



WESTERN
MICHIGAN
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College of Arts & Sciences

Department of Geology

newsletter

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Dear Alumni and Friends,

The past year has been one of profound change for the department, including the retirement of two long time faculty, and the arrival of two new ones. As I'm sure you can imagine, Rood Hall just doesn't seem the same without John Grace and Tom Straw around. Fortunately, John has an office on the third floor and spends quite a bit of time here between trips to exotic locations. Tom and Odessa have relocated to New Harmony, Indiana, where Tom is as busy as ever with his hydrologic consulting. While it has been difficult to lose such excellent colleagues as Tom and John, it is certainly a pleasure to introduce our new faculty members George Guthrie and Michelle Kominz. Both are mature scientists with excellent research credentials and we consider ourselves extraordinarily lucky to bring in such talented people. George spent eight years at Los Alamos Laboratory prior to coming to Western, where he built a distinguished research program in the health effects of minerals and the geochemistry and mineralogy of concrete. Michelle was formerly on the faculty at the University of Texas at Austin and most recently held an NSF Visiting Professorship for Women at Rutgers. Michelle's work on subsiding sedimentary basins is widely respected in the geologic community. Both of these people give our department new dimensions and epitomize the growing research capabilities and emphasis of the University.



Also serving on the faculty this year are Drs. Raj Sharma and Eliot Atekwana. Raj is an igneous and metamorphic petrologist who recently finished his PhD at the City University of New York and has joined us as a sabbatical replacement for Ron Chase and Bill Harrison. He says he enjoys the slower pace of life in Kalamazoo after spending seven years in New York City. Eliot, who many of you know, is one of our newly minted PhD graduates in hydrogeology, not to mention Estella's husband. Eliot is teaching in the hydrogeology program until our most recent hire, Dan Cassidy, arrives in September, 1998. The other new member of the department is Kathleen Keckler, who has just recently come on board to fill our second secretary position. Kathleen took on doing the design, coordination, and production of this newsletter as one of her first projects. Kathleen will also be working with the graduate advisor in keeping the grad students on track with all the deadlines and paperwork that they have to deal with. Her other responsibility will be the grant tracking and accounting for Institute for Water Sciences research projects. We are very happy to have her with us in the department.

If you have been following the saga of the Institute for Water Sciences over the past few years, you will remember that the Institute, which includes the Non-Invasive Site Characterization Lab, the Isotope Geochemistry Lab, the Water Quality Lab, and the Groundwater Education in Michigan (G.E.M.) program, was transferred into Geology in 1995. Despite a great deal of activity in each of these four areas, we have not been able to convince the administration to provide base funding to support the Institute, so its future as an organization is still uncertain.

On a personal note, I am getting more used to the duties of the chair, although I intend to continue my research pursuits and teaching in hydrogeology and glacial geomorphology. Sometimes this makes life more hectic than I would really like it to be. Our bluff recession project, which Ron Chase will discuss in more detail, continues to yield fascinating results. My glacial mapping project in St. Joseph County is in its third year and nearing completion. This work is done as a subcontract to the Geological Survey Division of MDEQ with funding from the U.S. Geological Survey. I am very excited about this work and hope to continue mapping in other counties when the St. Joseph project is finished. I also continue to plug away on a textbook on groundwater quality during the evenings and weekends. My wife Kay, and daughter Liz will be really happy if it ever gets done.

Overall, the department continues to be a very dynamic and stimulating place to be. With the turnover in faculty over the last few years and the new science facilities, which are progressing very nicely, we have the opportunity to retool and re-invent ourselves and our programs to meet the challenges of the geology profession in the 21st century. Our enrollments are still strong, although a decline in the hydrogeology/environmental geology job market has resulted in lower enrollments in those areas. Other areas, such as earth science teaching, have recently grown in enrollment. There is also renewed interest in the oil and gas industry as a source of employment for our grads. Whatever the future holds, we appreciate our contacts and interactions with our alumni more than ever. Please drop us a line whenever you can, and if you happen to be passing through Kalamazoo, we'll be happy to give you a personal update on everything that's been happening in the department.

Dr. Alan Kehew, Professor & Chair



Department of Geology

faculty news



Estella Atekwana
associate professor

Greetings to all alumni and friends. Another busy year has just gone by. My teaching activities this year included Geology 100 (Earth Studies), Geology 130 (Physical Geology), Geology 560 (Introduction to Geophysics), and Geology 562 (Gravity and Magnetic Exploration). Unfortunately, we had to cancel the Geophysics Field Course which was to be taught at the Wurtsmith Air Force Base in Oscoda because of low enrollments. We will hopefully offer it again this spring. Our goal is to open this class to non-WMU students as well. Three of our MS students who were working at this site have all graduated. Our student chapter of the Environmental and Engineering Geophysical Society is doing very well and last year we had approximately nine students. Please visit our web site to see what the students are up to.

In addition to my teaching responsibilities, I also served as the Monday seminar coordinator. Needless to say that this kept me quite busy.

Dr. Sauck and myself are the recipients of a research grant from the Petroleum Research Fund (American Chemical Society) to study the anomalous conductivities associated with hydrocarbon plumes. We are both excited about this line of research. Preliminary results from this work were presented at GSA in Denver, CO., and at the Symposium on the Application of Geophysics to Environmental and Engineering Problems (SAGEEP). From this work, two of our papers are in press: Bermejo, J. L., Sauck, W.A., and Atekwana, E. A., 1997, Geophysical discovery of an LNAPL plume at Wurtsmith AFB, Ground Water Monitoring and Remediation; Sauck, W.A., Atekwana, E. A., and Nash, M.S., 1997, High electrical conductivities associated with an LNAPL plume imaged by integrated geophysical techniques, Journal of Environmental and Engineering Geophysics.

On the home front, our house has increased by two feet. Baby Kyne Fofungtu arrived on June 4, 1997, weighing in at 8 lbs 2 oz., a baby brother for Kyle and Kyra. Kyle is now a second grader and Kyra is still a preschooler.

Our lives have become quite hectic, between taking care of the new baby and shuttling the older kids to ballet and swim lessons. Kyle also plays soccer for AYSO, hence I find myself as a soccer mom as well.



