Eric Roden measuring hydrogen gas concentrations in a microbial culture.

New Faculty

Introducing Eric Roden

Editor's Note: We are excited to welcome Eric Roden, who joins the department as full professor. Eric spearheads our new area group in geomicrobiology along with Nita Sahai, Huifang Xu, Clark Johnson, and others. Eric and Huifang have built impressive new labs in the "West Wing" addition to Weeks Hall.

Following many months of preparation—and with great excitement—in August 2005 we packed-up my laboratory at the University of Alabama in Tuscaloosa, and headed north to establish the new Geomicrobiology Laboratory in Weeks Hall. I come to the Department of Geology and Geophysics after having served for twelve years in the Department of Biological Sciences at Alabama, where I participated in interdisciplinary research and teaching in environmental/aquatic sciences. Why is a biologist moving to a geology department, you may ask? The answer is actually simple: microorganisms play a key role in the cycling of materials and energy in virtually all environments on Earth, from "everyday" places like the pond in your local park or Lake Mendota, to drinking-water aquifers, to hot springs in Yellowstone, to Antarctic sea ice, to mid-ocean ridge spreading centers, to geothermal environments deep within the Earth's crust…possibly even to present-day or past environments on other planets. The list of interesting connections between microbes and both modern and ancient geological environments goes on and on and is expanding rapidly. Understanding the mechanisms that underlie these connections, together with the physiology and "life history" of the organisms involved, is the central theme of geomicrobiology. In most cases, the endeavor boils down to answering the following questions: who's doing (or did) what, where, and when; how are they doing it; how fast are they doing it, and what effects does "it" have on overall geochemical conditions?

My specific research poses the above questions primarily in relation to oxidation-reduction ("redox") reactions that take place at or near the Earth's surface, for example in environments such as lakes, streams, wetlands, and aquifers. I am particularly interesting in the microbially-mediated linkages between cycling of carbon, nitrogen, sulfur, and iron. The latter (iron) has highest priority at present, and is arguably the most fascinating in a geological context: from 2-3 billion-year old Banded Iron Formations to reactions controlling the quality of public drinking water, microbial iron cycling is a premier example of how microorganisms control geochemical fluxes on our planet. They also have a unique influence on the mineralogical and isotopic composition of an immense variety of iron-containing materials. We are engaged in parallel studies of the composition of microbial communities involved in iron redox cycling, the metabolic properties of the organisms that do the work (i.e. how the bugs make a living), and the nature of the mineral phases that are either produced, destroyed, or modified during the process. Some of this work is very basic in nature (e.g. NASA-sponsored research on microbial iron cycling environments on Earth as analogs to possible iron-based microbial life systems on Mars), whereas other projects are directed toward understanding the fate and transport of various kinds of contaminants

Eric Roden drills through the ice in search of a sediment core.

(e.g. DOE-sponsored research on microbial transformations of metals and radionuclides such as cobalt and uranium that were released to subsurface environments during Cold War-era nuclear weapons production). A wide variety of tools and techniques are applied to geomicrobiological studies, including molecular biology and genetics, chromatography and spectroscopy, and of course all sorts of microscopy.

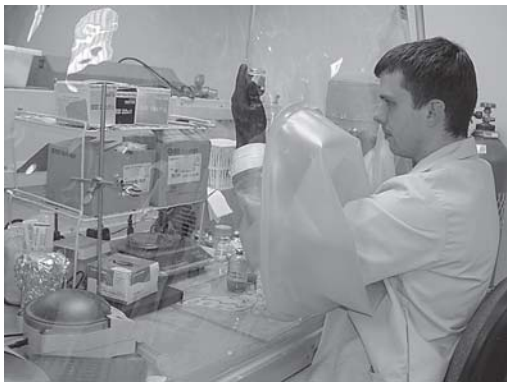
Opportunities for collaboration with other G&G faculty abound. Three examples paint the picture: with Clark Johnson at the helm, we are engaged (through support from the NSF Biogeoscience program) in a systematic evaluation of the potential for generation of "iron isotopic biosignatures" that could be used to infer the role of microorganisms in the geochemistry of modern and (more importantly) ancient geological environments. Through my own experimentally-based NSF-sponsored work, I am collaborating with Huifang Xu to understand how nano-phase iron oxide minerals are modified in systems where cyclic interconversions between ferric and ferrous iron take place. Finally, a new and exciting intellectual "outcrop" that arose through interaction with Laurel Goodwin will seek to define the role of microbial metabolism in the generation of carbonate mineral concretions in fault zones in New Mexico. The latter represents an example of how microorganisms could have a significant impact on the physical behavior of large-scale geological structures. Other collaborations likely to emerge in the near future include work with John Valley and colleagues on application of the new ion microprobe (WiscSIMS) to resolve the spatial relationships between microbial growth and mineral transformations in porous media, and work with Jean Bahr and colleagues on the transformations of nitrogen in streams and associated shallow aquifer systems.

