as field assistants in the project. For the 2015-2016, I, along with my new graduate student Nick Moleksi and undergraduate student Jason Bell have been working on the surficial geological map of Bessemer quadrangle in Dickinson County and the bedrock geological map of Norway quadrangle in Marquette County.

We have started a collaborative partnership with the Wisconsin Geological Survey to work on a new research project on the sulfur isotope studies in the sulfide mineral deposits of the Penokean Volcanic Belt in northern Wisconsin.

Throughout the 2015-2016 year we have participated and presented our research in several regional, national and international meetings such as the annual meeting of the Institute of Lake Superior Geology in Duluth, MN, annual meeting of the Geological Society of America in Baltimore, MD and the Goldschmidt Conference in Yokohama, Japan.
Greetings Everyone,  

Last year was my 30th at Western, so I'm beginning to feel a little long in the tooth. Fortunately, there is lots of interesting stuff to do here to keep engaged, particularly since the Michigan Geological Survey was moved to our department. My research program now revolves around the USGS Geological Survey mapping grants that we can get every year. The map products that we generate through these grants have lots of practical purposes involving aggregate resources, groundwater availability and vulnerability, zoning, etc., but since much of southern Michigan has never been mapped in detail before, there is a lot to learn about the dynamics of the glaciers and the origin of the landforms and sediments. By the end of this year, my co-mapper John Esch at MDEQ and I will have finished our surficial geology map of Calhoun County and will have started Cass County with John Yellich, Director of the Survey.

The state surveys in the Great Lakes region belong to a group called the Great Lakes Geologic Mapping Coalition, which meets yearly to discuss our respective mapping projects and share information about the glacial geology of each state. The coalition is a great resource for learning what others in the region are doing, since we have all have generally similar surficial geology.

A year ago in Madison, alumnus Kevin Kincare (USGS) and I organized a theme session at North Central GSA in honor of the 100th anniversary of Leverett and Taylor's classic USGS monograph on the glacial geology of the Great Lakes region. After the meeting I was approached by GSA book editor Skip Davis, who happens to be a former faculty member of this department, and asked to edit a GSA special paper on the glaciation of the Great Lakes region. Brandon Curry of the Illinois State Geological Survey agreed to help me with this and we are now moving 13 papers through the peer review and revision process for publication sometime in the next year (hopefully).

I currently have several active grad students, including Sarah VanderMeer, who continues her dissertation work mapping Pictured Rocks National Lakeshore for the National Park Service. With the help of Bill Sauck and Robb Gillespie, this is turning out to be a very interesting project involving several aspects of the geology up there. Nathan Erber finished a nice MS thesis last spring, showing that much of the meltwater from the Huron-Erie glacial lobe drained westward across the state, probably all the way to the Kalamazoo area. Within a week of turning in his thesis, Nate was already at work at his new job at the Ohio Geological Survey, doing mapping and other projects. Jay Kim is going to be doing a project in Cass County, which we just started mapping this year, and two new students with Quaternary interests are starting this fall.

Within the past few months, I have been lucky to spend some time in some classic and very spectacular geological areas including the tower karst in the Guilin area of China and several parts of the Sierras (Yosemite) and Cascades in California. The geomorphology class will be looking at many of the photos. The China trip was a visit to China University of Geosciences in Wuhan for two weeks. Imagine a 24,000-student university in which everyone takes at least some geosciences! And that's only one of their two campuses. I am hoping we can get some future collaborations set up with them.

It was great seeing many of you at the 50th anniversary celebration last fall. I think all of us in the department felt proud that we might have played some small part in the careers of so many successful people.

Dr. Alan Kehew

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Dr. Kehew discusses mapping while leading students on a field
The Michigan Geological Survey (MGS) is pleased to report that the Michigan Legislature and Governor’s office has granted the MGS a one-time Special Appropriation of $500,000 in the 2016 legislative budget. It is to be used to develop the case for annual funding to support both the mapping and assessment of the natural resources of the state. This budget was passed on June 8, and the MGS has a signed contract with the Department of Environmental Quality to receive this grant for the period, July 1, 2016 to September 30, 2018. The MGS applauds the support from the principal sponsors, Representatives Brandt Iden, Aric Nesbitt and Al Pscholka for their efforts to allow MGS to present the documentation needed for annual base funding for a fully functional survey. MGS also expresses the deepest gratitude for the support received from President John Dunn and the WMU Administration in working with the Government Affairs Department at WMU. Greg Rosine and Katie John worked with the legislators, and successfully demonstrated the need, and the benefits, for a fully functioning and a fully funded geological survey.

The survey also appreciates all the individuals who responded to our request to call, write letters, or personally talk to local government representatives in support of the MGS, and its mission as stated above. Our work on the geology of the State of Michigan will facilitate decisions that affect all the citizens and industry in the state, today and into the 21st Century. MGS is now charged with identifying studies and research in a demonstration form that can document the case for annual base funding that will bring geological science to the public for its use into the 21st Century.