Dave Barnes
associate professor

Greetings from Dave Barnes! Life is a beach, these days. This year has been spent with the traditional teaching assignments (lots of new WWW materials). They have been a big hit and a lot of Lake Michigan coastal field work. Our coastal erosion control monitoring program trundles along with final reports on monitoring at Duck Lake completed this fall. Field work in Manistee was complete this year (although we hope to stretch our funding another year to characterize coastal change during the unusually high water event of 1997 to ??); we will complete field work in the Onekema area next year.

A breath of fresh air was provided by the Michigan Space Grant Consortium (a NASA affiliated funding program) with student research grants totaling \$10,000 granted to Chris Cloutier, Deb Wilson and Therese Ryan for study of Coastal change in Lake Michigan on the basis of geophysical (GPR, ground penetrating RADAR) and bathymetric profile data. We are compiling an integrated coastal change data set on the department's GIS system (cross platform, PC-and UNIX-based software called GRASSLAND) to try and predict coastal change. I would love to get some words of encouragement from folks out in the working world on my current mission to integrate GIS technology into the Geology department!! It's a big deal folks.

I am getting more interested in GPR studies (under the able supervision of Dr. Bill Sauck) along the coast and seem to have a few enthusiastic grads (and prospective grads) interested in this area. We hope to emphasize the GEOLOGY part of Coastal Studies in the Great Lakes. During attendance at a recent meeting (ASBPA, American Shore and Beach Preservation Association) it was obvious how big a deal coastal GEOLOGY (as opposed to coastal ENGINEERING) is these days with the incorporation of the variation in coastal materials as a more significant variable in coastal change studies.

Along with GIS, the new emphasis on the geology along the coast is what's happen out there.

Talks at the Michigan Basin Geological Society in Lansing, a gathering of nervous property owners in St. Joe this summer, and at the ASBPA this fall in Long Island have kept me up to date with research activities. We are trying to promote our Grad program through seminars presented at neighboring institutions. If anyone is interested in a talk on Coastal Geology in Michigan, let me know! Best Wishes, Dave Barnes.



Ron Chase
professor

I have been very busy this past year doing what I usually do. On the teaching side, I enjoyed very much being an instructor for a group of dedicated geology majors (Optical Mineralogy, Petrology, Graduate Petrology,

Upper Peninsula field courses). I have also been one of a team of educators working on a new science curriculum for K-12 teachers with a \$225,000 grant from the U.S. Department of Education. I have planned a two-course sequence for Earth Science, tried out this sequence on local K-12 science teachers as a summer workshop, and am assisting the Department of Science Studies in their preparation for the teaching of these courses next year. Although pedagogy is not my primary research interest, I feel that people who practice science need to seek better ways to communicate science.

On the geological research side, I am on sabbatical leave for the 1997 - 98 academic year with high hopes of bringing a couple of grant-supported projects to closure. My Lake Michigan bluff erosion study (along with those of Al Kehew and Bill Montgomery and supported by \$176,000 from the U.S. Army Research Office) has yielded excellent data that bear on the kinematics and dynamics of slope failures. My interest in structural geology is coming to the forefront as I contemplate the results of triaxial compression tests, abnormal pore pressures, limit equilibrium calculations, stratigraphic correlations, surface displacements, balanced cross-section constructions containing shear planes, and the like. I never dreamed that my love of hard-rock petrology and structure would become so useful so close to home. I also received a modest grant from the WMU Faculty

Research Fund to pursue isotopic signatures of displaced igneous bodies in western Montana and northern Idaho. I am working with Pat Bickford (Syracuse University) to develop a way of determining, by neodymium and strontium isotope studies, whether granitic plutons have been displaced to positions that can not be explained by ordinary upward intrusion. This project is a link to my "Idaho batholith days of yesteryear". I will be working in the Syracuse isotope laboratory this coming January and February. Our preliminary results from samples already collected will determine whether major funding for continuation of the project is possible.

On the personal side, I continue to enjoy excellent health, jog 5k each day, play tennis weekly in a doubles group, try to avoid housework whenever I can, and enjoy the company of a wonderful wife (although the latter two are often incompatible). Chris continues to teach adult education, social science courses in the Comstock Public School system. Karl (28) works in Kalamazoo as a on-demand disc-jockey for PowerMix, and also at the Clarion Hotel. Andy (25) is a "webmaster" for an organization in Seattle where he creates and lays out web sites for a variety of sports teams (including the Yankees, Braves, Mariners, Sonics, etc). Scott (23) is in his second year of medical school at Barry University, Miami, FL. Jamie (22) is in his first year of law school at Georgetown University, DC. The kids are all grown up and gone. Chris and I are free, but occasionally lonely.



Greetings to all of my former students. I wish you well. If you can, please Email me (chaser@wmich.edu) and let me know what you are up to. I am known to respond quickly.

John Grace
professor emeritus

My wife and I are enjoying our retirement and in particular we enjoyed avoiding three months of Michigan winter this past year. We hope to do exactly the same this year and maybe stay even longer in the warm climes.



Department of Geology

faculty news

I've enjoyed receiving E Mail from some of the alumni. I have recently heard from Joe O'Sullivan, Tom Robyn, John Matylonek and Clarke Niewendorp and hope to hear from more of you one of these days. On my visits to the department to pick up mail I can report that it is doing quite well - lots of excitement with the new faculty and lots of interesting new courses. It makes one want to be a student again! Lots of luck to all for the coming year.



George Guthrie
associate professor

Hello from Rood Hall. Along with Michelle Kominz, I am a new addition to the faculty as of this fall. My most recent home was in Santa Fe, NM - I was in the environmental geology division of Los Alamos National Lab - so,

Kalamazoo is definitely a new adventure. The recent early snow storm gave me my first taste of a Michigan winter (something that we were warned of only *after* relocating here!). So far, so good: we had similar weather in NM. My only concern is trying to imagine what is meant by "Michigan Downhill Skiing."



I'm enjoying my first semester here at WMU (and my first semester of full-fledged teaching). I have the luxury of teaching Introductory Mineralogy and Optical Mineralogy, both of which are giving me an opportunity to re-learn the basics about my own discipline. At the end of my first lecture, I finally understood what mineralogy means to me (a very comforting feeling to say the least). The students in the classes have been great at challenging me to do my best while forgiving me for the errors of inexperience.