Coming back to where I started, thanks to fabulous financial, technical, and "human" support provided by department faculty and staff, and alumni gifts, the new Geomicrobiology Laboratory is now fully functional – within, that is, the excellent new space of the West Wing addition. I knew we were home free the day the autoclave (high temperature/pressure sterilizer) was installed and tested! Although not yet at full capacity, we're getting close with four postdocs and three graduate students. I feel like the sky is the limit in my new home here in G&G, and look forward to many years of interesting and fruitful interactions within and beyond Weeks Hall.

Evgenya Shelobolina counting cells on the microscope.

Marco Blöthe taking a UV picture of a DGGE gel for microbial fingerprinting.

George Tangalos measuring iron on the spectrophotometer.



Aaron Coby sampling in the anaerobic chamber.

Faculty News 2005

Mary Anderson

In fall 2005, I began a year-long sabbatical, which continues through summer 2006. (Tenured faculty are eligible for a sabbatical after 6 years of full time employment; you must submit a proposal, receive formal approval, and submit a report after it's over.) My sabbatical project involves new software to simulate heat transport in groundwater systems. This ties in nicely with Chris Lowry's PhD project; Chris is using heat as a groundwater tracer to investigate transient hydrologic processes in a wetland in northern Wisconsin. (Also see my recently published review paper on heat as a tracer: http://www.geology.wisc.edu/~andy/HOMEPAGE.htm). I was fortunate to spend nearly the entire month of December in Japan, visiting four colleagues, two of whom introduced me to the heat transport literature several years ago. It was good to learn about their current work and also see quite a lot of Japan while traveling between cities. A highlight was a trip to Mt. Fuji with Professor Fujinawa and his wife on a cold and crystal clear day (see photo below).

In other news, Rahul John finished in July and went on to a job in consulting in Florida. Melissa Masbruch also finished during the summer and is now at the University of Utah for the PhD. Raycine Hodo defended her thesis in August and moved to Maryland. Two new hydro students joined me in the fall. Chris Muffels is working on a problem in inverse modeling and Jonathon Carter is working on a nitrate project with the WGNHS in the Driftless Area. Second year MS student Mike Cobb is nearing completion of work on karst hydrology in northwestern Wisconsin. In between teaching, research and committee work, I continue as Editor-in-Chief of the journal ***Ground Water*** and still find this job quite enjoyable. I've become interested in the history of hydrogeology. See my web page (address given above) for recent articles focused on history at UW-Madison.

Mary Anderson's Mt. Fuji.

Maitri Venkat-Ramani (Shell representative and Board of Visitors' member), left, and Chair Jean Bahr, presented ten newly-established Shell Undergraduate Research Fund awards to department undergrads in December 2005. See page 37 for a list of awardees and their research topics.

Jean Bahr

My research group had a busy year in 2005. Tara Root completed her PhD work on naturally occurring arsenic sources and mobilization in the Lake Geneva area and took a job starting in September at Florida Atlantic University. Nate Keller completed his MS on development of a data base and field protocols for the initial part of our EPA-DNR-Commerce study of natural attenuation effectiveness. Rachel Greve spent the summer continuing field work for that project at eight additional sites around the state. Laura Craig also spent a good portion of her summer in the field, collecting data at a riparian wetland north of Lake Mendota where we are attempting to elucidate controls on nutrient export from nearby agricultural lands. Hilary Gittings Trethewey continued her refinement of a model of the Mukwonago River watershed, and the final calibration work has just recently been completed. Jeff Wilcox was awarded an EPA STAR Fellowship that is supporting his work on transport and transformation of pharmaceuticals and personal care products that can enter ground water from septic systems.