This allocation will be used to establish a collaborative effort that includes Michigan industries, Michigan agencies and MDOT to identify the processes needed to assess our resources in a priority driven program. This will utilize the survey to provide the unbiased geologic, scientific, environmental and socially responsive documentation to support the appropriate environmental management of these resources. This will certainly benefit the people of Michigan. In addition, the survey will continue to work with, and continue to provide the factual scientific and technical information to all the supporters of the survey through our professional staff, laboratories and the MGRRE core repository. We also appreciate the support from the members of the Michigan Oil and Gas Association, the Michigan Aggregates Association, the Michigan Manufacturers Association and its sub committees of Environment and Mining; Michigan Groundwater Association, the Michigan Association of Professional Landmen, the Ottawa County Road commission, the Southwest Michigan Water Resource Council, the American Institute of Professional Geologists, to other agencies and organizations not named here, plus all the individuals who signed the letter of support for the survey.

The primary functions mandated by the 2011 Legislation that created the current survey includes the investigation of the geological resources of the state, the collection and archival of samples, cores, cuttings and records of geological investigations and studies in the state. MGS wants to establish the survey as the “go to” geological expert for the State of Michigan. MGS continues to operate on soft money from Federal and State grants, and until there is an annual budget, MGS cannot meet the mandated requirements for matching funds that can secure a larger share of the Federal funds. For example, mapping and research is continuing through the awarded Federal matching funds grant awards. MGS also received a grant from the Michigan Department of Environmental Quality (MDEQ) Water Division.

MGS has continually presented the need for state funding for mandated functions to multiple private and government entities through presentations and formal meetings since October 2013. In nearly three years, MGS has made over 120 of these presentations. MGS has been awarded some grant monies, and is providing limited services of the survey with support from our resource center scientists. Please go to the website (http://wmich.edu/geologysurvey) for a summary of the resource centers to see our capabilities, and a list of those faculty scientists who are partnering their support to the Survey, as well as other resources enumerated in this Geosciences Newsletter.
Specific grant successes include: USGS STATEMAP funding for mapping in the Felch Quadrangle in Dickinson County of the UP, and in the Mottville Quadrangle in Cass County, of the lower peninsula, for a total of $124,687; a USGS Great Lakes Geologic Mapping Coalition grant to begin mapping of the Marcellus and Decatur Quadrangles in the amount of $72,499; a USGS grant for Data preservation through MGRRE; a grant that continues this year to conduct a data base assessment for the DEQ-Water Resource Division (WRD), and a contract is pending for the State of Qatar in the amount of $95,000 to assess sink holes in the country using Interferometry remote sensing methods.

Michigan is one of the few Great Lakes states that has not committed to an annual statewide funding for specific or combined multiple scientific efforts of geologic mapping, resource assessments, or selective airborne or ground geophysical data collection. For example, MGS lobbied, along with the state departments of DEQ, MDARD and DTMB, to the Federal Soil Conservation Service for agricultural support for the first comprehensive statewide LiDAR (Light Detection and Ranging) survey to be completed in the next few years. It is anticipated that the LiDAR for most of Michigan will now be completed in 2016-17. LiDAR is a program that can be used by every regulatory, research department and business development opportunity in the State including the MGS.

There is now a resurgence of ocean shoreline studies being conducted by USGS and NOAA that also needs to be expanded to include the Great Lakes. Michigan has more than 3,126 miles of Great Lakes shoreline, which has had limited research done outside of that which had been documented on beach, shorelines and dunes by WMU researchers such as Dr. Richard “Skip” Davis, Dr. Ron Chase, Dr. David Barnes and Dr. Thomas Straw over the last 40+ years, respectively. Clearly, there is an early history of interest and study of our beach resources by WMU researchers. The USGS and NOAA are instituting more collaboration in mapping beaches and shorelines, and MGS will present a case for support for Lake Michigan studies in collaboration with the Illinois State Geological Survey and the Indiana Geological Survey.

MGS has had numerous discussions with the USGS and State agencies. MGS has supported the funding of a demonstration airborne aeromagnetic geophysical survey in a portion of the UP which was contracted for this summer, 2016. The airborne survey has been initiated and will hopefully be completed by next year. Scientific data will be compiled by both the USGS and the MGS presenting validated subsurface geologic data in an area not previously published for the public. This area is bounded by an area with the line from Menominee to Escanaba, to Ishpeming to Iron Mountain. A case will be presented to the Michigan Legislature for incremental funding such airborne surveys in order to expedite our understanding of the geology of selected priority areas of the State, including the potential for studies in areas of the Lower Peninsula.

Michigan Geological Repository for Research and Education - MGRRE is the preeminent and recognized data and core repository for Michigan, and for the last 30 plus years has been under the direction and guidance of Dr. William Harrison, Linda Harrison and the staff. MGRRE is the scientific cornerstone of the MGS. The research MGRRE is conducting on the Michigan basin and the geology of our natural resources is invaluable. The MGRRE facility and data it provides creates a premier setting for numerous scientific meetings and events on Michigan basin geology. As reported in the MGRRE notes, the collaborative 15 year USGS research by Dr. Christopher Sweekey, on the maturation history and potential for energy discoveries in the geologic units of the Michigan Basin and adjoining States is an important resource. MGRRE is also recognized as the model geologic repository by the USGS in the National Geologic and Geophysical Data Preservation Program (NGGDP), and again this year, and for the last 10 years, has received incremental grant support to secure and preserve geologic data.
MGRRE/WMU in collaboration with the Department of Energy (DOE), Core Energy, and Battle National Laboratories continue their technical research on CO2 sequestration in the Niagara Reef structures and on enhanced oil recovery (EOR). Doctors David Barnes and William Harrison are the principal researchers in this effort. The results are briefly summarized in the MGRRE notes in this newsletter.