In addition to the students, another aspect about WMU that really excites me is the potential for pursuing both traditional and non-traditional problems in geochemistry. Since leaving Johns Hopkins University, where my dissertation work was largely traditional mineralogy/metamorphic petrology, I have pursued a number of non-traditional applications related to mineral-fluid interactions. This includes research on the geochemical processes that result in disease following exposure to materials such as the asbestos minerals as well as research on the geochemical and mineralogical controls

on the durability of concrete. While continuing these pursuits, I hope to apply my interests in clays to the department's efforts to understand various aspects of the glacial stratigraphy in the region. And -- with all of that remaining time! -- maybe I can get back to some more traditional geological problems, like the epitaxial growth of amphiboles on spinels. The expertise both in this department and elsewhere at WMU as well as the friendly atmosphere here make it the perfect environment for pursuing collaborative interdisciplinary problems, which is one reason I wanted to come here.



Duane Hampton
associate professor

Hello, geology grads. I am heartened by the arrival of Michelle Kominz and George Guthrie this fall, and by the prospective arrival of Daniel Cassidy next fall. They bring new perspectives, interests and skills.

For example, George's research into concrete fracturing is applicable to cement-bentonite mixtures used as grout to seal the annulus around a well casing.

Our hydrogeology enrollments have decreased as have hydrogeology jobs in Michigan. Next summer we will offer only one session of the hydro field course instead of two sessions as we did the previous 7 years. Then we met the demand by training many students quickly as hydrogeologists. Now we need to focus more on the quality of our educational efforts, as well as evolve to better prepare future geoscience professionals. We started talking about the difficult issue of curricular reform. Don't hold your breath -- voluntary evolution is hard.

I keep working at the refinery in Carson City. Brad Green and I installed lots of shallow wells with the help of Mike Dalman and Doug Werkema. We're finding that well development methods affect the rate of hydrocarbon entry into a new well about as much as the gravel pack used around the well, and that the amount of open area in a screen has a smaller effect. In a related lab study, Kirt Elliott, Bill Sauck and I found that a vertical array of electrodes on a PVC pipe could be inserted into a contaminated sand aquifer and used to look at hydrocarbon distribution with depth, but the signal is harder to interpret if the electrodes are more than one inch apart. We also used tomography between parallel arrays. I am still seeking funding to study hydrocarbon tracers at the refinery.

Stone Peng and I are refining the ultimate modeling paper. We applied several popular contaminant transport models to the same site and compared the predicted breakthrough curves. While there were differences, they all worked well enough for this site which had sufficient data to describe the geology and the contaminant source. Choices that made bigger differences were: dispersivity values, number of layers simulated and number of grid blocks used.

Darin Meyer is testing slug test analysis methods. He installed an 8-ft diameter steel culvert in the ground, filled it with uniform sand and inserted several 2-inch wells. He looked at how conductivities increase with increasing well development, and is about to determine how the radius of influence changes as the slug size, screen length, and gravel pack change. I'm sure the Bouwer and Rice method will not pass the test.

Let me know if your firm needs a level-headed, motivated hydrogeologist at the B.S. or M.S. level. Best wishes to you for a good year.



William B. Harrison III
professor - core lab director
Bill is on sabbatical leave this year continuing his research activities on horizontal drilling in Michigan. This research is part of a U.S. Department of Energy project with Michigan Technological University now in its third year. He is also involved

in several consulting projects with Michigan Operators to evaluate redevelopment potential of some of the State's old oil fields.

Bill and Linda have also traveled to Scotland and Costa Rica this year. Linda continues to help out in the Core Lab and in the cooperative programs with Latvian exchange students.

Bill was awarded an honorary Doctor's Degree from the University of Latvia for his cooperative ventures with the Geology Department there.

Michigan Basin Core Research Laboratory

The core lab continues to be a resource for oil and gas activity in the Michigan Basin. Cooperative Research with Michigan Technological University and the U.S. Department of Energy is continuing on a study of Horizontal Drilling in "old" Michigan fields. Numerous

new cores and data have been acquired in the last year. Another ongoing project is to develop a digital data set for Michigan oil production. This data will probably be posted on the web in the future. Check out the core lab's web site at <http://www.wmich.edu/geology/corelab>

Michelle Kominz
assistant professor



Hello friends and alumni of the Western Michigan University Geology Department. I am currently finishing my second month in Kalamazoo, and I'd like to know... Does it always snow before the leaves leave the trees, knocking out the power in your quaint little apartment?

In my first semester I have been given the pleasure of teaching two units of the large enrollment oceans systems class. This has been great fun so far, owing to a number of factors. Most importantly, Dave Barnes, who is teaching the third unit, has been wonderful, sharing his text, outline and web-site design (<http://www.geology.wmich.edu/dave> {or /kominz/home.html}, should you be interested in viewing my version}). In addition, my masters degree in oceanography from The University of Rhode Island and many years of teaching large enrollment introductory geology courses both at the University of Texas at Austin and at the University of California, San Diego, leave me in a good position to take on this course. So far I've had a blast.



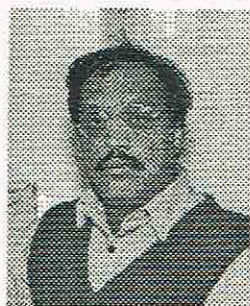
I have also been out of town a bit on scientific missions. I was fortunate to be invited to attend a Penrose conference on "Continental Interior Tectonics." Because of my interest in tectonics and my recent move to the stable craton, I was able to assess the current research in this area. What I discovered is that my main area of interest, basin dynamics, is largely being neglected of late. The problem remains enigmatic and seems to be wide open for research. Look out Western Michigan graduate students! Of course the yellow aspen and the field trips in southwest Utah (Zion, Bryce, etc.) were spectacular. As was the hurricane that came through and wiped out power for 12 hours. I didn't have this problem with electricity before I moved to Kalamazoo!