I taught Contaminant Hydrogeology in the spring and developed a risk assessment exercise to supplement the site project that has been a mainstay in that course since I developed it in 1987. I also taught my summer hydro field methods course, during which we gathered data useful to several projects in the hydro group as well as the Water Resources Management Workshop that was studying a the Starkweather Creek watershed on the east side of Madison. In the fall, with Herb Wang and Randy Hunt covering the introductory hydrogeology class, I took advantage of the

Geology 729 students at Nine Springs Creek. They were working with Jean Bahr in her summer course, Field Applications in Hydrogeology.

teaching release available to me as department chair to offer a graduate seminar on karst hydrogeology of the Yucatan. That seminar was in preparation for a hydro group field trip this spring that will be led by UW alumnus Luis Marin and some of his colleagues from UNAM.

After a year recovering from the Birdsall Dreiss lecture tour, I seem to have recovered my taste for traveling. In February I participated as an invited speaker in a Michigan State workshop series on "Shaping Future Water Policy: The Role of Science". In March I visited the University of Nevada Reno as part of a three-member committee conducting a review of their Hydrologic Sciences Program. A highlight of the summer was a week-long, 300 mile bicycle trip from Missoula to Bozeman, Montana. The fall brought opportunities to attend the CIC Geoscience Department Chair's meeting at Penn State and the annual GSA meeting in Salt Lake City. I also traveled to Houston in November with Toni Simo to visit with a number of alumni in that area. Visits to my parents in California both at Thanksgiving and Christmas rounded out the year.

Alan Carroll

Two major transitions occurred in the past year: the first flight of my experimental airplane, and the birth of our first child (William Charles Carroll). The airplane was much longer in gestation, about 8.5 years. I made the first flight in May and by October had already flown it to Wyoming. It's a two-seater, capable of 200 mph and aerobatics—rides can be arranged for the adventurous. William arrived in late July (during the annual Oshkosh fly-in convention and airshow), and aside from the usual sleep deprivation everything has been going great. Balancing parenthood with dual academic careers is sometimes challenging, but overall its been a very rewarding experience.

Major research efforts in 2005 continued to focus on the Green River Formation, via the projects of Amalia Doebbert, Lauren Chetel, and Mike Smith. Mike's geochronology work (undertaken in collaboration with Brad Singer) has really started to come together, and we now have an age model for the entire Green River Formation and surrounding deposits that provides an unprecedented level of resolution for a major lake system. During our field work we also saw evidence for a rapidly building petroleum "boom" in Wyoming, much of which is focused on fractured reservoirs and "basin-center gas". It was difficult to find hotel rooms in Rock Springs, and several new hotels were under construction. In addition to field work, our group also led a successful pre-meeting GSA fieldtrip to localities in the Green River Formation.

On the international side, I continued to be involved with projects in Argentina and Indonesia. Justin Gosses and I visited a spectacularly well-exposed succession of Eocene caldera lake deposits in Patagonia, that he is describing and dating for his MS. Beyond their intrinsic appeal, these lake beds also hold the richest known Eocene floral record in the southern hemisphere. I also continue to collaborate with Toni Simo in the East Java basin, work that involves students Mei Mei Tang, John Naranjo, and Eduard Dragan. Finally, after a hiatus of some 7-8 years I'm becoming re-involved with China work, this time in the Ordos basin via the PhD project of Jana Van Alstine.