Core-Kids This is the Outreach component of the MGS, MGRRE and WMU Geosciences Department. Dr. Peter Voice has been the Director of this recognized program for the last three years. Funding for Core-Kids has thankfully been through generous donations and grants, which are fewer in number than in previous years. Noting that this program is now expanding to involve the mineral, gem, geologic and teacher associations, we now have a more diverse contact audience, not only K-12 schools. This now includes all levels of interested parties in the earth sciences and the Core-Kids events have been expanded to include the east side of the state extending north to Mecosta and Bay Counties. Dr. Peter Voice and Dr. Heather Petcovic share these Outreach experiences with other educators and with industry. They have made presentations of their successes and hands-on training modules to national organizations. Dr. Voice made a presentation to the Geological Society of America, North Central Section during spring 2016 in Indianapolis. Dr. Voice has increased both the numbers and composition of contacts. His contacts are now focused on events that are most effective, and have resulted in Core-Kids donations and specific benefits to WMU students, scholarships.

For example, the summary of Core-Kids contacts for 2016 is estimated at 10,463, with the single highest event estimated at 4,824, the Kalamazoo Gem and Mineral Society (KGMS) annual show. KGMS supports Core-Kids, and has provided annual scholarships to WMU Geosciences students.

Dr. Voice has completed two significant compilations that can support both the Core-Kids Outreach and the MGS Outreach. The first is a bibliographic summary, March 2016, "Michigan Geology: a Bibliography". It includes over 6000 references on Michigan geology from all sources including student theses from all the universities that replied to his requests. This compendium is the most comprehensive available for all sources of published and unpublished Michigan geology data. It is now available on the MGS website. Dr. Voice's second compilation includes all published natural resources production data going back to 1845, approximately 170 years, and presents the first copper and iron ore production. This information will soon be available in printable formats on the MGS web site for industry and educators.

Dr. Voice and Dr. William Harrison are preparing a county demonstration publication that would present a summary of all available data from multiple database on soils, geology, water wells, oil and gas wells, injection wells and environmental sites. This will present the case for a summary of data for use by the public, state and county regulators, and officials and legislators.

Economic Minerals - Dr. Joyashish Thakurta is conducting geologic research and mapping in search of favorable geologic provinces that may host economic minerals. Dr. Thakurta is involved in his personal research mapping and studies in areas of geologic interest and importance and has found industry support for student research projects focused on mapping the geology and mineral potential in some of these areas of the Upper Peninsula (UP).

Surface Mapping and Groundwater - The USGS National Cooperative Geologic Mapping Program (NCGMP) has been actively funding state geologic mapping for over 24 years, which in all the states has been focused on critical need areas. Unfortunately, Michigan has lapsed in applying for this Federal funding and had presented limited priority-driven comprehensive resource assessments for more than 24 years. Michigan has little to no knowledge of the potential natural resources that may exist. However, for the USGS mapping program of 2015-16, an allocation of $44,000 was provided by the Quality of Life Departments (DEQ, DNR and OGL) for studies in Cass County. The adjoining states of Illinois, Indiana and Ohio, which have similar geologic environments, have prioritized areas to be studied, and have committed millions of dollars to these projects using matching federal and state funds to map natural resources, geologic phenomena and hazards. These three states have completed mapping 30%, 40% and 80% of their states, respectively, in high priority areas, where Michigan has not even mapped 10%.

Dr. Alan Kehew and the MGS continues to gain support for the continued mapping in critical need areas initiated more than 24 years ago through the USGS NCGMP program, which must be administered and managed by the Michigan Geological Survey. This USGS program requires a dollar for dollar match of funds to make the maps and reports that are so valuable. The investigation and mapping today is of much greater value because “boots on the ground” is still
required to confirm the validity of all mapping information, including remote sensing data. The geologic data available today includes, but is not limited to, the following: subsurface drilling (Rotosonic core and Geoprobe), drill hole and water well verification and analysis, and LiDAR data, all integral data subsets not previously available to prepare more comprehensive map products. Maps produced by the combination of remote sensing technologies and field derived data can provide “derivative” data to better understand the geologic natural resources of aggregates and groundwater, as well as providing mapping details to document groundwater pathways, the needed information, in the event of major spill or release resulting in an environmental disaster.

The MGS continues to conduct the research on the Water Resource Division (WRD) of the DEQ grant. This grant is directed toward the development of an outline of data types, collection protocols, and a review of software that will allow data collection and output to an ArcGIS and potential 3D geologic mapping data format. The testing of “off the shelf” software, such as “Rockware”, is also being considered to support this program.

