

Dear Friends and Alumni

Geosciences continues to be one of the stellar programs in the College of Arts and Sciences and in the University at large. Our programs attract competitive



Mohamed Sultan, Chairperson

students from across the country and from overseas as well. Our enrollment continues to grow for the fourth year in a row, 125 this year up from 119 last year and our graduate students are at a record high, 51 up from 37 last year. Only three years ago our undergraduate population was 75 students and our graduate students were 35. As far as research dollars go, we are the third highest in the College; Geosciences brought in 1.8 million dollars last year. This research productivity is reflected in the number of publications our faculty and students publish, presentations given in national and international meetings, and awards earned. William Harrison received the 2010 Public Service Award from American Association of Petroleum Geolo-

gists; I was named a Fellow of the Geological Society of America; and two of our graduate students received All University Research Scholar Awards—Zhanay Sagintayev and Doris Becker. The Department continues to promote opportunities for our students, graduates and undergraduate, to participate and present their findings in conferences, opportunities that allow them to be part of, and interact with, the geologic community at large early on in their careers.

Accomplishments

All the hard work and accomplishments of the faculty, students, and staff over the past years is paying off. Our good work and stewardship is being recognized by the geologic community and exciting opportunities are coming our way—opportunities that will further enhance our education, research and outreach missions. One such opportunity is the possibility of becoming the new site for the Michigan Geological Survey. Given the expertise of the faculty, their experience with the geology of the state, and the facilities that exist in the department including the Michigan Geological Repository for Research and Education, we were selected to take over the

assessment and mapping duties of the Survey. A bill to transfer these duties to WMU Department of Geosciences has been drafted and is being introduced and we are hopeful that the new political realities following the recent elections will not delay the process. Regardless of whether we become the Survey or not, we consider the selection of our department to be a testament to our achievements. The selection of our department as the new home for the Survey is an acknowledgment of our accomplishments by the geologic community and an indication of the significant role they want us to play in the economic development of the State. It is no secret that in each of the 17 states where the State Geological Survey has become a part of a University Geology department, the selection falls on one of the most established and the most accomplished departments in the state. We would like to believe that Michigan is no different from the other 17 states.

This is not the only opportunity coming our way. As you probably know, our hydro-field camp is being recognized as one of the most distinguished programs nation-wide. Given this reputation, we have been

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approached by the National Ground Water Association (NGWA) to explore the possibilities of developing and offering additional hydro-field courses tailored to the needs of professional hydrogeologists. If we are able to configure the logistics, the first of these courses will be offered in Summer I. Leading these efforts from this end is Dr. Duane Hampton and Mike Durham, and from the NGWA side, Dr. Richard Laton, one of our loyal alums and a member of our Advisory Council.

Research

Just a few months ago, Zhanay Sagintayev, one of my Ph.D. students, successfully defended his doctoral dissertation and left for Canada, where he accepted a post-doctoral appointment at the University of Manitoba, Civil Engineering Department. Our research group now encompasses two Ph.D. students: Mohamed El Sayed and Talal Al Harbi; four master's students: Jinal Kothari, Dee Becker, Racha Al Kadiri, and Dale Dailey; two computer scientists: Benjamin Welton and Kyle Chouinard; and a senior research scientist, Dr. Adam Milewski. We have just started a new project with the Saudi Geological Survey to assess the distribution and causes of landslides in the Red Sea Hills area. Additional ongoing projects include the assessment of the groundwater potential in the Quetta region and the Sinai Peninsula that are funded by the USAID and NATO, respectively, a NASA-funded project over the Nubian Aquifer in N.E. Africa to assess the utility of GRACE data

for extracting hydrogeologic observations from GRACE data, and we are continuing our research in the Mojave desert to examine the potential role the dextral fault systems could play in channeling the water from the area. These could be acting as conduits for ground water transport.

Alumni

Geosciences is fortunate to have a group of loyal alums who support the department in all possible ways. The Advisory Council is a testament to the dedication of a group of very loyal graduates and friends of the department. Geosciences wants to stay connected to all of our alums and friends. The Spring banquet is our largest gathering, so mark your calendar for April 15, 2011. On such occasions our students are inspired by meeting you and finding more about your success stories, plus the exciting opportunities and activities you are engaged in. We also look forward to meeting with you in other avenues as well; one of these is the GSA annual meeting. For the past three years, and hopefully for years to come, we have been holding alum gatherings at the annual GSA meetings and we were quite excited about meeting graduates of our department who were attending GSA. Lastly, I would like to extend my deep appreciation to the family of Geosciences, its faculty, students, staff, alums and friends for their continued efforts to advance the mission of this department and to make us all proud of being affiliated with it.



Geosciences Alumni gather at Homecoming



Dave Barnes attempting to provide guidance to his students!

Dave Barnes

Hello friends and alumni;

I sit in the Denver airport waiting for the return flight to Grand Rapids and southwest Michigan after a very valuable Geosciences Technology Workshop on Carbon Capture and Geological Sequestration put on by AAPG. This is the eighth presentation that I have done this year with several more, including a trip to Amsterdam in the Netherlands for the tenth Greenhouse Gas Control Technologies Conference, and the Eastern Section AAPG in Kalamazoo this fall. Our research group (including Bill Harrison, Duane Hampton, Kyle Patterson, Farsheed Rock, Tony Clark, Amy Manely, Steve Zdan, and Kate Pollard [this fall] with technical support from Susan Grammer, Jennifer Porter, Lolita Kreivs, Stephanie Ewald, and Linda Harrison) is very engaged in geological carbon sequestration research in Michigan, including geological characterization, numerical injection simulation modeling, and outreach.

With financial support from six separate research grants, totaling in excess of \$1.3 million, we hope to continue to do a lot of good subsurface geology in Michigan for the next several years.

We are seeing a big resurgence in interest in subsurface geology, and the Michigan Geological Repository for Research and Education (MGRRE) continues to see strong forward progress in student involvement and professional activity. Our students have been very successful in obtaining industry internships and job opportunities both in the energy and geological sequestration arenas. We are fortunate to be in a very strong upswing in national interest and emphasis on energy and environment issues and we are well placed to accept these opportunities. With the strong likelihood of our involvement in the Michigan Geological Survey, the future of subsurface geological research in Michigan at

MGRRE is truly bright.

We will be substantially engaged in the Midwest Regional Carbon Sequestration Partnership (MRCSP) Phase III Deployment scale, CO₂ injection demonstration project for the next several years. This is a nationally prominent test of geological sequestration that will be conducted in northern lower Michigan and will evaluate at least two of the important and prospective saline reservoir sequestration targets in the state. There will be a very impressive array of scientific work done during this project, coordinated by the MRCSP lead research group at Battelle Memorial out of Columbus, Ohio. We have learned a lot through our association with the MRCSP group, funded by the DOE-NETL Regional Carbon Sequestration Partnership program for the last six years. We appreciate the collegial relationships that have developed through this research affiliation, and with the other affiliated state geological survey groups in the Midwest.

I have focused mostly on graduate sedimentary geology courses in the last year or so, and have had to learn quite a few new tricks. I can't imagine being in a technical discipline that does not evolve; we in the geological sciences are lucky to have so many new technologies, methods, and research concepts to use in our applied research activities. I still try to inspire the undergraduate majors in the Sed-Strat course and enjoy the annual trip to Kentucky to (hopefully) turn a new group of students on to sedimentary geology.

Our family does well. All of the kids are either in, almost finished, or actually finished with college. Brendan received his B.F.A. after five years of dedication to art, sculpture and ceramics. We hope that he can fulfill the promise of his rigorous training and demonstrated artistic creativity. Lily is nearing completion of her undergraduate sales and marketing program and will top it off with a semester abroad in Amsterdam next spring. Nick is settling into and more seriously focusing on his studies and is exploring the health sciences, along with LOTS of guitar playing. Teresa has been busy finishing up her responsibilities as the mother of young adults. She looks forward to some exciting art project opportunities on the horizon; more on this later, I hope. There has been a lot of gardening, windsurfing, and raising laying hens for me in the last year.

Best regards to all and I hope to hear from you, or better, enjoy a visit. We will certainly be in Kalamazoo for the foreseeable future!

Ron Chase

My 37th year in the department has been very rewarding. Firstly, I have received messages from many former students letting me know of their successful careers, family activities (which I consider equally important), and future plans. I continue to teach well beyond normal retirement time because I love to work with young people and watch them grow past graduation.

Secondly, I taught the typical petrology and slope stability courses to some great students and have begun to evolve a Geos. 1000 (Earth Studies) lecture sequence that complements the lab manual I wrote nine years ago.

Thirdly, I continue to massage the huge amount of data gathered during my Lake Michigan bluff monitoring study (between 1996 and 2008) and show that ground water activity is the main issue in bluff erosion, although other causes play off of the saturation effects in a manner that leads, overall, to a very unstable Great Lakes coast. Right now there



Ron Chase

are two recent publications (first authored by my former Ph.D. student Rennie Kaunda) and two manuscripts in preparation that deal with the issue of bluff erosion. Once these papers are out, we will have published all we can, without recycling stuff, given the scope of the 12-year erosion study.

My personal year has been excellent, thanks to my lovely wife and, in part, to my children. Chris remains the wonderful companion who allows me to be me while keeping me on track in a loving manner. Karl and Sandy added to granddaughter, Ella, to give us our fifth grandchild (Sarah Emily) in April. Jamie and Kate, and grandson Joey, have moved from D.C. to Portland, Ore., where he is a criminal trial attorney. Scott and Colleen, and grandchildren Maddy and Ethan, remain in Indianapolis, Ind., where Scott is a physician. Andy is still in Kalamazoo.

Two years ago, I indulged my passion for classical music by renewing my interest in the French horn, an instrument that I once played as a semi-professional before becoming involved with a geol-

ogy career. After two years of lessons with a wonderful teacher in the WMU School of Music (which will continue indefinitely), I am now a member of their horn studio, a member of the horn section in the Kalamazoo Philharmonia Orchestra, a member of the Kalamazoo Woodwind Quintet, a participant (and sometimes coach) in multiple summer chamber music workshops, and a recital soloist.

None of this replaces any teaching and research activities. What it does is add a wonderful new dimension to the life of a long-time faculty member and family man who already loves life.

Robb Gillespie

Cheers to all alumni and friends. Hard to believe, but it's been another great year, already.