Charles W. Byers

For the spring semester of 2005 I was on sabbatical; boy, was it great! I worked on upgrading G110, Evolution and Extinction. I've taught the course for more than 20 years now, and I wanted to modernize the lecture presentation and illustrations, as a first step to offering the course on the web. Over the summer I went out to Park City and taught field camp for the first time since 1983. There had been a few changes to the town in the interim (i.e., it goes all the way to the interstate and on down the canyon toward Salt Lake). Not much change in the outcrops though. I came away re-impressed with what a great location Utah is for teaching field geology. We still try to show the students the basics of mapping: reading topo sheets, pacing, compass work, and, most critically, What is this rock I'm standing on? Sometimes the work coexists uneasily with GPS, an everyday technology now for many of the students, almost as ubiquitous as cell phones, ipods, and laptops.

Also this past summer, Amy Garbowicz completed her MS thesis on the Cambrian geology of Adams County and accepted employment in the petroleum industry. For her thesis project, Amy was able to trace the standard formations of the driftless area northeastward, with no change in lithology; in particular, we don't see evidence of shoaling or

influx of different sediment types. Apparently the shoreline of the Cambrian epeiric sea lay significantly further to the north.

And speaking of the north, our son Dylan has been admitted to the class of 2010 at the University of Minnesota. Come September he'll be off to the Twin Cities and Gopherhood.

Chuck DeMets

The past year was nothing short of a whirlwind of research, traveling, and research (Did I mention research yet ?). A number of long-term projects reached their publication phase simultaneously late in 2005 and required enormous amounts of time for manuscript preparation and submission. Submitting a raft of manuscripts was a long-awaited reward for years of hard field work and data analysis.

Chuck DeMets and Russian marine geophysicst Dr. Serguei Merkouriev. They spent a month in the fall working on a collaborative analysis of aeromagnetic data from the north Atlantic.

I traveled to India to present two invited talks at an international conference in January of 2005 shortly after the M=9.3 Sumatra earthquake of 26 Dec 2004. The combined effects of culture shock, jet lag, insomnia, and 18-hour work days lent a surreal aspect to the trip. I took a welcome break from my usual winter field work in Mexico and instead spent most of the winter teaching and on two occasions engaged in personal regeneration with my family on the ski slopes of Colorado and beaches of southern Mexico.

Indrajit Das, an Indian summer intern, arrived to begin working with me in early May and did a wonderful job of surveying literature and thoroughly documenting the mid-ocean ridge system's geography. After his departure in late June, my Mexican colleague Dr. Enrique Cabral arrived in Madison to work with my graduate student Francisco Correa-Mora and me on our earthquake cycle modeling for his field area in southern Mexico. His departure was followed within days by the arrival of a second Mexican collaborator Prof. Bertha Marquez-Azua, who lived with my family from mid-August through mid-September while we worked on Mexican tectonics using new GPS data. Dr. Serguei Merkouriev, my Russian marine geophysical collaborator, arrived the day of Dr. Marquez's departure and spent the next month working with me on a collaborative analysis of aeromagnetic data from the north Atlantic. I somehow juggled teaching of two lecture classes during these visits.

November and December weren't much better, with the usual frantic preparation of NSF proposals for the December 1 deadline, followed in sequence by my advisee Stuart Schmitt's master's defense, presentation of an invited talk at the San Francisco American Geophysical Union meeting, and (thankfully) a holiday escape with relatives. My New Year's toast ? "Here's to a more relaxing 2006...."

Dana Geary

On the graduate student front, I am happy to report that Hilary Sanders finished her PhD on the evolution of congeriid bivalves in Lake Pannon. Hilary is now teaching at the College of Wooster in Ohio, with fiancé Jade Star Lackey. Double congratulations to both of them!! Despite the scandalous implosion of the Milwaukee Public Museum, Paul Mayer continues his work on community evolution in Devonian brachiopods. Matt Kuchta is studying the paleoclimate implications of Pleistocene terrestrial snails from the driftless area of SW Wisconsin. Erik Hoffmann completed his MS thesis on evolutionary rates in Admetopsis, a lineage of brackish water gastropods from the Western Interior Cretaceous. He plans to switch gears for his PhD research, and will study geochemical markers of habitat variability in zebra mussel ancestors. We will be collaborating on this project with Carol Lee (UW-Madison Zoology Department).