MGS has received verbal confirmation from the Groundwater Research and Education Foundation of the National Groundwater Association for the funding of an unsolicited grant in the amount of $78,000. This grant is to be used for a combined geologic and geophysical methods approach to identifying and mapping buried glacial tunnel valleys. It is proposed for Calhoun County, where bedrock depths are estimated to range from 200 to 600 feet. The existing data in the county is from water well drilling, and has subsurface data in the range of 200-250 feet. This proposal will utilize a combination of geologic mapping, surface geophysics (Passive Seismic, resistivity, etc.) and drill hole confirmation in Calhoun County to test this method of finding buried valleys. Buried tunnel valleys potentially could contain high quantities of fresh groundwater for use by communities, future business development and agriculture.

MGS has presented the case to multiple associations and departments that all subsurface geologic information needs to have some standardization. The benefits are in the use of this geologic data to support a greater understanding of the subsurface, and in managing all of our geologic resources. For example, Michigan does not have a training program for logging water well drill cuttings by the licensed well drillers when they are drilling water wells. Water well data represents over 600,000 data points that must be validated by geologic information in the vicinity of the driller’s log(s). This program is long term, but the Michigan Groundwater Association’s licensed well drillers want to see this type of program initiated.

Remote Sensing and Airborne surveys – Dr. Mohamed Sultan and his research colleagues in the Remote Sensing Laboratory are the foundation for understanding and using satellite and other indirect mapping methods. The MGS/NMU laboratory has been notified of a funding grant that is awaiting government approval in the amount of $95,000 to study active sinkholes in the State of Qatar. The study will use satellite radar data known as Interferometry, a scientific data set that can be used for managing active land development in this country. Subsequent proposals have been submitted, and MGS is awaiting receipt of the signed sinkhole agreement before pressing for the commitment to the additional proposals that would support the management of Qatar’s geologic and engineering drilling data.

Michigan has the greatest amount of shoreline on the largest fresh water bodies of water in the world, totaling 3,126 miles. That is more than the entire East Coast of the US at 2,165 miles for eight states. Mapping of Michigan’s shorelines will greatly enhance our understanding of existing conditions, and allow the monitoring of changes in shore and bluff configurations as they respond to changes in lake levels. This information will also be invaluable during major storm events that can cause extensive structural or environmental damage from releases associated with pipelines, sea freighters and tankers.

Dr. Sultan and his remote sensing laboratory staff have proposed to utilize Gravity Recovery and Climate Experiment (GRACE)-derived Terrestrial Water Storage (TWS) data to assess the water resources of southern Michigan and initial comments are favorable in providing a demonstration that can be used for agricultural and surface water management.

MGS continues to seek funding for a permanent office, core repository and teaching facility.

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Greetings from MGRRE

Each year as we write this newsletter, we have the chance to pause, be grateful for, and to think about our former students and faculty as well as our supporters in industry. Through the past three decades at the Core Lab, now MGRRE, we have had the privilege of working with some wonderful students whose enthusiasm and fresh insights have kept life interesting here. And we really couldn’t continue to exist without financial support from alumni, industry members and Michigan foundations. We want you to know how much we appreciate you and your support especially in these financially challenging times.

We are continuing our research as a partner in the Midwest Region Carbon Sequestration Partnership (MRCSP) funded by the DOE and directed by Battelle Memorial Institute. As part of that project, Bill Harrison, Dave Barnes, and Stephen Kaczmarek along with several graduate students are developing Niagaran reef reservoir models. They are correlating facies interpreted from core descriptions, thin sections, and wire line logs archived here.

Two of those graduate students, Matt Rine and Jon Garrett, presented their research at the AAPG ACE meeting in Calgary this past June. Their poster, “Development of a Static Reservoir Model for the Niagra-Lower Salina Reef Complexes of the Guelph Formation, Michigan Basin” was awarded one of the SEPM 2016 ACE Outstanding Student Poster Awards.

Graduate student Matt Rine garnered more than $12,000 in research and travel awards in 2016 from 15 different sources. That’s a wonderful testament to his skills and perseverance. Matt also took top honors in April at WMU’s Research and Creative Activities Poster and Performance Day. Of the 40 students competing, Matt took one of the two first prize awards presented. Good on you, Matt!

Bill Harrison, Dave Barnes, Peter Voice and their students are putting together the final papers to be included in a Geological Society of America Special Paper on Geology and economic resources of the Michigan basin to highlight the research they have conducted about the Michigan Basin during the past ten years. They hope to have the volume completed and sent off to GSA by the end of the year.

Jenny Trout, Linda Harrison, Lolita Krieves and our student workers scanned more than 1500 mudlogs and reboxed more than 9,000 feet of deteriorated core this past year. After fact checking and compiling complete inventories, they uploaded the results to the National Geological and Geophysical Data Preservation Program datasets as well as the Survey website. We were very pleased to conduct this work funded once again by the NGGDPP.