Michigan Geological Repository for Research and Education (MGRRE) continues to expand. Some things move quickly; others just seem to grind along. The core and cuttings collections have grown to the point that rack space is at a premium, and it is time to order another full row of racks. The warehouse is filling up quickly. Remodeling seems to be a quarterly concern as the need for student workspace expands. Now, as the Utica, Mich. shale gas play heats up, I've enjoyed seeing old friends from other parts of the country, working other basins for various companies in the past—now focusing on the Michigan Basin—and coming to Kalamazoo to use the Michigan Basin cores and the data in the MGREE collection.

As the state of Michigan reinvents itself and reorganizes, it appears that MGRRE will play a role in both the resource assessment and the overall geological well-being of the state. Exactly what that role will be is still grinding through the state legislature, but it will prove to be another exciting step in the future of MGREE, regardless. It will be another challenge for the MGRRE team and the Department of Geosciences as a whole, but one that we are all up for, and we are looking forward to the beginning of this next journey.

The 2010 Eastern Section meeting for the American Association of Petroleum Geologist (AAPG) was held here in Kalamazoo, Mich., Sept. 25 to 29. The Michigan Basin Geological Society (MBGS), MGREE and the WMU Department of Geosciences were the main sponsors. Bill Harrison and I were co-general chairs, Mike Grammer was the technical program chair and Dave Barnes was the workshop committee chair. We worked

hard for the past six months getting the meeting put together. The theme of the meeting was “Perseverance—Pipeline to Prosperity.” The technical program focused on three topics: 1) the ongoing, unconventional shale-gas plays, with particular emphasis on the newly emerging Michigan Basin Utica Shale play; 2) new research in CO₂ sequestration; and 3) renewed interest in exploration and reservoir characterization modeling for the Trenton–Black River play. It was a very exciting meeting with somewhere between 300 – 500 geologists in attendance.

The economic downturn caught up with all the study abroad courses this past year, and many of the courses were not operated, due to lack of students. Our new course, GEOS 2020 Egypt—Civilization and Geology, was, unfortunately, one of those courses. Although it had been well received, and we had a great deal of student interest in the course this second offering, few students were able to afford the additional expense. It seems that most students are working harder, and being more frugal in an effort to cope with the continuing recession. Many of the students said they planned to have summer jobs, and were earmarking their earnings to take the course this coming year. Hopefully, that will be the case, and the course will once again be meeting this spring 2011 semester. Numerous alumni, friends and family are requesting information to get in on the trip. We are reserving a limited number of slots for their potential participation, so make your reservations early to ensure a spot.

The GEOS 1500 Geological Hazards and Disasters course continues to be popular. I’ll be teaching that again this fall, along with both sections of GEOS 3220 Ocean Systems. It should be another full semester for me with somewhere between 400 and 500 students in total. This should keep me more than busy.

I currently am on Jennifer Schultz’s thesis committee. She now has a full-time job in the oil and gas industry in Texas, so her progress toward thesis completion has slowed up a bit. It’s hard to learn a new, full-time job, and finish a thesis at the same time. But I have faith that she will make it. Peter Fuetz has asked me to be on his Master’s committee, and I’m looking forward to working with him unraveling the mysteries of the Trenton – Black River system.

We are currently developing a Power Point

presentation about our GEOS 4380/90 two-week field-camp course that we conduct in Michigan’s Upper Peninsula during the last two weeks of June each year. This presentation, which includes a section about the Marquette Iron Range, and a section about the Keweenaw Copper Region, will be shown on a second flat-screen in our Schmultz Geological Museum. This presentation will also include some spectacular photographs of various



Robb Gillespie

types of copper ore samples currently in the collections at the Seaman Museum (the official State of Michigan Mineral Museum) at Michigan Technological University. We have made arrangements with the Seaman Museum for use of their animation concerning the geological evolution of the Keweenaw Peninsula (Copper Country), and have also secured a number of beautiful copper specimens

from the Seaman Museum for long-term display in our museum. This fall will see a revamping and expansion of our “Michigan Upper Peninsula” and “Copper Region” displays.

I once again had the opportunity to help Dr. Ron Chase teach the GEOS 4380 “Field Studies in Geology” course this past summer. And, once again, it was a great bunch of students. The Quincy Copper Mine was “awesome,” and getting to stand “inside” the Hancock Fault where it cuts through the mine tunnel continues to be a “light bulb moment” for everyone (I still love it).

Tres Rios Resources, Inc., the small Texas based oil-and-gas company I’m associated with, had a reasonably good year. I’m happy to report that we were not involved in any oil spills, of any type, during the year. Neither my partner Ken, nor I, have to worry about getting our lives back, or being replaced and sent off to Siberia. Although, we did miss out on the \$15 million CEO retirement fund.

The new/getting-older house continues to be a black hole for all forms of currency (I don’t anticipate I’ll ever change this sentence). Between the Emerald Ash Borer and a mean winter full of storms, we have had to take down eleven trees this past year. I have so much firewood now!

Mike Grammer

Greetings friends and alumni:

It has been another busy and fulfilling year here in Kalamazoo that included quite a bit of travel, as well as work on the RPSEA grant that Bill Harrison and I have and the Eastern Section AAPG Meeting which we hosted this year. I was on sabbatical last year so was in and out of town quite a bit, traveling to Florida, Colorado, Texas and Brazil to meet with colleagues, give some talks and learn a bit more about carbonate petrophysics. I have recently been asked to develop and teach a course for Petroskills International entitled Petrophysical Characterization of Carbonate Reservoirs, so I will continue to be very busy trying to put that course together. So far, the course is scheduled to be taught in Calgary, London, Saudi Arabia and Houston during the summer of 2011.

This year our group was able to take a field trip to look at ancient carbonates and discuss sequence stratigraphy in the Paradox Basin of the 4-Corners region (see photo). Thanks to very gracious financial donations made by some of my former students Audrey (Ritter) Varga, Jennifer Schulz and Heather Qualman, my current students were able to attend the week long field trip, including a day rafting down the San Juan River, for nominal costs. As an extra attraction this year, professional geologists Diana Morton-Thompson and Paul Daniels joined us in the field and provided some “real world” input for the students during our field and core exercises. It was also good to have them there so that the students would know if (or when?) I was “lying” to them.

The RPSEA grant that Bill Harrison and I have is focused on evaluating the stratigraphic controls on the distribution of hydrothermal dolomite in the Albion-Scipio trend in the Michigan Basin. We have three M.S. students working full time on the project: John Thornton (Prediction of Petrophysical Properties of Trenton-Black River [Ordovician] Reservoirs by Comparing Pore Architecture and Permeability to Sonic Velocity); Pete Feutz (Evaluating the Effects of Thin Shales on the Lateral Distribution of Hydrothermal Dolomite Reservoirs, Albion-Scipio

and Stoney Point Fields, Michigan Basin); and Marcel Robinson (Integrating Depositional Facies and Stratigraphy in Characterizing Hydrothermal Dolomite Reservoirs: Trenton Group of the Albion-Scipio Trend, Michigan Basin). All three students made successful presentations on their thesis projects at the ESAAPG held here in Kalamazoo this September.

Other research ongoing in the Michigan Basin include Jenny Trout’s (M.S.) analysis of the variation in reefal communities within Silurian reefs in the Michigan Basin, utilizing some of the previous work done by our group showing that there is a distinct windward/leeward variability in the Niagaran-aged reefs here in Michigan. In addition, Shawn McCloskey is continuing his work on reservoir characterization and modeling of Devonian pinnacle reefs and associated facies.

Our two Egyptian Ph.D. students continued to make excellent progress with their Cretaceous sequence stratigraphy and isotope geochemistry related outcrop projects based in Egypt. Tarek Anan went back home to Egypt this summer and has successfully defended his Ph.D. Yasser Salama is currently finishing up his dissertation and will hopefully be with us until early summer 2011. It has truly been a rewarding experience, both for myself and for the other students, for us to have these great guys in our group the last couple of years.

In addition to the Michigan Basin work, new student Jason Asmus (M.S.) is just beginning to look at Permian age carbonates in the Delaware Basin of W.

Texas. Jason will be looking at the depositional and diagenetic history of the deepwater Bone Springs limestone and developing a reservoir characterization model of the unit using a combination of core, wireline logs, and outcrop data.

As noted above, the Eastern Section AAPG meeting was held this year in Kalamazoo and by all accounts was a very successful meeting on all fronts (as I am sure you will hear from several others in this newsletter). As the Technical Program Chair for the meeting, I was pretty busy for the last several months putting the program together, alternating between cajoling and pumping up various authors



Paradox Basin

for their abstracts and papers, and doing all the other things that go into putting a meeting together. Just to make sure I had limited time to get in trouble, I also put together a one-day core workshop on the RPSEA project along with Bill Harrison and students that we delivered the Saturday before the Technical Meeting actually started. We could not have done it without all of the help from our graduate students, as well as a number of talented undergraduates, especially Jared Bowen and Hachemi Bouali who helped me out with all of the presentation downloads and technical issues that came up before and during the meeting.

WMU in general, but also our group in particular, had a strong presence at the meeting, with our research group giving a total of 9 presentations. One of the most rewarding aspects of the meeting for me personally was that a number of my former students returned for a special session on carbonate reservoir characterization. Amy Noack, Jennifer Schulz, Heather Qualman and Audrey (Ritter) Varga all returned to give exceptional presentations on their WMU thesis work at the ESAAPG. In addition to the satisfaction of watching these young professionals deliver some of the best presentations at the meeting, I was also pleasantly surprised when we heard that Heather Qualman received an award for the Best Presentation by a Student in the Professional Session for her talk last year at ESAAPG. This was not the first time Heather won an award for a presentation at ESAAPG, and is an addition to previous AAPG awards given to other students in our group (Jen Schulz, Audrey (Ritter) Varga, John Thornton, Shawn McCloskey and Tony Sandomierski).

Next year looks to be every bit as interesting as this year has been, and I am especially looking forward to the travel associated with Petroskills courses, as well as the Bahamas course that I continue to co-lead. Best wishes to all of you for a happy and healthy new year. As always, let us know if you are ever in town. We would love to show you some of the work we are involved with.

Duane Hampton

It's been another quiet year in Kalamazoo. Life is good. I am working with Dave Barnes on his many U.S. Department of Energy grants to further the prospects of geological carbon sequestration. My role has been to work with students to help them model injection of supercritical carbon dioxide into deep saline aquifers in the Michigan Basin. This has



Duane Hampton

been good for me, because for many years I haven't done any modeling. Yet this work builds on my background in modeling flow and transport, in working with immiscible fluids (supercritical CO₂ is immiscible with brine), and in geology in general. My general attitude toward modeling is

that of a skeptic: show me why I should believe a model's results. Now I get to build a case for modeling as a tool in evaluating possible failure modes for geologic sequestration, and also in increasing the odds of success. I'm not quite in hog heaven, but I'm enjoying this opportunity.