Department of Geology

faculty news

At the headquarters of the National Science Foundation in Arlington, Virginia, I met with other women who had also spent 1996-97 on NSF Visiting Professorship for Women Awards. I rarely get the chance to hear talks outside the field of geology, and here I got to learn about scientists work on the "cutting edge" of many fields. In addition to promoting science for women, and teaching a couple of courses, my own year at Rutgers, the State University of New Jersey was devoted to research. I and developing a numerical modeling procedure which will backstrip two-dimensional sequence stratigraphic data to yield information on the tectonic and sea-level history of thermally subsiding basins. One such basin is the east coast continental margin. My colleagues at Rutgers, Columbia University's Lamont-Doherty Earth Observatory and the University of Texas' Geophysical Institute have been compiling data off the coast of New Jersey. By spending the year at Rutgers I was able to obtain the data required for application of my model. I will continue to work closely with these scientists while I am now stationed in Michigan.

I am looking forward to trying out my cross country skis after years of living in snow-free climates. Maybe if I can find a hill I will even try out the old downhill version.



R.V. Krishnamurthy
professor

The past year was indeed an eventful one for me. On the work front, it was almost a "Midas Touch" effect. Eliot Atekwana and Madhav Machavaram earned their Ph.D. degrees by

producing the kind of theses which would have passed the scrutiny of any university anywhere in the world. Carla Nascimento also completed an excellent piece of work which highlighted some new applications of carbon isotope techniques in environmental research. Norman Lohan, the only person that I know of who came to work to run samples on the day of the "blizzard of 97", developed a neat technique to measure hydrogen isotope ratios in organic matter. I had four papers appear in print, all the culmination of the relentless efforts of my students. I was also invited to contribute a chapter to the highly respected Encyclopedia of Geochemistry.

At least three more are in the review process. Madhav Machavaram brought additional fame to the stable isotope group by receiving the "Outstanding Student Paper" award from the American Geophysical Union. The National Science Foundation recognized our initial finding that the hydrogen isotope ratio in organic matter is potentially a new paleoclimate proxy by awarding me a two year grant. Norman works on this project and has already accumulated a wealth of new data. Personally, I achieved that coveted milestone in one's academic career, namely tenure, and promotion to the rank of full professor. The road to this landmark was made all the more easier by my untiring graduate students and the supportive departmental colleagues.



On the family front, my wife Sujatha completed her Associate Degree with a GPA of 3.9. This is particularly significant in the light of the meager help that she received from me in running the domestic chores. My daughter Sowmya, an eighth grader, entered the Academically Talented Youth Program by scoring high in the SAT examination. She now attends Kalamazoo College once a week in the reading and writing program and will hopefully help me out with my own inadequacies with the English language! My son Rohan, having skipped a grade (from four to six) makes steady progress in his primary love, which is learning to play the Mridangam, the drum used in South Indian classical music. He was awarded the first prize in a competition held in Cleveland which was attended by about four thousand people including many top artists invited from India. As I said in the beginning, the past year was very eventful, the kind I wouldn't mind having more.

Bill Sauck
senior research scientist

Fall semester, 1996, was a bit hectic. We hardly started the term with the Seismic Methods class (which was able to use the new GeoMetrics 24-channel seismograph) when I left for Brazil. The first stop was in Manaus, where I continued work on the geology and groundwater portion of the Manaus Hydro. Cycle project. I also spent several days doing GPR profiles with our newly upgraded GSSI SIR-10A+ which I had brought into Brazil for the second time.





We mapped more spectacular neo-tectonic structures which disrupt the Cenozoic sediments. Dinners almost always included a variety of Amazon fish dishes. The next stop was Belem, where the first Workshop on Geophysics Applied to the Environment was held; sponsored by the Brazilian Geophysical Society. I gave a GPR short course the day before the 3-day workshop. The next day I was asked at breakfast to open the Workshop with a 45 minute lecture (because the programmed speaker was delayed in his trip from Sao Paulo). I somehow managed that, and on the second day also participated in a Round Table as a panelist. After returning to Michigan, it seemed to take until Thanksgiving to get caught up again. I was invited to give the Environmental and Water Resources Engineering Department Seminar at the University of Michigan on November 8. Winter term involved shoveling snow, teaching a new GPR course, getting ready for the Spring and Summer Hydrogeology Field Courses, and shoveling more snow. Actually, I got a break in February by accepting an invitation to give a one-week GPR course at the National University (UNAM) in Mexico City. This trip was co-sponsored by the Institute for Geophysics and by the Institute for Anthropologic Investigations. After the short course several geophysicists and archaeologists accompanied me to the Yucatan where I built another pair of GPR antennae and surveyed for the next 10 days at 4 Maya sites with our SIR 10A + system: Chichen Itza, Balankanche Cavems, Izamal, and Dzibilchaltun. Spring term included a trip to Reno, NV, with Mike Nash and Dale Werkema for the annual SAGEEP gathering. Mike presented some of our work from Wurtsmith AFB, Oscoda, MI. Spring also brought good news for Estella and me: our proposal for more work on the anomalous electrical properties under LNAPL plumes was funded by the ACS-Petroleum Research Fund for two years. Spring and Summer terms were full of activity associated with the Hydrogeology field courses. Mike Dalman and I worked hard to fill the empty space left by Richie Laton in his administration of the courses during previous years. (Richie did finish his Ph.D. this summer!) We also miss Mike Nash and Kristina Sprietzer who both finished geophysics theses and went on to bigger and better things. I slipped away for a few days this summer to do more lower Michigan sub-bottom GPR work, this time with Dave Barnes and Chris Cloutier north of Manistee, where we discovered a large submerged aeolian dune field, relict of a time when lake level was much lower. Trips with Estella and students to the refinery at Carson City and to Wurtsmith AFB to gather more geophysical data rounded out the summer.

On the home front, oldest daughter Christine became a freshman at Ann Arbor, Jeff graduated from Lewis University, Carolyn continued to be active in band, orchestra, track, and cross country as a Mattawan H.S. Junior, and Eric was finishing his last year in Mattawan Elementary school. Elen celebrated her passage into her second century with a BIG party, and of course hosted several other parties during the year. She made several trips to Brazil, and continues to teach Meteorology & Climatology, and South American Geography, as an Assistant Professor in the WMU Department of Geology.