This year, we received some outstanding donations of well records, cores, and specimens. Steve Wilson gave us his families’ collection of rocks and minerals and three display cabinets. Most of the specimens were given to the Geology Club to be used in fund raising. We filled two of the display cabinets here at MGRRE with some great museum-quality pieces.
Bill Harrison (left) enjoys specimens donated to MGRRE

Bill and Linda filled the third cabinet with fossil corals collected by him and his father.

We received a large set of handwritten and typed well records from Pure Oil’s work in the Basin, dating back to the 1920’s. What a great source of data!

Hydrogeology cores from Detroit area will be used in research at MGRRE. A hydrogeology engineering firm brought us 5 truckloads of cores from the Detroit area. Those 17,000 feet of core represent the Antrim, Dundee and Traverse formations from 230 shallow bedrock boreholes. They were drilled as part of a combined sewage overflow project that was never completed due to lack of funds. We are grateful that they saved the cores and gave them to us.

We have been offered a very large collection of cores from another university. Many of those are from gas storage fields. With all those new cores, we had to add more racking. We asked industry friends to help us pay for it. Within 2 months, they gave us $20,000 to buy and install the new racking. We couldn’t be more grateful.

David and Jill Hall generously donated the painting to MGRRE in 2015.

Patricia John’s 1983 oil painting created this old photograph of a well on her father’s farm near Oil City, Michigan, in 1937.

David and Jill Hall generously donated the painting to MGRRE in 2015.

David and Jill Hall gave us a large oil painting by Patricia John that was featured on the cover of the Michigan Oil and Gas News in 1983. It is now displayed in our seminar room.

Bill Roth needed some help cleaning out his basement which resulted in our picking up 24 four-drawer file cabinets filled with wireline logs. We are still inventorying those and finding

Bill Harrison speaking at March PTTC meeting
In November we held a core workshop at MGRRE to discuss Michigan’s petroleum systems. That was also the topic of the PTTC workshop in March this year in Mt. Pleasant. Chris Swezey of the USGS addressed both workshops with several other industry speakers as well as MGRRE students and faculty who presented research and field information.

Last December, Bill and Linda Harrison, Zaid Nadhim, Agam Suhaime and Jenny Trout rented a truck and drove to Emmet, Michigan, to pack up boxes of cuttings from some of the deepest wells in Michigan. They had been borrowed from another university a long time ago. That university had since given all their cuttings to us. These cuttings have now been combined with their original collection, all of which is now at MGRRE.

Bill Harrison, Peter Voice and Matt Rine represented us well in April at the GSA. They made four presentations on their research. Rine presented his new depositional model for the formation of the Silurian Pinnacle reef oil and gas reservoirs. Harrison presented a discussion of some new observations from core on the Salina evaporates. Peter Voice made two presentations: One on an unusual upper Ordovician/Lower Silurian phosphatic interval found in cores and another on his outreach efforts using the department’s “sandbox” exhibit that helps visualize topographic maps. Peter was also the co-chairperson of a Technical session on educational outreach.

Our old MGRRE server finally gave up the ghost so we replaced it with a faster more robust model. Thanks to a lot of work by the team of Breanne LeJeune, Jenny Trout and Linda Harrison, we completely reformatted all our web pages. So, please look for us at our new web site: http://wmich.edu/michigangeologicalrepository

Most recently, we asked many of you to contact your legislators to support our request for legislative funding. Thanks to your help and ceaseless work from John Yellich and WMU’s legislative affairs people, we obtained $500,000. That will fund some work for two years and give us the chance to show the value of supporting the Survey in Michigan. We will hope for stable on-going funding in the future.

To you, our extended geology family, we offer our heartfelt gratitude for your continued support and we wish all good things for you in the coming year.
Core-Kids K-12 Outreach Program

CoreKids had another successful year bringing geological outreach to members of the K-12 community and the public in Lower Michigan. We held 45 events and worked with 10,400 students, teachers and members of the general public.

Breanne LeJeune worked with us to update the CoreKids website. Please take a look at her work at http://wmich.edu/corekids

Donations from the Michigan Section of the American Institute of Professional Geologists and the Kalamazoo Geological and Mineral Society allowed us to continue running the program. We thank these sponsors for their support.

CoreKids participated in the school day events at both the Central Michigan Lapidary and Mineral Society and the Kalamazoo Geological and Mineral Society Annual Shows. At both events, we displayed rocks and minerals at our booth and entertained children with hands-on activities.

In early December, I took a short core in the Portage Lake Volcanics and several examples of economic minerals to the Mineral Mania Event at Grosse Pointe North High School.

In April, Katie Dvorak and Hannah Pankratz (WMU Graduate Students) went to the American Association of University Women (AAUW) Tech Savvy Conference, where they worked with young women interested in STEM careers. They brought hands-on activities and rock samples and discussed energy careers with the students.

In August, I attended the annual meeting of the Michigan Earth Science Teachers Association Meeting in Marquette, MI. The theme of the field conference was iron and copper resources of the area, so I developed a handout of teaching resources focused on Michigan’s Natural Resources production history. Twenty teachers came to my talk on Michigan’s Natural Resources. The handouts are available on the CoreKids website.