On the teaching front, I'm trying some new things, too. 1. In the fall of 2009 I taught my surface water hydrology class in Geosciences at the same time as teaching essentially the same course in Civil & Construction Engineering for the first time. I adopted a new textbook to make that work. 2. I taught a new course in January 2010 called Climate Change: Geologic Perspectives. Dan Cassidy and I worked on getting this approved. We felt there was a big void in Western's course offerings that this could help fill. Then I got the opportunity to teach it the first time, and next spring as well. We taught this with a discussion section instead of a "lab", which is the first time I have tried that. I will need a different textbook next time around, but I'm happy that we instituted this course. I think it will contribute a lot toward Western's educational mission. 3. My advanced hydrogeology class this fall is focusing more on flow of immiscible fluids than before since several students in the class are interested in working on carbon sequestration. 4. I'm working on setting up a three-day short course on pump and slug tests to be taught next May or June at Western by myself and a guest instructor. National Ground Water Association would advertise and "sponsor" it, thanks to a good word from WMU super alumnus Richie Laton, this year's President of the NGWA's division of approximately 16,000 hydrogeologists.

I have several good graduate students working with me, which, of course, is also renewing and exciting. Tony Clark and Amy Manley are working on modeling CO₂ sequestration in the Sylvania and Mt. Simon formations. Rachel Salim is working on laboratory and theoretical determination of the height of capillary rise in porous media of different grain-size distributions. You'd think that this should

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have been settled decades ago, but it hasn't been. Hussain Al'faifi, a doctoral student, is testing the Bouwer and Rice slug test analysis method at a site by Asylum Lake. I've had students start this work before, but not finish. This time I hope we can finish the study and publish it.

Finally, on the home front, my wife and I are enjoying our lives as empty nesters. My wife works now that the kids are gone, and we are busy serving in our church's 12-step program. Our four children are married and on their own, and we have five grandchildren with a sixth due this Thanksgiving (how appropriate!). Of course, everybody has their struggles, financial, emotional and even physical. But all of them are bearable, formative, and character-building. We're happy.

I wish you and yours health, happiness, fulfillment and professional satisfaction in the midst of these trying times.

Alan Kehew

Hello everybody,

As I am just starting a sabbatical, my contribution will be short this year. The academic year was pretty typical for me, teachingwise. Over spring break, I took a trip to Egypt to visit the field area of a visiting scholar from the Desert Research Institute in Cairo, Sayed Alfaran. He is working on the groundwater conditions near Lake Nasser in extreme southern Egypt, near Abu Simbel.

We spent about a week in his field area collecting data. Then, during his stay at Western Michigan University, he will complete his Ph.D. The Kurkur Plain in this area of the Western Desert is a very interesting pediplain, with isolated hills of Cretaceous

sandstone, erosional remnants everywhere. From a distance they look like pyramids (picture to come). My theory is that the ancient Egyptians got the idea for the pyramids in Giza and elsewhere from these hills rather than some religious symbolism.

I'm sure the archaeologists will think I am crazy.

Earlier this summer, I continued mapping in Barry County, Mich., with the State Geological Sur-

vey. We are just about finished with the county and it has added much new detail to our previous work on tunnel channels, which are erosional valleys formed by meltwater underneath a glacier.

My sabbatical project is focused on these valleys and I plan to spend a month in Denmark this fall with Jan Piotrowski, who is one of the top European experts on tunnel channels. We will write a paper on tunnel channels in general, or on the Saginaw Lobe tunnel channels in Michigan. I will fill you in on that in the next newsletter.

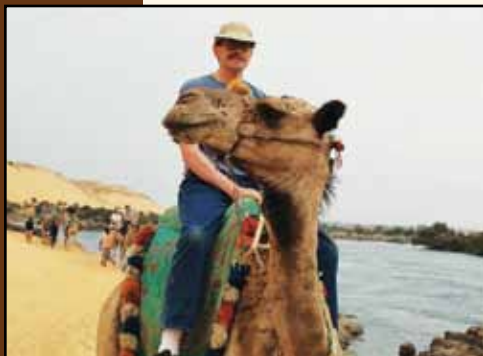
Michelle Kominz

Hello alumni and friends. Time flies when you are having fun, and I sure have been having fun since I last wrote.

Fall 2009—The Department gave me the semester off, since I really did go to sea in November and December on the R/V JOIDES Resolution (called the JR by those of us on board), IODP leg 317: Canterbury Basin Sea Level. The name implies, correctly, that the primary function of the two months of drilling was to provide data that I will eventually be able to use in my geodynamic models in order to determine the sea-level history in the New Zealand region for the last 15 to 35 million years. Normally I do the modeling beginning two to three years after the data is acquired. This time, I was also a cog in the machinery, doing the tedious exercise of obtaining one little piece of data—physical properties data. On-board scientists pull 12-hour shifts. Mine was from midnight to noon. I spent the day sampling core, weighing samples (a trick on a ship), measuring volume in a pycnometer and then quality-checking the data.

When I had a break from all of that, I worked on other physical properties stations: a thermal conductivity probe, a natural gamma ray counter or a multisensory track with P-wave velocity, GRAPE density, and magnetic susceptibility. During my 12 hours off, I was writing up results from the 12 hours on. Usually, I was the chief writer of our four-person physical properties group, since I am a native English speaker and the other native English speaker, Bob Carter, from Australia, was divided between physical properties and macrofaunal identification. My co-worker on the midnight watch was Daniel Hepp from Germany and Bob's was Young Kim from Korea.

There were no breaks for weekends and maybe an extra hour off on holidays (11-hour shifts). And



Kehew on a Camel!

we had holidays...Thanksgiving, Christmas and New Years were celebrated on the JR. Working an 84-hour week with another 20 hours or so of home-work sounds rough, but, in fact, this was GEO-nerd heaven. You get to do what you love, getting fresh surprises (new core, new results) every few hours, with a group of people who are just as passionate about the stories that rocks can tell. It is an experience not to be missed.

We boarded the ship in Townsville, Australia on Nov. 7. We had several days in port and then eight days crossing the Tasman Sea. During this time we were getting up to speed with lectures on the practicalities of life at sea, the research we were about to undertake, and scientific background. I even gave a talk about my research plans with the data that the scientists were about to gather. And we learned how to use the equipment at our stations. We stopped for about 12 hours in Wellington, New Zealand, to pick up fuel for Expedition 318. Winter fuel for their trip to Antarctica would be unavailable when we got off the ship in early January. Once we set sail from Wellington, it took less than 12 hours to reach our first station. Then we began to drill. The goal was to obtain as complete a sedimentary record as possible in a dip transect of the top 500 or so meters of section in the Canterbury Basin. This expedition achieved several firsts. We drilled in the shallowest water for the JR. Usually she is pretty poor at drilling on the shelf, but due to the fine-grained nature of these sediments we had pretty good recovery. Our second site was occupied the longest. We drilled in the upper slope and reached our goal—the Eocene section—at some 1900 m; the deepest single-leg core drilled by the JR. Despite our successes, there were challenges. The biggest was wire line logging. The clastic sediments tended to cave in on the instruments. That meant hours of nail biting while the logging equipment was retrieved. It also meant that we never got to shoot vertical seismics, so concerns about air-guns and marine mammals did not materialize. Albatross were in abundance. They hung around the ship during the day, flying when the wind picked up and bobbing about otherwise. At night they hunted squid that came up to the surface in schools. We had one whale sighting while I was awake, and there were often a few seals. But most of the wildlife was viewed by the day-watch. We were always in sight of land—New Zealand’s South Island—but rarely saw it, due to fog or weather. In Wellington I met up with Travis Hayden, who is a Ph.D. candidate working

with me at Western Michigan University. He was getting ready to board the JR and take my place as physical properties specialist on Expedition 318: Wilkes Land Glacial History. Travis is studying the results of ANDRILL coring in Antarctica, and we expanded his program to include 2.5 months on the JR, drilling off the coast of Antarctica. Both of our blogs may still be seen at: <http://joidesresolution.org/blog>.

When I arrived in Kalamazoo from Wellington,



Michelle Kominz and Stacie Blair

I had less than 24 hours to prepare for my first ski race of the season and less than five days to prepare for the first class of the spring 2010 semester. Yes, I am still participating in the Timber Ridge adult ski league. And, despite being quite frazzled and not getting much slope time this year, I managed to walk away with the “fastest mature female” award this past season. The fast gals are finally reaching the “mature” category, so I was lucky to score that top award this past year.

I taught two classes in the spring, Quantitative Basin Analysis, a graduate class, and Ocean Systems, a general education class—the two ends of the spectrum. I used some of the materials that I obtained on the JR for the graduate class and the whole class gained some familiarity with the Canterbury Basin as they developed skills in backstripping and in sequence stratigraphic interpretation.

I used some of Travis’ blogs on expedition 318 in my Ocean Systems class. Three TAs took turns helping me in with class logistics and exams. Somehow we all survived. As advisor for our undergraduate majors, I have been kept busy. I tried to meet with everyone in the fall before leaving for my two-month voyage. For the ones who resisted my emails, Heather Petcovic increased her advising duties and

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took my place while I was at sea. Somehow the number of students interested in geosciences at Western Michigan University seems to be growing. It is fun getting to know all of you, at least a little bit.

Carla Koretsky

Hello friends and alumni!

I hope it has been a good year for all of you. It has been another busy year for Team Geochemistry, and we have also grown in size this year. Last year, we were joined by Dr. Seonyoung Kim, who is completing postdoctoral research with me, funded by the South Korean National Science Foundation. She is interested in the effects of road salt on wetland sediment geochemistry; an interest that turns out to be quite timely.

Trevor Whitlock continues his Ph.D. research on interactions with nickel and sediments, and hopes to finish up his work and defend his Ph.D. in the coming year.

Michelle Barger joined us last summer as a doctoral student as well, having decided not to take her M.S. in Geosciences and disappear to the "real world." Instead, she is sticking around for a bit to complete a Ph.D. in Geochemistry. She has spent considerable time developing expertise in uranium-organic acid geochemistry and is continuing a project to look at how organic acids influence the adsorption of uranium on clay minerals.