Eliot Atekwana

assistant professor



Greetings to alumni and friends. As many of you know by now, I finally graduated last year and am privileged to have been offered the opportunity to teach in the department for the current academic year. Teaching Introduction to Hydrogeology and Environmental Geology has been both challenging and exciting. On the research front, I am actively engaged in conducting research in stable isotope hydrology. Actually, my collaborator, Dr. R. V. Krishnamurthy and I have developed techniques for analysis of carbon in sediments/soils and water. This is exciting since these techniques allow us to investigate carbon cycling in natural and polluted hydrologic systems and thus increases the breadth of research that can be conducted in our department in the area of biogeochemistry. I have presented some of our findings at the American Geophysical Union Spring meeting in Baltimore, MD and the Geological Society of America annual meeting in Denver, CO. This year, publications related to our research include: "Concentrations and isotope ratios of dissolved inorganic carbon in denitrifying environments: (Geophysical Research Letters), and "A simple, inexpensive carbonate-phosphoric acid reaction method for the determination of carbon and oxygen isotopes of carbonates" (analytical chemistry). Already accepted for publication in the Journal of Hydrology is an article entitled "Investigations of seasonal variations in dissolved inorganic carbon and $\delta^{13}\text{C}$ of surface waters using a modified gas evolution

faculty news

technique." We have a manuscript currently undergoing review entitled "Investigations of landfill-groundwater interaction using stable isotopes" (Water resources Research) and several in preparation. I am currently involved in the characterization of dissolved inorganic carbon production and evolution in a landfill environment, carbonate disequilibrium associated with biodegradation at contaminated sites, and carbon cycling in freshwater lakes in glaciated terranes to name a few. Of course, all these research activities would not be possible except for student involvement and participation which we are proud of. I am actively putting together proposals to seek grants to fund some new ideas that we have developed. On the home front, the children (Kyle, Kyra and Kyne) are doing fine and keeping me busy. Kyle and Kyra are continuing with their swimming lessons on the weekends. Kyra is now taking ballet lessons since she claims to have "light feet". The truth is that Kyne is keeping me busy the most, needing lots of attention since he is only four months old.



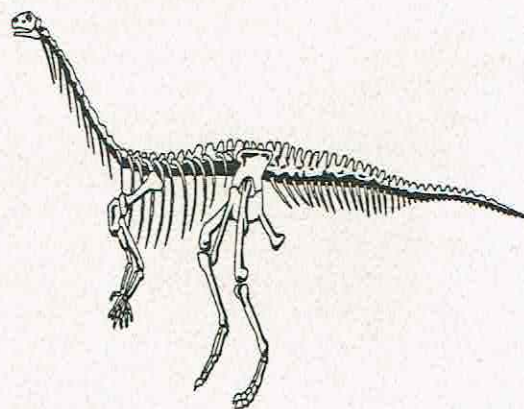
Raj Sharma
assistant professor

Hello. After spending almost seven years in chaotic New York City, I am fully enjoying my stay at the peaceful and panoramic Kalamazoo. Year 1997 started with a talk on the combined

"Geophysical and Geochemical Modeling of Magma Chambers" at the Woods Hole Oceanographic Research Institute of MIT, which was attended by full capacity crowd. In the beginning of this year I submitted two research papers for publication to the Journal of Geophysical Research (JGR). One of the papers deals with the three-dimensional gravity modeling of Bouguer gravity highs along western India. This area (1.5 million km²) of India is covered by the Deccan flood Basalts, which were erupted at the K/T boundary. According to some scientists the copious eruptions of these basalts were responsible for the demise of the "Dinosaurs." Results of the paper show that Deccan Basalts erupted from upper crustal magma chambers. The second paper treats the emplacement of dike swarm from a magma chamber. Both of these papers are under revision from

JGR. Recently, I have also submitted a small paper on the shape of big mafic plutons in the upper lithosphere to the Geophysical Research Letters. The geochemical model I developed and presented at the fall American Geophysical Union and annual Geological Society of America Meetings includes the effects of eruption on the isotopic ratios and trace elements concentrations in a magma chamber. This model was cited in the news letter of the annual GSA meeting. Presently, I am applying this model to the recent volcanoes of Hawaii and Iceland to estimate the mass of residual magma in a magma chamber after an eruption. The initial results of the estimation of residual magma are encouraging and if works successfully this model will help to predict the mass of future eruptions from volcanoes around the world. After completion of this research I plan to submit it as an article to Nature and a more detailed paper to the Journal of Petrology.

Presently we are in process of updating our Department of Geology home page. After updating, the home page will be more informative and visible. It will also include the recent achievements by the faculty, students, and staff of our department and new courses offered by the department. If possible I will also try to add a topic of "alumni" in the main menu, which will include the current addresses, professional interests and current employment of the alumni. All alumni will be able to add or change their information by themselves. So, if you have any questions or inquiries then please let me know and make sure to visit our department's home page at <http://www.wmich.edu/geology>.



Department of Geology

awards and scholarships

Dr. John Grace Field Camp Scholarship presented by Sigma Gamma Epsilon, National Earth Science Honorary

Mary Savillo
Deborah Korson
Shafiul Chowdhury



Matching Scholarships by Advisory Council

Ryan Wilson
Matt Warner

A SCHOLARSHIP TO CELEBRATE THE LIFE OF DR. ELIZABETH (BETTY) GARRETT

As you may know, our friend and colleague, Betty Garrett, passed away in the summer of 1995 after a long battle with cancer. Lloyd Schmaltz approached several of her friends with the idea of establishing a scholarship in her name. A committee consisting of Lloyd, Betty's daughter Julie Hotchkiss, Bob Havira and other friends from Western and Kalamazoo with the help and encouragement of the Development Office started fund-raising last year. The last report has the fund very close to the \$10,000 goal (minimum to establish an endowment). Thank you very much to all of you for helping make this work. As I said, we are short of the goal, so please keep Betty's scholarship in mind for further help. I was very fond of Betty and I can think of no better way to honor her memory. Please pass the word to anyone you know that knew Betty or if they didn't know her, tell them about this fine, remarkable person. The scholarship is intended to provide financial aid to women in the sciences. Please direct your donations to the WMU Foundation, Garrett Scholarship (not to the Geology Department).