Dr. Peter Voice, Director of CoreKids
Members of the Advisory Council congratulate the department's 2016 graduating class of graduate students.

The Advisory Council met on April 22, 2016 during which the Council received numerous updates regarding the status of the University as well as the College and the Department. It is very evident that there remain many challenges associated with funding programs and overall enrollment. However, the Department is very strong and doing great things including finding creative ways to bring new talent and offerings to the Department.

The Council continues to move initiatives forward through its committees including:
- Fundraising
- Guideline Revisions
- Alliance Outreach and
- Student Outreach and Mentoring.

Additionally, efforts to revitalize and develop the Schmaltz Museum continue. We will be looking for additional volunteers for a special committee to move this initiative forward.

The Council is excited to welcome the new Hydrogeologist Dr. Matt Reeves to the Department and looks forward to working with him to expand the Hydro Field Camp among other programs.

We reconvened this fall on October 7 and interacted with students during student outreach luncheon.

Again, as the longest serving Council at Western Michigan University, we look forward to exciting times at the Department and continuing our service to the students, faculty, administration and alumni. If you are interested in serving on the Advisory Council, please let us know.
Dane Alexander was selected for the Alumni Achievement Award by the Department of Geosciences because of his outstanding work as a dedicated teacher and educational leader. Dane graduated from WMU with bachelor’s and master’s degrees in earth science and political science in 1973 and 1983. He was involved in education as a high school geology teacher in the Mattawan Consolidated Schools for 30 years before retiring. As a high school teacher, Dane understood the importance of relating to his students and making the subject relevant to the students’ lives. He often spent his weekends taking students on field trips to local rock quarries or other areas of geological significance throughout Michigan.

At WMU, Alexander has led more than a hundred students and alumni on field trips to the U.S. Southwest and is especially well known for his epic Grand Canyon rafting trips down the Colorado River, which he led from 1993 to 2006. He still continues to teach the very popular course, geology of the national parks, at WMU as a part-time instructor and is an outspoken supporter of both the National Park system and earth science education. His youthful enthusiasm, personal photographs and humorous stories about his experiences visiting the U.S. National Parks consistently make it one of the most popular and rapidly filled courses taught at WMU. Dane’s charisma and passion for teaching earth science and geology has inspired a myriad of students to pursue degrees and careers in earth science and geology, as well as in education. Dane is an avid car enthusiast and never misses attending the Indy 500 race. He and his lovely wife Chris reside in Mattawan, Michigan, and are currently enjoying semi-retirement traveling and spending time with their two sons.
## 2015-2016

### Endowments

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### Corporate Donors

- Air & Water Compliance Group, LLC
- American Institute of Professional Geologists-MI
- Apache Corporation
- Barratt Consulting, LLC
- Core Energy, LLC
- The Dart Energy Foundation, Inc.
- Daniel R. McGuire, Inc.
- Devon Energy Corporation
- Dune Technologies, Inc.
- Envirologic Technologies, Inc.
- EOG Resources
- Estwing Manufacturing
- ExxonMobil Foundation
- Innova Exploration
- Johnson & Smith, LLC
- Kalamazoo Community Foundation
- Kazoo School
- Michigan Wireline Service, Inc.
- Miller Energy Company
- Northern Lights Energy
- Pale Morning Dove
- Stock Drilling, Inc.
- Trendwell Energy Foundation, Inc.
- W.B. Osborn Oil & Gas Operations, LTD
- West Bay Exploration
- West Michigan Drilling
Individual Donors

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<td>William B. Harrison III</td>
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<td>William E. Lambright</td>
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<td>William T. Stelzer</td>
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Grants/Sponsored Work

- **National Science Foundation:** EAR-Instrumentation & Facilities, PI: S. Kaczmarek & A. Caruthers, Acquisition of a handheld XRF spectrometer to enhance sedimentary and paleoenvironmental research, Award #1636441 ($76,771).

- **ExxonMobil Upstream Research Company,** PI: S. Kaczmarek, Donation of Carl Zeiss AxioPlan2 research-grade petrographic microscope and accessories (~$35,000).


- **Battelle Memorial Corp.,** PI: Dave Barnes, Geological assessment of representative core and well log data will test geological models for controls on reservoir properties, heterogeneity, and compartmentalization.

- **National Science Foundation:** EHR-IUSE, PI: Heather Petcovic, Collaborative Research: The Geo-CC&CP Foundry - Building Institutional Capacity for Broadening Participation in the Geoscience Workforce, Award No. 1445227 ($115,240).

- **Herbert H. and Grace A. Dow Foundation** (subaward through Michigan Technological University), PI: Heather Petcovic, Science Teaching and Assessment Reform (Mi-STAR) ($39,814).

- **Michigan Space Grant Consortium Fellowship,** Pls: Massood Atashbar, Kristina Lemmer, Damon Miller, & Heather Petcovic, Michigan Space Grant Consortium Fellowship ($16,000).

- **WMU College of Arts and Sciences Interdisciplinary Research Initiative Award,** Pls: Heather Petcovic, Steven Bertman, & Todd Ellis, Experiencing Research for Teachers in Earth Science (ExpeRT-Earth) ($5,000).