Martin Akafia and Angel Cuellar, both M.S. candidates, are very close to finishing up and should both be defending in the coming months. Martin has completed a comprehensive study of metal adsorption on montmorillonite, while Angel has worked on calibrating a sequential extraction scheme to better understand metal speciation during reductive dissolution of iron oxides.

Dan Levine has recently joined our group as an M.S. candidate, as well. He will be investigating Cr(VI) adsorption on a variety of sorbents. This work will be supported by a Department of Energy grant that I recently was awarded.

Patrick Donovan has recently graduated and plans to continue his geochemical education as a doctoral student at the University of Michigan with Joel Blum's research group. Donovan will be presenting results of his work at WMU (together with Michelle, Seonyoung and Martin) at the upcoming Goldschmidt conference in Knoxville, Tenn. (Not so exciting a setting as Davos, Switzerland was for

last year's Goldschmidt, unfortunately!)

Ryan Sibert has just finished up his undergraduate degree at WMU, but will be staying here for a couple more years to complete an M.S. with me. He plans to look at salt input in Woods Lake (more on that in a bit).

Thomas Reich, another undergraduate member of Team Geochemistry, has been working on Pb adsorption on a variety of substrates. In addition to presenting this work at last year's Goldschmidt conference, he is first author on a paper recently accepted by "Chemical Geology," focused on this work.



Carla Koretsky

Andrew MacLeod and Christine Synder, both of whom recently completed their undergraduate work in geology, are currently working with me (and Ryan Sibert) on a summer internship, funded by the Pierce Cedar Creek Institute in Hastings, Mich. We are investigating the water quality of four lakes, two urban/suburban (Asylum Lake and Woods Lake), and two rural (Brewster Lake and Aurohn Lake).

One of the most interesting endeavors for me in the last year was the development of a new course in environmental field geochemistry. This course is funded by a National Science Foundation Geoscience Education grant awarded to Dr. Heather Petcovic and I. We spent much of last summer creating a cutting-edge water quality analytical facility in Rood Hall for undergraduates in this course. Equipment purchased for this lab includes an ion chromatograph, three UV/Vis spectrophotometers, and a plethora of other smaller equipment (pipetors, balances, centrifuges, stir plates, ovens, glassware, etc). We also purchased some pretty nifty field equipment, including two large canoes, a Van Dorn sampler and a variety of field probes.

Heather and I worked with doctoral student Kate Rowbotham (Mallinson Institute for Science Education) to create the new course, which is structured in a very non-traditional way. In the first offering of the course (fall 2009) students investigated the water quality of a local lake (Woods Lake), designing and carried out their own field and laboratory sampling plans. The semester culminated in an open-house poster session held at Bell's Brewery,

at which the students discussed their results with members of the local community. The students found that not only is Woods Lake eutrophic (nutrient-rich, creating a lack of oxygen in the water), but it also has unexpectedly high levels of sodium and chloride, presumably due to historic loading by runoff with high levels of dissolved roadsalt.

The work these students completed is truly impressive. They quickly learned many new procedures and generated publication-quality data by the end of the semester. Their work now has been presented to the Woods Lake Association, the Winchell Neighborhood Association, the Two Rivers Coalition and students at Portage Northern High School and Decatur Middle School. I am very much looking forward to the next iteration of this course, which is offered in fall 2010. In addition, Heather and Kate are completing a comprehensive study of student conceptions of biogeochemical cycling, eutrophication and related processes based on this course. Their preliminary results are fascinating and should yield very useful insights regarding student learning with respect to these subjects.

In other news, after my debut in the Chicago Marathon in October 2008, I officially became hooked on marathons. Since then I have run four more full marathons: the Mont Blanc Marathon in France (June 2009), the Air Force Marathon (in September 2009), the Rocket City Marathon (in December 2009) and most recently, the Kentucky Derby Marathon (in April 2010). I am very excited to have qualified for the Boston Marathon in my last race, with a time of 3 hours and 41 minutes.

Finally, I went to Wheeling, Ill. (a suburb of Chicago) to receive the 2010 Wheeling High School Distinguished Alumni Award. on Sept. 10. I met with students all day long, then went to a BBQ with staff/faculty from the high school. They presented the award at half-time during a football game that night.

I hope that all of you have had a terrific year, and please contact me to let me know what you have been up to at carla.koretsky@wmich.edu!

R.V. Krishnamurthy

Last year began with mixed feelings. I had just returned from my sabbatical leave which took me to Finland, India, Germany, the Czech Republic and Paris. During those halcyon days, one was tempted to forget the routine chores back home, but a month's respite before proceeding to Europe

brought me back to reality! In any case, the fall semester began with the usual verve and I enjoyed going back to the classroom to teach hard core earth science. It also was time to work on a paper that is to come out in a special volume of the journal *Quaternary International*. Oh! Just heard that the paper has been accepted. The activities meant that one could spend little time in the lab that had been shut down for a year. The lab responded, like a toddler, showing protests for being ignored for so long. As we go to press, all I can say is, work is in progress.

There was a bright silver lining to the dark clouds generated by a reticent lab and that came in the shape of one of my most cherished students, Dr. Eliot Atekwana, getting the Distinguished Alumni Award. In my opinion no one deserved it more than he did. Eliot, now an associate professor at Oklahoma State University, has been in constant touch with me, and last month we sent out a paper to *Rapid Communications in Mass Spectrometry*. He is a well-respected geochemist of whom our department can be really proud.

Looking at the relationship between Eliot and me reminds me of the famous Michael Faraday. As we all know, Faraday had very little formal education and spent most of his time with mentors, doing menial jobs in their laboratory. These mentors were well recognized chemists in England at that time, and in one important meeting one of the mentors, a chemist—already a knighted figure—was asked what his



R.V. Krishnamurthy

greatest contribution to science was. This honorable gentleman pointed at Faraday and said, “he is my greatest discovery.” I guess, with due humility, I can say the same about Eliot!

The spring semester sprang a surprise by having me teach an undergraduate course that I had never taught before. I accepted the challenge but, given the nature of the students in the class, it turned out to be lot of food for the assessment program that has been in place for few years. Hopefully, the experience gathered from this will help me address the process in depth, and also will be of use to other colleagues.

The winter was erratic last year and made me wonder if there was a connection between our win-

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ter and global warming. Admittedly, last year was an El Niño year and some of its ramifications showed in our winter, but a few other anomalies require investigation. For example, some studies suggest that global warming will result in more lake-effect snow in the Great Lakes region. This is a good topic for interested graduate students to pursue!

Returning from sabbatical had other unavoidable side effects, too. Having disconnected all services, the first task was to get a new phone line. A new phone line we did get, but it somehow got misinterpreted. If my name is “Googled” it takes one to “RV dealers in Kalamazoo.” No wonder I keep getting at least 10 calls a day inquiring about various RV related issues. I never responded nor returned their calls until last week when the Better Business Bureau called me say that they have received lot of complaints about my RV business! So my business acumen is crushed even before it has a chance to take off!

Moral of the story: Be aware of how your private information is available to all people around the world and in what distorted manner.

Heather Petcovic

Greetings Geosciences friends and alumni!

I continue to keep busy with teaching, advising, research, and involvement with the Journal of Geoscience Education, where I currently am an associate editor for the research section. This fall the Earth Science for Elementary Educators course will be renamed Exploring Earth Science: Geology. In this course, I continue to use a combination of hands-on lab activities, short lectures, and discussions to build understanding of geology content for future K-8 teachers. My four doctoral students in the Mallinson Institute for Science Education (MISE) keep many of my research projects moving forward, as well as pursue their own interests in earth science education research. I also continue as the undergraduate advisor for the earth science teaching major and minor, in which we currently have about 50 students.

Two major National Science Foundation (NSF)-funded research projects keep me busy. In the fall of 2009, Carla Koretsky and I, with the help of MISE graduate student Kate Rowbotham, developed a new environmental geochemistry field and laboratory course. The 16 Geosciences and Environmental Studies (ENVS) students enrolled in the course conducted a water-quality assessment of Woods Lake in

Kalamazoo, and presented their results to the community. The students found that, in addition to problems with eutrophication (excessive nutrients leading to algal blooms and low oxygen levels), the bottom water of the lake is excessively saline, likely due to decades of road salt accumulation. We’d like to thank student volunteers from the course who participated in surveys, observations, and interviews as part of our research on student learning. We have presented education research from this class at Goldschmidt and Geological Society of America (GSA) conferences, and plan to present more at the fall American Geophysical Union (AGU) conference. The course was offered again in Fall 2010.

My second NSF-funded project investigates geologic problemsolving in the field—with a focus on better understanding the skills and knowledge that underlie field work in bedrock mapping. We are interested in how these skills and knowledge transition from novice (student) to expert (professional geologist). By comparing the strategies, behaviors, and thought processes of the students to the professionals, we hope to understand where the gaps are between student and professional thinking in the field. Together with collaborators Kathleen Baker (Geography, WMU), Julie Libarkin and Zach Hambrick (Michigan State University), Joe Elkins (Northern Colorado University), and several doctoral students from MSU and WMU, we spent a week in 2009 and two weeks in 2010 in the Rocky Mountains in Montana collecting data from 68 participants as they completed a battery of cognitive measures, plus a one-day



Heather Petcovic

mapping project. Many thanks go to our project volunteers for allowing us inside their heads as they mapped. We have presented results from this study at GSA, the American Association of Geographers (AAG) conference, and at the International Geoscience Education Organisation (IGEO) conference in South

Africa. In January 2010, I was invited to give the keynote address about this project to a geoscience education conference in Birmingham, England.

Continuation of these projects, plus advising, teaching, and working with graduate students, promises to keep the coming year interesting! In my spare time (what there is), I play Medieval and

Renaissance music with the WMU Collegium Musicum and enjoy hanging out with my family, Mike, Jessica (five) and Allie (two).

William Sauck

Hello friends and former students! In the Fall, 2009, semester I taught Geos. 5600 (Intro. to Geophysics), with a class of 14. Teaching during Spring term included a small class (four) for Ground-Penetrating Radar (Geos. 6500) and a large class (75) of Geos. 1000. For the third year, I did not teach the Geophysics module of the Hydrogeology Field course during Summer II, again turning that over to recently graduated Dr. Laura Sherrod. From Apr. 11 - 14, the SAGEEP (Symposium for the Application of Geophysics to Engineering and Environmental Problems) meeting was held in Keystone, Colo., where I presented a paper.