Thanks, Bob Havira



Lloyd and Marilyn Schmaltz Undergraduate Scholarship Award

E. Tyler Knoll for his proposal to design and develop a vertical electrical resistivity probe.

Lee Honors College Undergraduate Research and Creative Activities Award Program

E. Tyler Knoll



W. David Kuenzi Graduate Research Scholarship Award

Scott Lancer for support of field expenses for thesis project to study Brittle Deformation of Pre-Cambrian Crystalline Rocks in Large Mountain Systems, Southern Front Range of Colorado.

Andrew Kozlowski for support of field expenses for thesis project to study Geologic Mapping in Calhoun and Branch Counties, MI.

College of Arts & Sciences Undergraduate Research and Creative Activities Award

Christina Barker

Schmaltz Grand Canyon Fund Award

Jarrall Barnett

Shafiul Chowdhury

Graduate Student Research Fund Award

Andrew Kozlowski
Mike Nash

William Montgomery
Douglas Werkema

WMU Staff Service Excellence Award for Fall 1997

Lauren Hughes

American Geophysical Union Annual Meeting Outstanding Student Paper

Madhav Machavaran

Geological Society of America Outstanding Research Proposal

William Montgomery

Sigma Gamma Epsilon National Earth Science Honorary Best Student Poster (at GSA)

Gloria Christine Celeste Britton

Senior Honor Awards

Hydrogeology

Adrienne Carr
Matt Downing

Geology

Benjamin Kozlowski

Earth Science

Heather K. Thomas
Presidential Scholar
Benjamin Kozlowski

Department of Geology

alumni news

Richard Andrews is employed at Geo Information Systems in Oklahoma. He is a project geologist for Oklahoma's fluvial-dominated deltaic reservoir project. His professional interests include application of sandstone facies, interpretations in oil and gas reservoir development, formation evaluation using wire-line logs, and evaluation of oil fields for secondary oil production.

Robert F. Batt is newly retired, after 39 years in the Kentwood Public Schools (since they started, in fact). He taught middle school, mostly social studies, english, reading, and finished his career with science. WMU/Earth Science/WMUK laid the ground work for a satisfying career and life. He has thanks for the patience of instructors who he says by now are only names and old pictures, but who remain alive in his memory.

Lynn D. Broede is an unemployed hydrogeologist, but actively searching and interviewing. She is currently doing temp work to survive, using Excel, Microsoft Word and Access. Her professional interests include contaminant hydrogeology, organics and metals, and landfills. She is dating an electrical engineer named Ed and is hoping for marriage.

Jeff Clark is attending WMU obtaining a teacher's certificate. He hopes to find a teaching position and work on river and shoreline repair and restoration in the summers.

J and Kim Deopsomer are the proud parents of Thomas J. Deopsomer born October 11, 1997. They are still in Butte, Montana.

Don Drozdenko works as a Product Regulations Engineer/Manager for the Hewlett-Packard Company in San Jose, California. He is professionally interested in laser and LED safety, fiberoptic communication, and high voltage insulation components. He is the co-author of two Hewlett-Packard application notes:

1. LED Eye Safety
2. Regulatory Guide to Isolation Circuits

James H. Duncan, Sr., is retired. He was Chairman and CEO of First of America Bank Corporation. He will continue his work in archeology of the Northern Rio Grande with Northern Illinois University and Field Museum. He curates rare books for the School of American Research, sells



books, and does book appraisals (free) for contributors to New Mexico institutions. He is also chair of the Santa Fe Community Foundation. He has six acres of various rocks (Santa Fe formation) to keep him looking.

Andy Erich is a Senior Geophysicist for the Exxon Exploration Co. in Houston, Texas. His professional interests include earthquake seismology, 2D-3D seismic interpretation, and structural interpretation.



Dawn Mackety Kirkbride lives in Marshall, Michigan, and is employed at MSU Extension in Calhoun County as an extension agent. She received an M.A. in educational leadership in 1996 and is interested in environmental education, program development/evaluation, and volunteer management.

Wendy S. Manial works for Blue Cross/Blue Shield of Michigan, Plastic Card Services, as a Certificate Issuance/Inspection Clerk. She no longer works in the environmental field, she decided the stress just wasn't worth it. She is a Certified Fitness Trainer III through International Sports Sciences Association (ISSA).

Paul Micciche is a Project Manager for the Galson Corporation in Rochester, New York. His professional interests include RCRA/CERCLA investigations, remediation projects, and business development. He was married in September 1992 to Dr. Jacky Williams. Jacky is an Assistant Research Professor at University of Rochester. She is interested in radiation oncology. They purchased an old farmhouse (1890) and adopted 4 surrogate children (2 dogs & 2 cats). Their main hobbies are gardening and hiking.

Robert Steckley lives in Mandeville, Louisiana and is a Senior Market Analyst at P.T. Freeport Indonesia in New Orleans. His professional interests include mining, metals marketing, mineral economics, and hydrogeology.

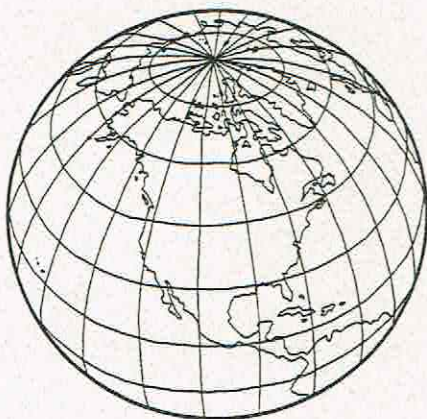
Thomas Stevenson is a Principal/Project Manager for Environmental Incorporated, Valparaiso, Indiana, an environmental consulting firm specializing in environmental investigations and design/implementations of corrective actions.

Matt Stuk lives in Pinckney, Michigan, and is a hydrogeologist for RMT in Ann Arbor. He was married to Amy in September, 1996.

Kevin Sullivan is a Senior Geologist for Miller Oil Corporation. He is busy working the Gulf Coast (MS, LA, TX), the Michigan Basin, and Williston Basin. He is still enjoying life in Traverse City but traveling a great deal.