In other ongoing research, I completed a paper on the legacy of punctuated equilibrium for a volume on Stephen Jay Gould and his work. I am continuing to work with former post-doc Gwen Daley (now at Winthrop University in North Carolina) on predator-prey behavior in Pleistocene mollusc communities from Florida. And finally, I am continuing a variety of other projects on Lake Pannon molluscs and their evolutionary patterns with former post-doc Imre Magyar.

Undergraduates involved in research include Emily Kleiber, who is pursuing her senior thesis research on stereotypy of snail predation on Pleistocene Anadara (clams). Clint Boyd completed his senior thesis on the enamel microstructure of hadrosaurid dinosaurs. Clint is now a graduate student at North Carolina State University. Other

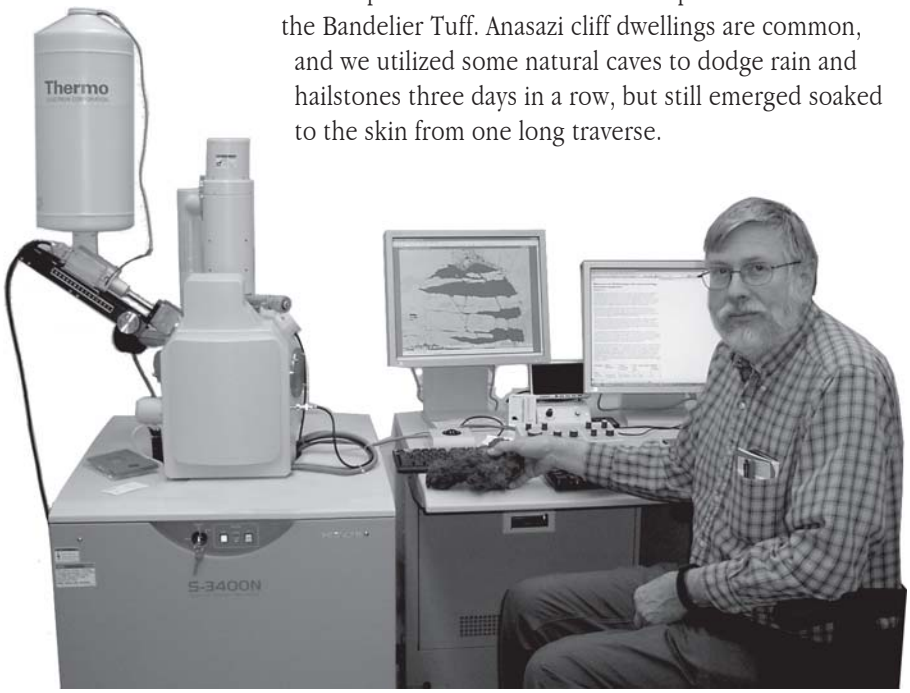
recent paleo undergrads off to grad school include Adam Behlke (Fort Hayes State, KS), Summer Ostrowski (SUNY Stony Brook), and Dan Hyslop (University of Rhode Island).

In June, I went with Rob and the girls to Halifax, Nova Scotia for NAPC (North American Paleontology Convention). I presented a paper on the relationship of ontogeny to phylogeny in two lineages of cardiid bivalves from Lake Pannon. Hilary Sanders, Erik Hoffmann, and Paul Mayer all presented papers on their research at this meeting. With my family I enjoyed some post-meeting travel in Nova Scotia, including the cliffs at Joggins (visited by Charles Lyell, and famous for Carboniferous tree stumps containing fossil amphibians and very early reptiles), the Bay of Fundy, and various wonderful places on Cape Breton Island (pilot and minke whales, moose, carnivorous bog plants, nesting kittiwakes, skuas, etc.).

I am a member of the campus Evolution Coordinating Committee, a fairly new group that is trying to get the hundreds of evolutionary biologists on campus coordinated and organized in various ways. In the fall, I took on the task of organizing the first-ever UW-Madison Darwin Day (Feb. 11, 2006). The 2006 version of this was an all-day symposium entitled Evidence for Evolution: Updating Darwin's Case. This turned out to be a major project. See next year's Outcrop for a report on how it went!