Our exchange program with several Egyptian universities continued. Akram Aziz Ghataas was wrapping up writing on his Ph.D. research and two manuscripts, preparatory to returning to Egypt in early September 2010. Another geophysicist arrived on the channel program, Ihab Ibrahim Ahmed Ali. Arthur Obiadzie is finishing his field work (gravity and seismic) in Texas Township, and Ben Hoyt continues with his gravity and magnetic surveying south of Battle Creek. I spent time in the spring again in the Mojave Desert with Dale Dailey, looking at the geophysical signatures of the Helendale and other parallel faults, and their effect on groundwater flow.

On the family side, Christine graduated with a Ph.D. in Clinical Psychology at Clark University in Massachusetts. Carolyn began her M.S. in Environmental Engineering at the Colorado School of Mines in January. Eric took a full-time engineering job with Kia Motors in Irvine, Calif. Oldest son Jeff and his wife live in Crystal Lake, Ill., with our two grandsons, ages eight and four, where he heads a small engineering group at a manufacturing facility.

After a very difficult 2009, with the death of my mother in January, and Elen in April, the year 2010 has been going much better. I married my undergraduate college sweetheart, Arlene (Kelly), in June.

(We had not been in contact since 1963, but she found me with Google.) We traveled to Italy (Tuscany) for 10 days, and then to Brazil for a month.



William Sauck

In August we went to Iguassu Falls (Brazil) where I presented a poster at the American Geophysical Union meeting.

Chris Schmidt

I spent a little over two months of my spring term sabbatical in Cordoba, Argentina doing field work with colleagues at the university there. Cordoba is located in the mountains of the north central part of the country, and our field work was in the foothills of the Andes (Precordillera) near the border with Chile, about a day's drive from Cordoba.

When I first went to Argentina about 20 years ago I helped my Argentine colleague (Ricardo Astini) and an old friend (Bill Thomas from the University of Kentucky) work out a tectonic history in which a large piece of Laurentia was rifted out of the southern Appalachians in the Cambrian, crossed a bit of ocean,

and collided with western Gondwana in the Ordovician. We are now studying the Paleozoic history of the northernmost part of this Precordillera terrane. My main focus was on the Ordovician-Devonian tectonic history, and we have made enough



Chris Schmidt

progress on it to present a paper at GSA in Denver this year. It's a really fascinating story that involves the collision of another terrane (Chillenia) in the Devonian with obduction of Ordovician oceanic crust onto Grenville age basement. I plan on returning again this spring and hope to continue going back each year as long as I am able. Working at 4500 meters in a mountain desert in strong winds is challenging.

I also spent August in Montana doing a bit of field work in the thrust belt, fishing, and roofing my house in Cardwell.

Carolyn has moved to Lander, Wyoming where she works as a geologist for the Bureau of Land Management. She enjoys the field work and certainly does not miss working for the city of Kalamazoo. My youngest son Gene is a senior in our department and my grandson, Saul, (now 3 1/2) is a great little kid who is frequently in tow with Gene around Rood Hall.

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Congratulations



Editor-in-chief with *Geochemical Transactions*
Carla Koretsky



Department Faculty Award for Service
Alan Kehew- professor of glacial geology and hydrogeology



Nominated for scientific leadership in the United States, GSA Fellow: North-Central Section
Mohamed Sultan



2010 Public Service Award from American Association of Petroleum Geologists
William Harrison



William Harrison



Participated in the Integrated Ocean Drilling Project
Michelle Kominz



Michigan Geological Repository for Research and Education (MGRRE)

We want you to know how much we appreciate it when you call or email us to let us know how you are doing. We are always so proud to see our graduates at meetings, usually giving papers, and to see your professional growth. We also are grateful to have welcomed a record number of industry members at MGRRE this past year, and to have shared your excitement in looking for data for new prospects and projects.

We thought 2009 was pretty busy. Looking to 2010, we thought we'd have about the same level of activity; we were clueless. Here's a brief summary of our 2010 highlights:

Repository and data management news:

• Three moving vans rolled up to MGRRE, containing 80 years' worth of cuttings previously archived by the State DEQ in Lansing. We are very pleased to house these samples from more than 10,000 wells. A team of students currently is working

on the inventory.

- We are merging more than 6,000 boxes of cuttings, previously held in two separate collections here, noting inventory corrections as we go, and making those samples much easier to access.
- We initiated a b3ar-coding digital asset management system (you can imagine the ac-

ronym) and have started to place bar code labels on every box of cores, cuttings and rock samples, and every paper record here. It is dizzying to think about. Several geology students and work-study students have started that project, working only on the cuttings so far.



Bar coding cuttings

- We finished scanning the hand-written production records from the Albion-Scipio field. So far as we know, that set of eight leather-bound books is the only one in existence and is proving very useful to our RPSEA research.
- Our work-study students have inventoried and scanned almost 4,000 mudlogs and hand-entered porosity and permeability number for more than 2,000 core analyses—all available digitally now at our web site.
- We received 18 four-drawer file cabinets of well records, including wireline logs and mudlogs. A team of work-study students is working on that inventory.
- Linda Harrison hired and supervised several new work-study students as well as geology students for all the repository work. Many of them worked through the hottest summer we have seen—in an unair-conditioned warehouse. Lots of frozen juice bars were consumed. Kudos and major thanks to those students!
 - With all that help, we completed the year's work in partnership with the state DNRE to inventory several major collections and report that to



80 years' worth of cuttings arrive at MGRREE



Jennifer Triout works with cuttings.

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the national project on repositories, funded by the U.S. Geological Survey. Thank you, Steve Wilson (DNRE) for putting in all your agency's data and metadata. Whew, glad that's done!

Staff and facility news:

- Niah Venable left for Colorado in the fall for graduate school and to live in the mountains. She made a major contribution here by organizing the internal data server, entering data in the Petra system, and training students on both. We miss her already, but we applaud her courage to follow her dream.
- We welcomed a new staff member this year to help manage MGRRE and MichCarb data and work on our web pages. Lolita Krievs has an extremely high tolerance for attention to detail and has QC'd several datasets, reformatted everything to help people search them, and created new pages for MichCarb and for MGRRE. She's so highly skilled and a joy to work with. Welcome aboard, Lolita!
- In the summer we packed up everything in four rooms on the ground floor of MGRRE, took out old desks and furniture that was earlier rescued from surplus, and equipped new work areas in the largest two rooms to create space for more data lines and students. Both the Miller and McClure Rooms now have work areas and data lines for six students, bookcases and file cabinets. We relocated the kitchen cabinetry to the warehouse and now have a break area there. Linda had her desk area turned around so she can face the lobby. She couldn't find her pencils or anything else for a while. Thanks to all the students who helped with that move. We couldn't have done it without you.
- Linda Harrison continues to work with industry in responding to requests for data and sup-



A thin section of core

porting their on-site visits. She hires, trains and supervises all the students who do the heavy lifting around here. Linda also writes grant reports, handles PR for MGRRE, writing and illustrating articles, and helps to generate revenue for MGRRE. In her spare time, Linda still enjoys photography and went to the Badlands, Iceland and Nova Scotia this year for workshops, sometimes dragging Bill along when he's not too busy at the vineyard. We had a late frost this year, so we won't have a huge crop, but the grapes look good and are headed to an early harvest with this hot summer.

- Industry outreach—Bill Harrison and Robb Gillespie co-chaired the American Association of Petroleum Geologists Eastern Section annual meeting here in September, and Mike Grammer planned the technical programs. A big crowd of geologists came to Kalamazoo for the meeting, which was jointly sponsored by MGRRE and the Michigan Basin Geological Society. Technical programs, poster sessions, three field trips and three workshops were featured in the five-day event. Dave Barnes, Mike Grammer and Bill Harrison, along with many of our students presented papers and led workshops and field trips.

All our faculty members, Bill Harrison, Dave Barnes and Mike Grammer published and presented several research papers this year. Please see the publications section for those.

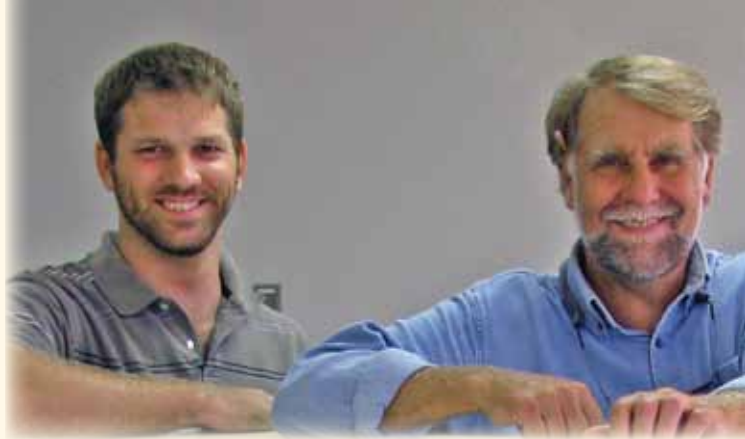
- Linda and Bill Harrison presented three PTTC workshops this year, attended by more than 300 people. They also responded to a record-breaking number of requests for data and on-site visits by industry members looking for information relative to the new gas play in northern Lower Michigan. Because of a successful new well, the State took in a record \$178 million at their May auction for the right to explore for oil and gas on state land. The previous records as \$23 million set in 1981. Bill was interviewed by MiBiz and several other Michigan media members about the new play. MGRRE is pleased to have played a role in helping industry members before and after the auction by supplying core, cuttings and well records to identify potentially prospective areas. We'll be following the economic impact of this play.



CO₂ Poster

Research News:

- WMU President John M. Dunn joined us at MGRRE in January for a visit by Congressman Fred Upton. His press release about the meeting began: “Breakthrough WMU Research Could Transform Climate Debate, Create Countless Jobs in Region.” The release continued, “Upton spearheading a bipartisan effort in Congress to support state-of-the-art research conducted at MGRRE to advance the development of carbon capture and sequestration technologies, which have the potential to revolutionize the effort to reduce carbon emissions.” MichCarb, the Center created by that funding, focuses on research and educational outreach. Drs. Barnes and Harrison head up MichCarb and are joined in their research by Dr. Duane Hampton and several graduate students. For more about MichCarb, please see their faculty updates.
- Dave Barnes would like to clone himself to keep up with all the CO₂ sequestration grants he has received. He and his associates are working with six separate research grants, totaling in excess of \$1.3 million. With the current national and international interest and funding for this work, you won’t see Dave out in his garden much this year or in the near future.
- Michael Grammer and Bill Harrison continue their work with several talented graduate students in a DOE-sponsored research project to look at stratigraphic control on lateral development of hydrothermal dolomites away from major fault planes. They are joined by Polaris Energy, an industry partner, owned by John Fowler and Steve Schaefer. Polaris is helping address a key problem: trying to understand lateral variability in reservoir quality. Preliminary results suggest this variability is related to both the primary depositional facies and the sequence stratigraphic framework. Please see more about this research at Mike Grammer’s faculty update.
- Bill Harrison received a research grant from the DOE to evaluate Michigan’s subsurface potential for geothermal energy. This work is part of research program by most of the geological surveys in the country, coordinated by the Arizona



Marcel Robinson (left) and Dave Barnes

Geological Survey. Bill is working with several graduate students to search well records here at MGRRE at the State DNRE for relevant temperature data.