David A. Wardwell lives in Albuquerque, New Mexico, and is a Project Manager for Mission Research Corporation. His professional interests include working in research and development environmental technologies, real-time automated environmental sensors, and data acquisition control systems. He will be delivering a paper at Battelle National Symposium on Bioremediation (in-situ pressure and flow monitoring of air sparging). He has been working with Rob Hinchee. He hopes some WMU reps will be there.

Troy Weaver works for the Indiana Department of Environmental Management (IDEM) hazardous waste geology section. He currently oversees and regulates any concerns related to the geology, hydrogeology, contaminant migration, etc., at 10 to 12 hazardous waste (RCRA) facilities in Indiana. His professional interests include "bickering with lawyers" (ha ha). Also, developing new guidance and policies involving micro-pulse techniques, extent of contamination delineation, 3D contouring, etc., into everyday regulatory oversight processes. Additionally, he is involved with Indiana's GPS & GIS studies. This includes receiving ESRI training (ArcView, ArcCad, etc.) and high accuracy field surveying (submeter accuracy – have produced closure of 1 cm over 7 to 10 mile distances!) He's not bragging just trying to relay to WMU faculty (especially Dr. Kehew), how much the courses and degree from WMU has done for him. Seriously, he says, the geology related technical, computer, and of course, field skills, learned at WMU put him way above his competition.



Bachelor Degree Recipients

Earth Science Majors

Dennis Terzian, Carl Warfield, Brett Routhier, Bradley Dawson, Kerin Goedert, Matthew Johnson, Eric Walton, Christopher Hansen, Eric Hennig, Marshall Chu, Jeffrey Clark

Field Hydrogeology Majors

Matthew Bailey, Molly Barker, Brett Buchanan, Jeffrey Kooistra, Adam Smith, Jonathan Stewart, Pamela Bodnar

Geology Majors

Benjamin Kozlowski, Judith Tobin

Hydrogeology Majors

Matthew Warner, Mark Worrall, Matthew Downing, Christopher Kelly, Jennifer Lee, Aaron Chamberlain, Todd Dennis, Russell Ellis, Van Fritz, Matthew Goyot, Todd Mehall, Beth Pelland, Erik Peterson, Kurt Skrade, Deborah Korson, Ryan Wilson

Master Degree Recipients

Earth Science

Gloria Britton, Kevin Curran, Philip Loew, William French, Hillol Guha, Howard Harmless III, Steven Kougiass, Phil Odenkirk, Steven Brewer, Rosetta Bredael, Gary French, Alan Stone, Jose Luis Bermejo, Kirsten Bucher, William Raitter, Cynthia Skinner

Geology

Mike Nash, Christopher Amore, William Hunsberger, Santis Limezs, Robert Buechler, Caroline Lovetere, David Deyoung, Kristina Sprietzer, Heidi Wines, Kevin Kincare

Doctoral Degree Recipients

Geology

William Laton, Alan Hascall, Madhav Machavaram, Eliot Atekwana

geology development and scholarship donations

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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Kalamazoo, MI 49008

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- ☐ Unrestricted*
- ☐ W. David Kuenzi Scholarship Fund (support of graduate student research)
- ☐ Senior Honor Award (amount awarded is \$50)
- ☐ Undergraduate Student Work Program
- ☐ Undergraduate Scholarships (amount awarded is \$250)
 - ☐ Earth Science
 - ☐ Geology
 - ☐ Hydrogeology
 - ☐ Geophysics
- ☐ Advisory Council Scholarship Award (amount awarded is \$250)
- ☐ Lloyd J. Schmaltz Geology Museum
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* to support student and faculty travel, field trips, student and faculty research, and visiting speakers

GEOLOGY COMMUNITY

Western Michigan University

1981-82



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 Fourth Row: Pat Mahan, Stan Ueda, Jim O'Brien, Mike Schulze, Kurt Schantz, Brian Mulder, Lloyd Schmalzer, Mark Grady, Bill Grange
 Third Row: Art Williams, Terry Wagner, Rebecca Boone, Kathy Bulken, Carol Hartness, Tom Gray
 Second Row: Dave Lindsay, Shelley Bonstein, Andy Davis, Jim Brode, Jan Nieuwoudt, Joe Glenn, Hanken Warren, Leona Favore, Ruth Casey, Sally Barclay
 Front Row: Thom Hanna, Mike Sproatan, Barb Leonard, T. Rex, Bill Harrison, Sally Smith, Mary Ann Jucapich

Department of Geology

G.E.M.

Lauren Hughes
associate director



The past year has been a very busy, very successful year for the Groundwater Education in Michigan Regional Center. In previous years, the Center has been totally funded by the W.K. Kellogg Foundation with the focus on one major funded project. With the phasing out of the G.E.M. Program by the Foundation, the Center has begun to focus on developing projects from various funding agencies. The Kellogg Foundation still provides more than half of the Center's budget. The G.E.M. Center continues to maintain its outreach capacity for southwest Michigan as it has since its creation in the late 1980's. As one of the five regional G.E.M. Centers, we were actively involved in the production of the "Drinking Water Celebration" held in East Lansing on May 5 to celebrate the success of non-regulatory, voluntary drinking water pollution prevention efforts in the state of Michigan, and to launch a statewide drinking water media campaign and G.E.M. dissemination effort. Gordon Eaton, Director of the U.S. Geological Survey, was the keynote speaker for the event. We are currently developing a Resource Network Directory for Southwest Michigan. The purpose for this directory is to effectively list service providers to local governments and the general public in the areas of water resources and land use planning and growth management.

As part of our efforts to diversify our funding base, the Center contracted with three area watershed studies for a variety of services. We have been contracted by the Calhoun Conservation District to locate residential water wells within the Nottawa Creek Watershed using GPS technology. Dr. Sauck served as advisor on this component of the project. These data have been entered into the statewide groundwater database. The project has employed students in the hydrogeology program to locate the water wells, establish the water budget for the watershed, and to assess aquifer vulnerability for the area. This information will be used to determine critical areas within the watershed and to support identification of appropriate watershed management tools. Dr. Kehew is the faculty advisor for the watershed assessment component of the project.