John Fournelle

In 2005 I was involved with evaluating scanning electron microscopes (SEMs) and related detector systems to fill some gaps in department analytical capabilities. The NSF proposal of Goodwin, Fournelle, Tikoff, Valley, and Xu was funded and then the hard part began: finding which instrument is the best for the Department. It will be "packed" with some new features and capabilities, including: electron backscatter diffraction (getting crystallographic data), EDS, sensitive CL detector with filters for creating colored CL images, ultrasensitive BSE detector for imaging low contrast chemical zonation in minerals such as plagioclase, and low vacuum ("environmental") SEM capacity, i.e. samples do not need to be coated and can be outgassing. A Hitachi S3400N was selected and will be delivered in February 2006. I presented invited talks at the Goldschmidt and at the Microscopy and Microanalysis conferences.



John Fournelle with the new SEM's first sample, an iron nodule from St. Peter Sandstone, Blue Mounds, WI.

Mary Diman and I developed an exhibit, The Science and the Art of Charles C. Bradley, which was shown in Madison at the Steenbock Gallery of the Wisconsin Academy of Science, Arts and Letters May 3 -31, 2005. The exhibit traveled to Montana State University and was on display from October through December, 2005.

Laurel Goodwin

It has been a busy year for structural geology in the Department. The Structural Geology Wing was named "In recognition of the contributions by Professor Campbell Craddock to geology and the department through his teaching and research areas, which spanned the globe." Weeks 170 was renovated as the Advanced Structural Geology Lab, "Dedicated to the legacy of Wisconsin structure students who helped explore the world" by alum and former BOV president Jay Nania. A new transmitted/reflected light microscope and computer for image analysis add to the existing suite of microscopes and computers. Adjacent lab spaces have been reorganized to facilitate analog deformation experiments, sample prep, group meetings, and planning for field work, field trips, and labs. Weeks 174 is decorated with photos of our students' field areas, from all over the world, of course. Please visit us at any time.

I went to the desert on two continents this year. In both places, we were pelted with unseasonable rain. In May, MS student Paul Riley, his undergraduate field assistant Craig Schuettpelz, and I went to the Jemez area of New Mexico. Paul is looking at the spatial distribution of small-displacement faults and their impact on fluid flow in the Bandelier Tuff. Anasazi cliff dwellings are common, and we utilized some natural caves to dodge rain and hailstones three days in a row, but still emerged soaked to the skin from one long traverse.

MS student Kathy Staffier, undergraduate student Daniel Hallau, Basil Tikoff, and I met in Alice Springs, Australia for research on exposures of granulite facies rocks exhumed from the lower crust. We got a brief start in the area Daniel is studying for a senior research project before it started to seriously rain. Alice was crowded with people forced from the outback by impassable roads. We couldn't get to our field area, but visited Uluru (Ayer's Rock) during a brief window of open roads. It is easy to understand why this site is sacred to native Australians.

JoAnn Gage started her MS with me and Basil this past fall. She will be working in central Australia also. Team Australia is investigating the lower crustal record of rheology to better understand the mechanical link between the crust and upper mantle. In the shallow crust, Jennie Cook, a new PhD student, is investigating the link between micromechanical processes and macroscopic structures in fault zones. Jennie and I leave soon for California, where she will map the San Gregorio fault zone, a portion of the San Andreas fault system, in great detail. We look forward to an exciting year.

NEWS FLASH! Our new Hitachi 3400N Scanning Electron Microscope was parked in Weeks 308 February 27th 2006 (this is the SEM featured on CSI: Crime Scene Investigation). A variety of detectors will allow us to map both crystallographic preferred orientations of phases and spatial variations in cathodoluminescence in addition to standard imaging. The SEM will be used for paleontological, geochemical, mineralogic, and structural studies. Of course, I'm jazzed about the increase in our microstructural analytical capabilities. John Fournelle will run the facility; stop by and check it out!

Start of fall 2005 semester party, chez Nita. Left to right: Young Lee, Katya Delak, Mark Stevens, Nita Sahai, Tim Oleson and Mark Ciardelli.