Awards:

- Bill Harrison received one of three Public Service awards given at the annual meeting of the American Association of Petroleum Geologists in April. Dr. Paul E. Potter and Wayne Goodman were his citationists who commended Bill, “To Professor William B. Harrison, III, an enthusiastic educator and researcher who dedicated his professional life to building the only large subsurface geological data and core repository in Michigan that now serves industry, government, higher learning, and the public.”
 - Bill also received the John T. Galey Memorial Award in September from the Eastern Section of AAPG, the highest honor bestowed by the Section. The award “is intended to recognize distinguished geoscientists whose outstanding accomplishments and contributions to our profession and its application have been directed toward the betterment of society—the select genre of geoscientists epitomized by John T. Galey.” To Bill Harrison, MGRRE’s founder and the man who has kept this place running for almost 30 years, we offer our gratitude and our congratulations for these well-deserved awards.



A thin section of core



Sue Grammer and Jennifer Porter



Girls at scope

K-12 Outreach:

- CoreKids K-12 earth science outreach program had a busy year, visiting with more than 2000 school-age children and their teachers and parents to explore Michigan geology, natural resources, climate change and geologic carbon storage. Susan Grammer, program coordinator, Jennifer Porter, assistant coordinator, and faculty advisor Mike Grammer, were joined by MGRRE staff, several Geosciences faculty members and graduate students and undergraduates, as well as two high school student volunteers, who helped with field trips hosted at MGRRE and with exhibits at science fairs, at the Kalamazoo Gem and Mineral Show and at Kellogg Company's Go Green Initiative exhibition in Battle Creek, Mich. Although we cannot list all of the schools we visited, they ranged geographically from St. Joseph and Benton Harbor to Hastings, Middleville and Coldwater. Jennifer and Susan also exhibited at the Michigan Science Teachers' Association conference in Lansing and presented a workshop for teachers based on our curriculum. We also were surprised and thrilled to be acknowledged in an article in *Environmental Science and Technology* called "Who Will Fill the Geoscience Workforce Supply Gap?" (Gonzales and Keane, Nov. 2009).
- This year's CoreKids programming was sponsored by grants from DTE Energy Foundation and Consumer's Energy Foundation. We are very pleased to announce

that Consumer's

Energy Foundation has awarded us another grant for the 2010-11 school year. In the coming year, we will be seeking additional sponsors to sustain the program into the future.

- For the second year, CoreKids partnered with the Keystone Center for Public Policy and Keystone Science School, of Keystone, Colo., to organize a Youth Policy Summit (YPS) on Energy Innovation in Michigan. In July, 27 high school students and eight teachers from across the state gathered on the WMU campus for a five-day dialogue on public policy surrounding climate change and reduction in atmospheric greenhouse gases. We welcomed participants with a BBQ at MGRRE on the day they arrived and were amazed to be in the company of so many bright and highly motivated high-school students. The students' final recommendations for the course that Michigan should take on Energy Innovation will be circulated to legislators and industry leaders in the fall. During the week

Keystone also presented a workshop for YPS teachers and 15 other local teachers on its CSI: Climate Status Investigations curriculum for middle-school and high-school students.

From the faculty, staff and students at MGRRE, we wish you a healthy and rewarding year to come. "We're pulling for you; we're all in this together. Keep your stick on the ice."—words to live by from that Canadian philosopher, Red Green.



Sue Grammer and Shawn McCloskey

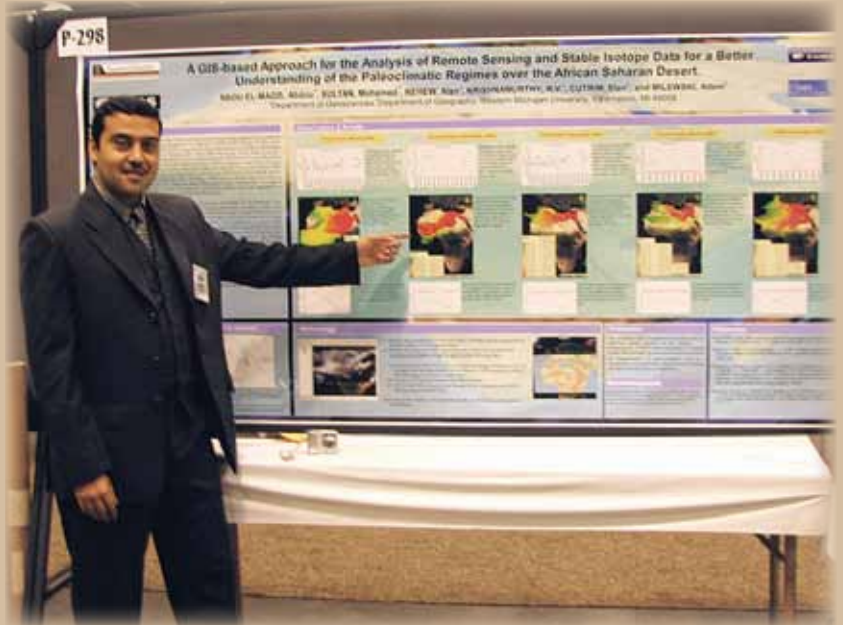
Grants

Project Director	Title	Sponsor	Funding Source	Date
Carla Koretsky	DOE Complexation Models	DOE	Federal	9/10-8/12
Dave Barnes	"Midwest Regional Carbon Sequestration Partnership (MRCSP); Regional Geological Sequestration Assessment, Phase III"	Battelle Memorial/DOE	Federal	2009-2011
Dave Barnes	MICHCARB, An initiative for the Acceleration of Geological Carbon Sequestration in Michigan	DOE	Federal	2009-2012
Dave Barnes	Regional Simulation of CO2 Injection into the Mt. Simon Sandstone along the Midwest Arches Province	Battelle Memorial/DOE	Federal	12/09-12/12
Dave Barnes	Cambro-Ordovician Assessment	University of Illinois-Champaign/DOE	Federal	1/10-9/12
Dave Barnes	USGS CO2 Sequestration	U.S. Geological Survey	Federal	7/10-6/11
Heather Petcovic	"Development and evaluation of a problem-based field and laboratory environmental geochemistry course."	National Science Foundation	Federal	9/08-8/10
Heather Petcovic	Improving the STEM workforce by improving community college teachers of science	National Science Foundation	Federal	8/08-8/13
Heather Petcovic	"Collaborative Proposal: Learning across the Expert-Novice Continuum:Cognition in the Geosciences"	National Science Foundation	Federal	9/08-9/11
Michael Grammer	Core Kids	DTE	Private	12/08-12/10
Michael Grammer	"Evaluation and Modeling of Stratigraphic Control on the Distribution of Hydrothermal Dolomite Reservoirs away from Major Fault Planes"	RPSEA	Federal	2009-2011
Michelle Kominz		Consortium of Ocean Leadership	Federal	11/4/09-11/3/12
Michelle Kominz	Hayden Ocean Leadership	Consortium of Ocean Leadership	Federal	1/10-1/8/13
Mohamed Sultan	"Assessment and Development of Renewable Groundwater Resources in the Quetta Valley, Pakistan"	The National Academy of Sciences	Federal	3/07-1/10
Mohamed Sultan	"Assessment and Development of Alternative Water Resources in the Sinai Peninsula, Egypt"	NATO Science Program	Foreign	2/07-6/11
Mohamed Sultan	"Integration of Grace Data with Inferences from Hydrologic Models, Geochemical Data, and Field Data for a Better Understanding of the Time-Dependent Water Storage Variability in Large-Scale Aquifers:Case Studies from North Africa"	NASA	Federal	4/08-4/11
Mohamed Sultan	Transcurrent Fault Evaluation for Water Resources Investigation of Este Groundwater Basin	Mojave Water Agency	Education	3/09-7/10
Mohamed Sultan	Saudi Jazan Area Landslides	Saudi Geological Survey	Other	6/10-6/13
William Harrison	Petroleum Technology Transfer Council Michigan Center	Petroleum Technology Transfer Council	Other	10/97-9/10
William Harrison	MDEQ NGGDP Data Preservation	MDEQ	State	12/9-7/10
William Harrison	AZGS National Geothermal Data	"Arizona Geological Survey Headquarters"	Federal	5/10-5/11
William Sauck	"Exchange visit to Suez Canal University and field geophysical work on the Red Sea Coast-Eastern Desert, Egypt"	Western Michigan University	Other	4/10-5/11

Graduate Student News

The 2009-2010 year was satisfactory to me in terms of reaping research awards and grants. I won the North-Central Section GSA travel grant to present my work at the 2009 annual meeting in Portland, Ore. The Graduate College at Western Michigan University awarded me both research and travel grants totaling \$1,600. In addition, during the Celebration of Research and Creative Activities Fourth Annual WMU Research Poster Day, held on April 9 in the Fetzer Center, I was one of the top 15 graduate students to win an award recognizing outstanding graduate student posters. My poster title was "Towards a Better Understanding of the Paleoclimatic Regimes over the African Saharan Desert." The Department of Geosciences granted me a David W. Kuenzi Memorial Research Award in spring 2010. The final award installment was received from the Michigan Section—American Water Works Association (MI-AWWA) in the form of Fellowship for Water Quality and Treatment Study, January 2010. The award provides a one-year membership and \$3,000 research grant.

The collected grants, plus the generous financial support from the Earth Science Remote Sensing Lab (ESRS), was a great motivation to do my first and unexpected field trip to very important part of my study area: the Sinai Peninsula, Egypt. Sampling groundwater from the deep Nubian aquifer was the main goal of the field trip, which took place from June 26 to July 1, 2010. The collected samples are being analyzed for chemical analysis, noble gas concentrations, carbon-14 age dating, stable isotope content and radioactivity analysis. I hope the results of these analyses will achieve a satisfactory progress towards my Ph.D.