- **Michigan Geological Survey Grants** received or still active, 2016-2017.

- **DEQ-Legislative Special Appropriation**, PI: J. Yellich, Funding to develop programs to assess natural resources. ($500,000).


- **NGWA – Ground Water Protection Foundation,** PI: J. Yellich, W. Sauck and A. Kehew; Geophysical testing for buried bedrock valley using H/VSR Tromino Passive Seismic methods, ($74,000 – Pending agreement).
Department Publications


WMU achievements

2016 All University Graduate Research and Creative Scholar Award: Abotalib Farag (PhD)
2016 PhD Dissertation Completion Fellowship: Abotalib Farag (PhD)
2016 Research and Creative Activities Poster and Performance Day Awards: Abotalib Farag (PhD) and Matt Rine (PhD)
WMU Graduate College Research Grant: Matt Rine (PhD), Sita Karki (PhD)
WMU Graduate College Travel Grant: Matt Rine (PhD)
Best Research Poster, WMU Graduate College: Matt Rine (PhD)
Graduate College Research Awards: Sarah VanderMeer (PhD), Chanse Ford (MS) and Jeff Hudson (MS)
All University Teaching and Research Awards: Sarah VanderMeer (PhD) and Abotalib Farag (PhD)
Gwen Frostic Dissertation Fellowship: Sarah VanderMeer (PhD)
Climate Change Research Graduate Scholarship: Esayas Gebremichael (PhD) and Sita Karki (PhD)

Undergraduate Awards
Presidential Scholar: Courtney Wright
Earth Science Education: Reid Nicholson and Zachary Waber
Geochemistry: Stephanie Finley
Geology: Rosemary Probst
Hydrogeology: Natalie Stoflet and Courtney Wright
Secondary Integrated Science: Keith Meyers

External achievements

GSA on the Future travel grant: Esayas Gebremichael (PhD) and Joy Keifer (MS)
Margaret Hawn Mirabile Memorial Best Student Paper, Eastern Section AAPG, Indianapolis, IN: Matt Rine (PhD)
SEPM Outstanding Student Poster Award, AAPG ACE, Calgary, AB: Matt Rine (PhD)
Michigan Basin Geological Society Scholarship: Matt Rine (PhD)
GSA Research Grant: Matt Rine (PhD)
Aapg Grant-in-aid: Matt Rine (PhD)
2016 UNAVCO grant to attend and complete InSAR Processing and Theory with GMTSAR: Sentinel-1A Time Series Workshop, La Jolla, CA: Hannah Pankratz (PhD)
2016 SEG/ExxonMobil travel grant, Student Education Program and the SEG Annual Meeting, Dallas, TX: Hannah Pankratz (PhD)
2016 SEG Certificate of Excellence for completion of the Student Education Program (SEP): Hannah Pankratz (PhD)
National Ground Water Association’s Len Assante Scholarship: Joy Keifer (MS) and Jay Kim (MS)
AGU Travel Grant: Sita Karki (PhD)

2015-16 Departmental scholarships

Alan E. Keheu Endowment: Sarah VanderMeer
Core of Four Endowment: Rachael Kluba
Department of Geosciences Endowment: Rozkar Ismael, Scott Feldpausch
Distinguished Student Service: Natalie Murphy and Joy Keifer
Douglas Daniels Endowment: Olga Tarasev
Enviroleogic Technologies Endowment: Jay Kim and Zachary Waber
Jacob Koebe Award: Kevin Zanger, Sean Panetta, Brandon Brock and Chad LaFleur
John and Kelly Grace Endowment: Keith Meyers
Kalamazoo Geological and Mineral Society Scholarship: Jason Bell, Jay Kim, Joy Keifer and Matthew Rine
Lauren D. Hughes Environmental Scholarship: Jay Kim and Joy Keifer
Lloyd and Marilyn Schmaltz Professional Activities Award for MGRRE: Cameron Manche and Matt Rine
Lloyd and Marilyn Schmaltz Professional Activities Award for WMU Department of Geosciences and Schmaltz
Geology Museum: Sita Karki and the Geology Club
Lloyd and Marilyn Schmaltz Quasi-Endowment: Jason Bell
Mohamed I. Sultan Endowment: Hannah Pankratz, Abotalib Farag
Randall Kerhin Graduate Endowment: Hannah Pankratz
W. David Kuenzi Graduate and Undergraduate Student Research Fund: Nick Panyard, Tom Brubaker, Abdel Mohammed, Abotalib Farag, Elizabeth Palmer, Abdullah Othman, Esayas Gebremichael, Mustafa Emil
W. Richard Laton Field Camp Endowment: Joy Keifer
William and Linda Harrison Endowments: Jonathan Garrett, Matthew Hemenway, Cameron Manche, Zaid Nadhim and Matthew Rine
Our Students
Welcome Our New Graduate Students!