Nita Sahai

The highlight of this past year has been the graduation of my first PhD student, Katya Delak, who successfully defended her thesis in January 2006. Katya worked out the chemical mechanisms by which amines catalyze silica formation by controlling hydrolysis rates under benign solution conditions. Her study provides clues to the potential mechanisms by which biogenic silica producing micro-organisms such as diatoms and sponges enzymatically induce precipitation of nanoporous silica for potential industrial and technological applications. It was a pleasure and a privilege to have Katya in our group for the past five years.

Another milestone was that graduate student, Tim Oleson, defended his MS thesis and has decided to continue for a PhD in our group. Tim has been working on understanding the stability of cell-membrane forming phospholipids at oxide mineral surfaces. This work has implications for the early stages of the evolution of life involving organization of cell-membranes at mineral surfaces and for developing targeted drug delivery systems.

The first post-doctoral researcher to join our group, Young Lee, is working with MS candidate student, Mark Ciardelli, on developing a new approach for toxic arsenic uptake at iron and calcium phosphate surfaces. We have some exciting results in this project, which show that some simple treatments of arsenic-contaminated water may alleviate the severe well-water contamination problems in Eastern India and Bangladesh.

We also recruited two new graduate students, Mark Stevens and Jennifer Thornberg, into our group. Mark Stevens will work with Tim Oleson, and Jennifer is interested in the structure-activity relationship of silicate bioceramics towards the ability to nucleate hydroxyapatite at their surfaces, with potential implications for designing orthopaedic implant materials.

My own research efforts have continued on theoretical and crystallographic considerations to explain why certain silica-based ceramics are "bioactive"—promote apatite growth at their surfaces when implanted as prosthetic devices in the body thus forming a bond between the implant and existing bone—whereas other materials are inert. I am also collaborating with colleagues at University of Michigan, Ann Arbor and Harvard Medical School and Boston Children's Hospital on modeling hydroxyapatite-protein interactions potentially involved in bone growth.

We published four peer-reviewed papers last year, attended several conferences where many of our group's students presented talks, and I was fortunate enough to be invited to many conferences and universities to present our research work. The fall 2005 semester was an especially busy time for me as I wrote several research grants to support our larger group and simultaneously taught double my usual teaching load. I look forward to 2006!

Toni Simo

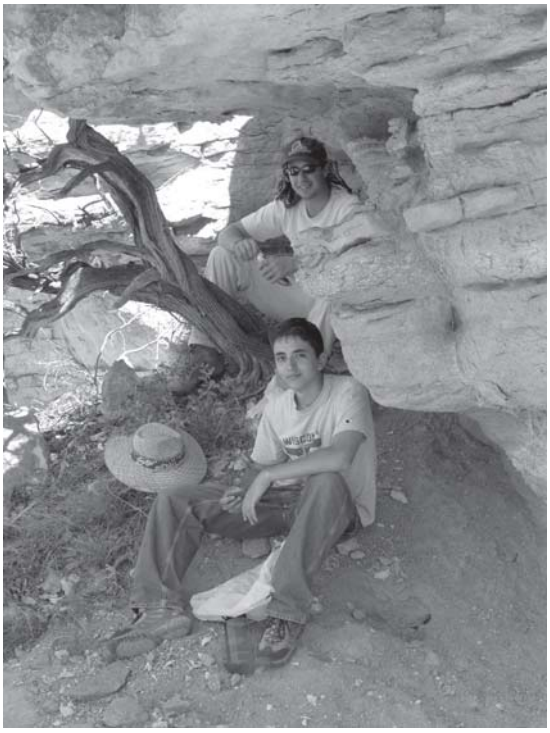
2005 continued with much travel to my favorite cities in Europe (Barcelona, Bergen and Milan) where I spent extended periods collaborating with colleagues at Norsk Hydro, ENI and Catalan University. Field work continues in Indonesia, Tunisia, Spanish Pyrenees and SW US, and of course teaching undergraduate core courses and specialized graduate courses is part of my life too. The family is doing well in Spain; Edgar is already in college and Julia in high school.