Abdou El-Magd
Ph.D. Candidate



Meeting with Dr. Farouk El-Baz, Director of the Center for Remote Sensing and Research Professor in the Boston University College of Engineering. GSA 2009 Annual Meeting, Portland, Oregon.



American Water Works Association (AWWA) Fellowship Award at joint conference 2010, Soaring Eagle Resort, Mt. Pleasant, Michigan. The award presented by Mr. Paul Reinsch, Co-Chair of the Michigan Section, AWWA Research & Technical Practices Committee.

New Graduate Students



Steven Barone



Ann Gilchrist



Abdel Mawgoud Mohammed



Jason Asmus



WESTERN MICHIGAN UNIVERSITY
College of Arts and Sciences
Department of Geosciences



Katherine Pollard



Racha El Kadiri



Beth Vanden Berg



Stephen Zdan



Jennifer Porter



Ryan Siebert

2010 Department Awards

Lauren Hughes Scholarship
Rachel Salim

Advisory Council
Martin Akafia, Nicole Shatter,
Jessica Smock

David Kuenzi
Abdou El-Magd, Kathryn Titus

Jason Koebbe Scholarship
Ryan Bos, Greg Sawatzki

Laton Field Camp
Jinal Kothari

Schmaltz Award
El Hachemi Bouali

MGREE Schmaltz Award
Joe Adducci

Envirologic Technologies
Peter Marsala

Douglas Daniels
Jared Bowen

Distinguished Service
Tom Howe

**Department Appreciation
Scholarship**
Michelle Barger

Senior Honor Awards

Geology
Jason Asmus, Ryan Sibert

Hydrogeology
Tom Howe

Geochemistry
Patrick Donovan

Earth Science
Adam Brown

Earth Science Education
Jessica Smock

**Kalamazoo Gem and Mineral
Society**
Tom Howe

**AAPG Grants-in-Aid for his
research**
John Thornton

**November-December 2009
Graduate Research Grant**
Abdou El-Magd

**January-February 2010 Gradu-
ate Research and Travel Grant**
Jinal Kothari

**2010 Department Graduate
Research Scholars**
Dee Becker and Travis Hayden

**2010 Department Graduate
Teachers**
Shawn McCloskey and Michelle
Barger

**2010 All-University Research
Scholars**
Dee Becker and Zhanay Sagin-
tayev

**A&S Undergraduate Research
Award**
Patrick Donovan

**Michigan Section American
Water Works Association, 2010
Fellowship for Water Quality
and Treatment Study**
Abdou El-Magd

**September-October 2010 Gradu-
ate Research and Travel Grant**
Mohamed Ahmed

**September-October 2010 Gradu-
ate Travel Grant**
Michelle Barger

**September-October 2010 Gradu-
ate Research Grant**
Ryan Sibert

**Participated in the Integrated
Ocean Drilling Project**
Travis Hayden

Recent Graduates

Bachelor's Degree Recipients:

Earth Science Majors
Adam Brown
Thomas Doherty
Craig Kovi
Daniel Marschner
Kimberly Suchyta

Geochemistry Majors
Patrick Donovan

Geology Majors
Jared Bowen
Brian Eustice
Andrew Soens
Shannon Towne
Vicente Vasquez

Hydrogeology Majors
Stephanie Ewald
Thomas Howe
Nicholas Palfey

Earth Science Education
Samantha Bokor
Tracie Cagle
Troy Hernandez
James Kropp
Jo Ann Mathews
Jessica Wolfe

Master's Degree Recipients:

Earth Science
Hatem El Ssayed
Ruth Nair
Geology
Meghan Good
Joy Gryzenia
Melanie Haveman

Ph.D. Recipient:
Brian Bird

Geology Club Field Trip, Spring 2010:

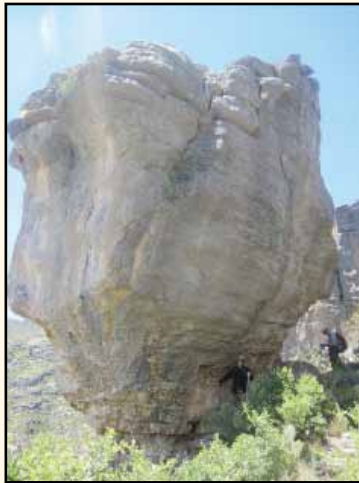
NEW MEXICO

Guadalupe Mountains National Park

We hiked the famous Permian Reef Trail at the northeastern corner of the Guadalupe Mountains National Park. The hike was 8.4 miles long (round-trip) with an elevation gain of two thousand feet. The trail has 30 marked stops for the hardcore geologists. We also had the privilege and pleasure of being toured throughout the entire hike by a local park ranger who just finished his masters in geology at the University of Arizona.



Those of us who made it to the top of the arduous hike. (Left to Right) Back Row: Jared Bowen, Kevin Dodyk, Hachemi Bouali, Jessica Slagter, Muthanna Yaqoob, Park Ranger William. Front Row: Mike Durham, Gene Schmidt, Niki Nobach.



Jared Bowen, Guadalupe Mountains National Park.



Gene Schmidt, Guadalupe Mountains National Park

White Sands National Monument

We climbed the amazing gypsum dunes of White Sands and stayed for a spectacular sunset!



(Left to Right) Muthanna Yaqoob, Jessica Slagter, Hachemi Bouali, Kevin Dodyk, Niki Nobach, Kathryn Titus, and Ryan Bos, White Sands National Monument. A truly breathtaking experience!



(Left to Right) Gene Schmidt, Niki Nobach, Hachemi Bouali, Ryan Bos, Muthanna Yaqoob, Jared Bowen, Kathryn Titus, Kevin Dodyk, and Jessica Slagter



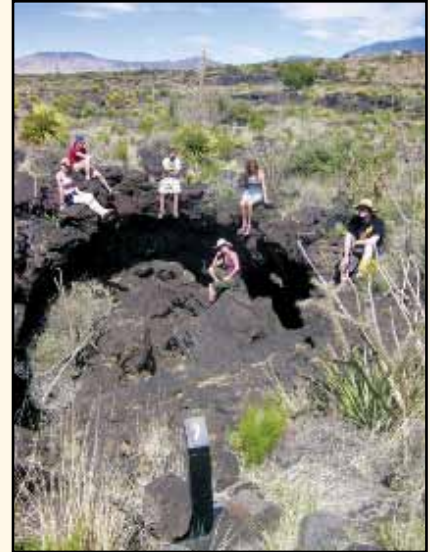
Niki Nobach in front of the Visitor Center, White Sands National Monument.

Valley of Fires State Park

We took a one-hour hike, the Malpais Nature Trail, atop a large ancient lava flow exposed in New Mexico.



(Left to Right) Niki Nobach, Kevin Dodyk, Hachemi Bouali, Jessica Slagter, Susan Jager, Muthanna Yaqoob, Jared Bowen, Valley of Fires State Park.



(Left to Right) Niki Nobach, Kevin Dodyk, Hachemi Bouali, Susan Jager, Jessica Slagter, Jared Bowen, Valley of Fires State Park.

Carlsbad National Park

We took two self-guided tours through the Carlsbad Caverns: The Natural Entrance Tour and The Big Room Tour. Many photos were taken, but not many turned out incredibly well due to the bad lighting in the caverns.



Hachemi Bouali at the mouth of the natural entrance, Carlsbad Caverns National Park.



Whales Mouth, Carlsbad Caverns National Park.



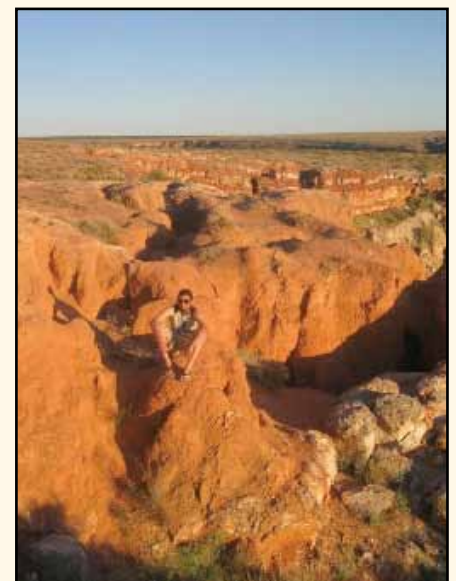
Mike Durham and Ryan Bos, Carlsbad Caverns National Park.

Bottomless Lakes State Park

We camped a night at Bottomless Lakes State Park and went Pecos Diamond hunting in the vicinity. We also visited Roswell, New Mexico, just a mere fifteen minute drive from camp.



Campsite (Left to Right) Jared Bowen, Ryan Bos, Niki Nobach, Kathryn Titus, Mike Durham (tent), Kevin Dodyk, Bottomless Lakes State Park



Hachemi Bouali, Bottomless Lakes State Park

Geosciences Community



First Row

Adam Milewski, Hussain Al-faifi, Zhanay Sagintayev, Muthanna Yaqoob, Talal Al-Harbi, RV Krishnamurthy, Michelle Kominz, Mohamed Sultan, Robb Gillespie, Heather Petcovic, Rachel Salim, Amy Manley, Kathy Wright

Second Row

Mohamed Ahmed, Peter Marsala, Farsheed Rock, John Thornton, Travis Hayden, Jennifer Trout, Ruth Nair

Back Row

Abdou El-Magd, Jinal Kothari, Al Sayed, Alan Kehew, Ron Chase, Duane Hampton, Dave Barnes, Naomi Leonard, Peter Feutz, Marcel Robinson, Carolyn Rutland, Jason Asmus, Ryan Bos, Jessica Slaughter, Nicole Nobach, Greg Sawatzki, Stephen Tatum, Joy Gryzenia, Shawn McCloskey



2009 Geosciences Alumni Award Recipient Eliot Atekwana

Dr. Eliot Atekwana earned a B.S. ('84) in Geology from the University of Maryland, an M.S. ('87) from Howard University, and a Ph.D. ('96) from Western Michigan University.

He has been teaching and conducting research at the university level since graduating with his Ph.D.