The G.E.M. Center has also contracted with the Cass County Conservation District to conduct a preliminary hydrogeologic assessment of the Dowagiac River Watershed. Little actual data is available for this project, thus requiring us to compile existing studies and develop a more general overall assessment of the watershed. As faculty advisor for this project, Dr. Hampton used this study as a research problem for the '97 Winter Semester Advanced Hydrogeology (GEOL.

612) class. Students pulled together much of the readily available information. Dr. Hampton and a student in our Ph.D. program are developing the more comprehensive report from this initial assessment. As part of this study, Dr. Chansheng He of the Geography Department, is modeling the effect of land cover/use change and nonpoint source pollution on the watershed. Both studies will be combined to assess critical areas and to develop 1996 land use/cover maps by the GIS Research Center. This information will assist the District and the Dowagiac River Watershed Stewardship Committee in identifying the most effective watershed management tools for local stakeholders.

In August of this year, the Center received funding from the Kalamazoo Foundation to initiate a one year preliminary assessment of the Portage Creek watershed. This project will involve identification and compilation of existing studies on water quality within the watershed. Ultimately this will be integrated into a single summary of the water quality status for the watershed and identification of any areas where additional data are needed. The study employs one graduate student and the faculty advisor will be Dr. Kehew. In addition, an undergraduate student in geography will begin to compile existing zoning and land use plans for the watershed plus other data identified as we proceed with the study.

Other projects that the Center has been involved in this past year include: 1) a project funded by the Kalamazoo Foundation to identify and compile all zoning and land use plans that acknowledge and provide protection for water resources in Kalamazoo County, 2) a project funded by the Southwest Michigan Land Conservancy to identify critical information already available on the Kalamazoo River AOC to be used for developing education materials for local decision makers in the AOC, 3) a water quality project for Paw Paw Lake, Berrien County. Funded by both the Paw Paw Lake Association and the Paw Paw Lake Foundation, this project provides an annual limited sampling program to help identify sources for nutrient loading. Dr. Thorstenson and the Water Quality Lab are providing support.

The Center has also facilitated numerous workshops throughout the past year. Three workshops addressing tools for managing growth & protecting community character were provided for three area townships with Mark W. Wyckoff of the Planning & Zoning Center, Inc. Mark provided an overview of the Michigan Trend Future Study and assessment of land use plans for each township.

Two training sessions were offered to provide hands on training for 13 area Wellhead Protection Communities and County health departments from throughout lower southern Michigan on the use of the new Wellhead Protection Community Guide. The guide was written by the Huron River Watershed Council with the support of the Wellhead Protection Program in the Drinking Water and Radiological Protection Division of the MDEQ and is designed to simplify the process of creating and sustaining a State-approved Wellhead Protection Plan.

Two teacher workshops were offered to promote the use of the Center's new Groundwater Protection Education Modules Grades 7-12. These took place at the 1997 Higgins Lake Environmental School promoted through the MDNR and the MDEQ, and at the Summer 1997 Science Workshops/Courses offered for K-12 teachers through Western Michigan University and the Center for Science Education.

On October 15, 1997 the G.E.M. Center, in partnership with Oshtemo Charter Township and the Kalamazoo County Department of Planning and Community Development with funds provided by the Michigan Economic and Environmental Council and Michigan Environmental Council through the Mott Foundation, offered an evening forum at the Fetzer Center on "Rural by Design: Conservation Design for Subdivisions." The forum was attended by 130 representatives of local government, planners, developers, homebuilders, realtors, engineers, landscape architects, and county and regional service providers. National speaker Randall Arendt provided a compelling argument for planning over zoning to protect critical open space while still providing for community growth.



The Western Michigan University Geology Department Advisory Council is reactivated.

Greetings alumni, friends, students and faculty: The Western Michigan University Geology Department Advisory Council felt the need to submit a letter to the Department newsletter to provide some information about who and what we represent to the department and university.

A quorum of the Geology Department Advisory Council met on March 21 to discuss the current status of the group, which was started in 1980, and the efficacy of continuing their support to the Department. The conclusion of the group was unanimous and with the endorsement of Dr. Kehew and the support extended by the department faculty, the attendees committed to reactivate the council and develop a mission statement of their volunteer efforts.

The Mission Statement is as follows:

The mission of the Advisory Council is to advise the department in perpetuating the highest quality graduates that are well prepared for employment and leadership roles in the geosciences, and success in graduate programs. The Council expertise will be utilized in several ways to:

- Advise the department concerning diversity and flexibility of industry and employment trends
- Advise the department of curricular changes to make graduates as globally competitive as possible
- Advise the department faculty in formulating long-term plans
- Support the department in the recruitment of quality students and faculty
- Support the WMU Foundation in fundraising campaigns that will enhance department activities

The Council will also serve as an advocate of departmental needs and activities by presenting collective views to the administration or other internal, or external, entities.

Many topics and discussions were covered during the one day meeting, which also included a brief meeting with the new Dean of the College of Arts and Sciences, Elise Jorgens. The advisory group was also informed of the current faculty additions. The advisory group agreed to meet at least once per year on campus, with a provision that additional meetings may be held either on site, off site, or by teleconference.

The advisory council wanted to articulate their continued desire to provide benefits to the department and students. In doing so they unanimously passed a resolution to develop scholarships for supporting field trips for the geology department students. The advisory attendees for the day were as follows: John Yellich, Mick Lynch, Lloyd Schmaltz, Jerry Aiken, Tom Kamin, Tom Segal, Tom Straw, Paul Daniels, and Dennis Gebben.

The next meeting of the council is scheduled for the March-April time frame and the council hopes to identify additional members by the time of the meeting and to be able to spend some time not only with the faculty, but also with the students.

John A. Yellich, Co-Chairman
Mike Lynch, Co-Chairman

Department of Geology

G.E.M.

advisory council news

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John A. Yellich, Co-Chairman
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News Items

Return to: Alan E. Kehew, Department of Geology, Western Michigan University, Kalamazoo MI 49008
Phone (616) 387-5485 • Fax (616) 387-5513 • E-mail kathleen.keckler@wmich.edu