<table>
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<tr>
<th>Alex Koerber</th>
<th>Austin Johnson</th>
<th>Ben Seiderman</th>
<th>Brooks Ryan</th>
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<td>Chad Ailes</td>
<td>Clayton Joupperi</td>
<td>Fahad Alsheri</td>
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<td>Grant Haynes</td>
<td>Jack Hybza</td>
<td>Jacqueline Snow</td>
<td>Jonathan Andrews</td>
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<tr>
<td>Karl Backhaus</td>
<td>Mohammed Al Musawi</td>
<td>Neal Turluck</td>
<td>Ryan Cascarano</td>
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</table>
The Geology Club has continued to have a great and active membership throughout 2016. This year's annual summer field trip was ambitious with eleven days in the Pacific Northwest. Sixteen students and Dr. Petcovic boarded planes bound for Seattle at the end of the summer. By the time September came, the class had been a variety of geologic sites, including the Olympic Peninsula, Mt. Rainier, Mount St. Helens, Newberry Caldera, and Crater Lake. For many, it was their first time in Washington or Oregon. Mineral sales, bake sales, and groundwater model kits made the trip affordable for all. The club is currently planning the annual trip for 2017, any help with fundraising is greatly appreciated!
American Association of Petroleum Geologists

This fall, the AAPG student chapter has been revamped, thanks to the influx of new faces in the department that have interest in the petroleum industry. In the past few years, we have graduated a handful of students who went on to work for various petroleum companies around the US. Our students have also been very active, presenting posters and talks at both the annual ACE and the Eastern Section meetings. We currently meet once a week, and meetings range from sharing internship experiences, discussing field trip ideas, and building soft skills such as interviewing, resume building, and presentation skills. After competing in the IBA competition in the spring of 2015, the student chapter took 2016 off in order to be super polished for this year’s spring 2017 competition! This year’s team has already started to prepare for the competition, which begins in early spring semester, and lasts 8 weeks. Dr. Robb Gillespie is the chapter advisor again, but this year we have additional help from Kyle Patterson (WMU alumnus) of Miller Energy who is acting as the team’s industry advisor to help with seismic interpretation. Kyle has graciously spent his time.

The Society of Exploration Geophysicists

Membership for WMU’s Student Chapter of the Society of Exploration Geophysicists (SEG) is free and provides you the opportunity to apply to a variety of research and travel grants as well as be part of an organization that boasts over 27,000 members in 128 countries. Both undergraduate and graduate students are encouraged to join. WMU’s SEG student chapter debuted in the fall of 2014, and has grown considerably since its inception. Our members now meet every week during the school year to plan social and academic events, and coordinate outreach events with local schools and other departments on campus. One of our main priorities is to gain hands-on geophysical experiences in the area, so this semester we are visited an oil and gas company in Grand Rapids to learn about their major projects and toured the facilities. Even if you do not identify as a geophysicist, the SEG foundation has a lot to offer, with national and international conferences and abundant travel grants to attend leadership and educational programs. This semester, our president, graduate student Hannah Pankratz, received a full scholarship to attend the SEG 2016 Annual Meeting in Dallas, TX to participate in ExxonMobil’s Student Education Program. Whether you are working toward your bachelor’s, master’s or doctoral degree, an SEG membership can open your eyes to cutting-edge research topics, familiarize you with the wide variety of geophysics jobs, and help you develop your network. For undergraduates, an SEG membership is also a great way to get your foot in the door for internships and travel grants. SEG is a strong addition to your resume and it is super easy to become involved! If you are interested in learning more, please stop by any Thursday at 1:00 pm in the conference room in Rood Hall when we have our weekly meetings, or feel free to email us at wmu.seg@gmail.com.


Group photo taken at a picnic hosted by Dr. Bill Sauck and his wife at their home in Texas Charter Township. Front row (left to right): Jay Kim, Elizabeth Palmer (secretary), Hannah Pankratz (president), and Ryan Franklin (vice president). Back row (left to right): Sear Rahimi, Benjamin Seideman, Katie Dvorak (treasurer) and Dr. Sauck (faculty advisor).

Group photo taken at their home in Texas Charter Township. Front row (left to right): Sear Rahimi, Benjamin Seideman, Katie Dvorak (treasurer) and Dr. Sauck (faculty advisor).
Please keep in touch!

Maintaining relationships with our alumni is important to both the faculty and staff who knew you. It is also a vital part of evaluating how our department prepares its students for life after graduation—whether you have decided to pursue a career in geosciences or not. As such, please take a moment to let us know how you are, where you are, and what you’re up to! While you’re at it, please also share where you are currently employed, what you do there, what your professional interests are, and your contact information so that we can continue sending you newsletters and updates regarding alumni events.

ATTENTION! Do you have electronic versions of your thesis, dissertation, proposal, or conference posters? We are currently collaborating with Waldo library in order to better archive student research. We welcome any/all work, but are particularly interested in electronic files from those alumni who submitted paper manuscripts to the graduate school (most likely before 2000). For more information, or to submit your work to Scholarworks (which is free to the public), contact us. To view the Department of Gesosciences' Scholarworks page, visit: http://scholarworks.wmich.edu/geology

Alumni Achievement Award 2016: Collage of Arts and Science honors alumni for their inspiring and outstanding contributions