Dr. Atekwana's Ph.D. research focused on the application of stable isotopes of carbon in understanding carbon flow; groundwater contamination; and stream water-groundwater interaction downgradient of an unlined landfill (the Cox Street Landfill, Kalamazoo, Mich.). In this regard, Dr. Atekwana developed an alternative gas evolution technique for measuring dissolved inorganic carbon in natural waters. This technique is widely used to study groundwater and surface water chemical evolution and contamination.

Dr. Atekwana started his academic career as a sabbatical replacement in the Western Michigan University Department of Geosciences in 1997-'98. In the spring of 1998, he accepted a position as an assistant professor at Central Michigan University (CMU). Later in the fall of 1998, he took a position as an assistant professor at Indiana University Purdue University Indianapolis (IUPUI). He worked at IUPUI until 2003 and left for a position as an assistant professor at the University of Missouri-Rolla (UMR), now Missouri University of Science and Technology. In 2006, he accepted a position as an associated professor with tenure at the Boone Pickens School of Geology, Oklahoma State University (OSU).

Dr. Atekwana is a member of the American Geophysical Union, Geological Society of America, and the National Association of Black Geologists and Geophysicists.

Throughout his career, Dr. Atekwana has taught a variety of courses at the undergraduate and graduate levels in physical geology, environmental geology, oceanography, hydrology, hydrogeology, geochemistry, isotope geology, and seminars covering specialized topics. He has supervised three Ph.D. students (graduated one) and seven M.S. students (graduated five). He has been an external examiner for five Ph.D.s, served on the committee of three Ph.D.s and 10 M.S. students. He has also supervised senior theses and independent research for undergraduates, and supervised about a dozen students in his laboratory.

Dr. Atekwana's research interests are in hydrogeology, stable isotope geochemistry, hydrogeochemistry, and wetlands. Dr. Atekwana currently conducts research in carbon cycling in acid mine drainage (AMD) contaminated streams. This research has shown that protons

produced during AMD evolution causes seasonal losses of 50 to >98% of dissolved inorganic carbon (DIC) exported from contaminated streams and that isotopic fractionation during DIC loss from contaminated streams is predominantly kinetic. The results, thus far, suggest that acid mine drainage impacted hydrologic systems acts as a "chemical pump," converting and transferring carbon from the terrestrial reservoirs to the atmospheric reservoir.

Dr. Atekwana has worked with several collaborators from different universities and internationally on a variety of problems that are multi-disciplinary. Dr. Atekwana and his collaborators research how microbes change the physical properties of contaminated environments. Dr. Atekwana also is involved in international research in Botswana and Zambia where he and his U.S. collaborators train graduate and undergraduate students. The international projects investigate how tectonic forces associated with incipient rifting alter surface geomorphology and hydrology, and how the resulting environmental change is recorded in lake sediments.

Dr. Atekwana's research has been funded by the National Science Foundation (five grants) and he has obtained several internal university grants. He has published 26 articles in peer review national and international journals; five technical reports; more than 75 abstracts in regional, national, and international scientific meetings; a field guide; and several articles in Scientific Proceedings. Dr. Atekwana has delivered more than 25 invited presentations at universities and in the community.

Dr. Atekwana has served as a mail reviewer for national and international funding agencies and as a panelist for the National Science Foundation on several occasions. He has served as a reviewer for several scientific journals such as *Geochimica Cosmochimica Acta*, *Chemical Geology*, *Journal of Hydrology*, *Hydrological Processes*, and others.

Dr. Atekwana has consulted for Gillette on issues of groundwater contamination in San Paulo and Rio de Janeiro, Brazil.

At OSU, he serves as the faculty advisor for the African Students Organization (ASO). He is a member of the Reappointment, Promotion and Tenure Committee in the College of Arts and Sciences.

Dr. Atekwana is married with three children. Their oldest son is at the University of Tulsa, their daughter is in high school (Oklahoma School for Science and Mathematics) and the last son is in sixth grade. His wife is an endowed chair and professor in the Boone Pickens School of Geology at OSU.

Greetings to Alumni and Friends:

WMU Geosciences Advisory Council
2009-2010 Annual Report

The advisory council met twice during the 2009-10 academic year; once during the spring semester, and once during the fall semester. Alumni and friends are welcome to participate in department activities, and are invited to volunteer their support, or simply to visit Western. Last October, the council sponsored a pre-game tailgate party and in attendance were various students, faculty, University administrators and friends. It was a rainy Saturday, but all had a great time. More of these events are planned for the future. Students, alumni, and friends are all invited. Please contact Dr. Mohamed Sultan (at mohamed.sultan@wmich.edu) or a Council member if you are interested.

Members of the Council strongly support the department's outreach to the greater geoscience community, and the proposed expansion of the Hydrogeology Field Course. It is one of the few remaining field courses in the United States. Pending approval by the department, efforts will be directed to bring attention to the hydrogeology field course on both a national and an international level.

Western Michigan University and the Department of Geosciences are poised to become the premier geologic resource for the State of Michigan. WMU's Michigan Geological Repository for Research and Education center is being considered as a primary site for the relocation of the offices of the Michigan state geological survey.

Letters underscoring the benefits of moving the geological survey to the WMU campus have been sent to key state legislators. The Council endorses this move, and pledges its support for this effort. We hope all alumni and friends will offer their voices in support of this endeavor, and will help to strengthen the geoscience community both at Western, and in the State of Michigan.

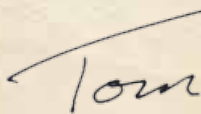
Interaction with students is a primary focus of the advisory council. We hope that alumni and friends of the department will assist us as graduate and undergraduate students look toward a future in our profession.

Council members have developed a marketing summary of our past accomplishments. That summary is included with this newsletter. It is our hope that all of you will consider offering your time and support to the Department of Geoscience at Western through the Alliance or through the Advisory Council.

Respectfully,



John A. Yellich
Chairperson



Thomas C. Kamin
Secretary

Advisory Council Activities, Accomplishments and Initiatives



April 2010 Front L-R Dr. Tim Greene- Provost, Dr. Mohamed Sultan- Chair, Dr. Daniel Litynski- VP Research, John Yellich-Council Chair, Council Members - Kim Finkbeiner, Dr. Tom Straw, Jeff Hawkins, Linda Harrison-MGRRE, Jerry Aiken. Back L-R – Ron Parker, Tom Kamin, Mike Kovacich, Bill Steinman, Chris Amore, and Dr. Bill Harrison-MGRRE (Not present Paul Daniels, Hal Fitch, Chris Roth, Carolyn Rutland, Jean Talanda, Jim Ferritto, John Fowler, Rich Laton).

Council Activities Since 1982:

- Meet with University Administrators at Council Meetings to discuss current Department initiatives.
- Evaluated the Geosciences Undergraduate and Graduate Curriculum.
- Provide mentorship to students and alumni.
- Meet with students to discuss careers and how to interview for professional opportunities.
- Meet with faculty and students to discuss present and future research activities.
- The professional development and future of students and the Department has been and remains the focus of the Council.



1984 Council Meeting – Left around table, Tom Seagal- State Geologist- Back, John Fowler, Bob Garrison, Brian Shaw, Dr. Lloyd Schmaltz-Chair, George Macalenan, Mari Hall, John Yellich-Council Chair, James Duncan, Sr., Dr. Roger Steinger, Elizabeth Oldham



Bob Garrison, Dr. William Harrison, Elizabeth Oldham

Council Accomplishments:

- Established the Advisory Council Scholarship Fund to support students at Field Camp.
- Recommended and supported the University to commit to establishing MGRRE.
- Council members have aided in the acquisition of core and well log data for MGRRE
- Recommended the development of the B.S. Hydrogeology program in Geosciences.
- Supported Geosciences development of M.S. Hydrogeology program.
- Supported the second M.S. in Hydrology for geologists during the oil decline of the '90s.
- Supported Geosciences development of the Ph.D. program.
- Supported the Hydrogeology Field Camp.

Council Initiatives:

- Hold bi-annual Council meetings to review and develop support for Department initiatives.
- Support students with Council donations for travel to Professional Society meetings and presentations.
- Support Geosciences Department programs to meet industry needs.
- Recognized the asset potential of the Core Lab (MGRRE) to the Geosciences Department and University.
- Monetary support for student and faculty field trips.
- Provided leadership and support for relocating the Michigan Geological Survey to WMU.
- Support the Department Fund raising functions through the Foundation



What can you do?

- Support your University; come and interact with your Department!
- Become an active Geosciences Alliance Member, attend Department functions.
- Friends and Alumni, the Department can use your expertise!
- Volunteer to serve on the Advisory Council.
- Visit the Department to see how Geosciences has advanced to meet the social and technical challenges of today.

Contact Dr. Mohamed Sultan to volunteer—(269) 387-5485.
email to: mohamed.sultan@wmich.edu
Geosciences Web site: <http://www.geology.wmich.edu/>

Gifts to Geosciences

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 Carla Koretsky
 Philip Koro
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 Thomas Mall
 Todd R. Mall
 Karen S. Mater
 Wayne R. Mater
 Barry C. McBride
 Beth McBride
 Ray William Merrill
 Suzanne K. Merrill
 Michelle Lynn Mitchell
 Timothy J. Mitchell
 Mary Rebecca Moore
 Diana Morton-Thompson
 David H. Naas
 James H. Nidy
 T. Michael Pendergrass
 Lisa K. Phillips
 Michael J. Phillips
 Elizabeth A. Park
 Scott G. Park
 Ronald A. Parker
 Sandra Pohl
 Wolfgang G. Pohl
 Heather Qualman
 David C. Rapp
 Linda Rice-Ness
 Terri Runyon-Halbach
 William A. Sauck
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 bara E. Savage
 Bruce E. Savage
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 Kathryn A. Wright
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 John A. Yellich

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Your generous contributions to the department support a wide array of activities and we appreciate your help. We try to thank each donor, but as with all bureaucracies we do miss someone occasionally. If we missed you, please know that we rely on your support and will continue to make every effort to acknowledge your gifts. Please accept our sincere thanks.

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Department of Geosciences with a gift of \$_____

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- Envirologic Technologies Endowed Scholarship
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- Lloyd Schmaltz Quasi-Endowment
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WMU Foundation Office
1903 W. Michigan Avenue
Kalamazoo, MI 49008-5403

Keep in Touch with your GEOS Family

We are anxious to keep your current address on our mailing list and, therefore, ask for your cooperation in advising us if you move. Also, if you know of other alumni who do not receive this newsletter, please send their names and addresses, we would like to add them to our file. You may also update your information online at http://www.wmich.edu/geology/alumni_form.htm.

Name _____

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