My involvement with hydrostratigraphy continues, especially with collaboration with the Catalan University of Barcelona where I advise one PhD student and a postdoc. We have completed the data collection including reflection seismic at sea and land, coring, age dating and description of near 560 wells. Stay tuned for papers coming out in the near future.

The geology of Indonesia (in collaboration with Alan Carroll) is becoming a major effort with collaborations with several companies and the Technical University of Bandung. Field work with Mei-mei Tang to new and unexplored areas was very revealing with a tectonic and provenance history that is challenging present concepts. John Naranjo, Eduard Dragan and Wasinee Aswasereelert have joined the group with emphasis in seismic/structure, mound growth and demise, and modeling respectively. Six Indonesian students have joined the group mapping several outcrops that are of unique importance for the subsurface.

The interaction between structure and carbonates has been a major part of my research effort in 2005. In collaboration with Basil Tikoff, Chris Gordon has been mapping and reconstructing folds in Tunisia. In collaboration with colleagues in Tunisia we obtained seismic and well data that allow us to tie outcrop to subsurface and movement of salt and creation of mini-basins and anticlines at different times. Further, I have been focusing on the reconstruction of a system of synsedimentary faults in the Guadalupe Mountains in 3D combining digital scanning of the outcrop, GPR and field mapping with Jana van Alstine and colleagues at Norsk Hydro visualization lab.

Ground Penetrating Radar (GPR) in carbonates continues to be an important area of research as many companies have shown great interest in our method and results. Preeya Jirutthitijaroen continues with her work on the GPR profiles collected in Spain. Leonardo Piccoli completed his thesis using GPR in the Hueco group in West Texas. And Neal Lord, Frank Klein and Justin Fairchild collected field data in the Sacramento and Hueco Mountains. Justin and Frank are completing their undergraduate thesis and their work was part of a recent workshop in Milan.



Undergrads Justin Fairchild, above, and Frank Klein find a shady spot for lunch. They were collecting field data in June with Toni Simo in the Sacramento Mountains, New Mexico.

Brad Singer

In March, PhD student Brian Jicha and I traveled to Puyehue Volcano in the Chilean Andes to map and collect samples from Holocene ash and pumice fall deposits for U-Th isotope studies aimed at constraining time scales of magma residence and transport in the crust, part of a larger project on this topic that involves PhD student John Hora, Clark Johnson, and Brian Beard. Danny Douglass defended his PhD dissertation on the glacial chronology of the southern Andes in June and is now an Instructor at Northeastern University in Boston. Danny, former post-doc Mike Kaplan, Dave Mickelson, and I published a paper in Geology that provides the first unequivocal geochronologic evidence for early to mid-Holocene glacial advances in the Southern Andes. Richard Becker gave an outstanding presentation of his MS thesis results on the chronology of late glacial ice advances from the Southern Patagonia Ice Field to a packed Union Session at the AGU meeting in San Francisco. Following publication in March of a paper in Nature on the last reversal of the Earth's geomagnetic field, I was selected jointly by the Franco-American Exchange Commission in Paris and the Fulbright Commission in Washington to receive a Fulbright Research Scholarship in France. Thus, I will spend most of the upcoming summer during the end of my 2005-06 sabbatical at the CNRS laboratory in Gif-sur-Yvette, a suburb of Paris. While in Europe I will work with French collaborators on the Geomagnetic Instability Time Scale (GITS), which will integrate a high resolution chronology of all geomagnetic reversals and excursions that are recorded globally in sediments, polar ice, and lava flows during the Quaternary. Part of the GITS project included an excursion in March to 3768 m high Santa Maria

Left: Brad Singer witnessed several phreatomagmatic eruptions from the 200 m tall Santiaguito dacite dome in the main crater of the Santa Maria Volcano while he was in northern Guatemala in March.

Volcano in northern Guatemala, where lava flows exposed for hundreds of meters in the 1902 collapse crater record a geomagnetic field excursion. Four days of camping and drilling these lavas with collaborators from Michigan Tech University, including visiting UW Madison student Rüdiger Escobar Wolf, were rewarded with several spectacular phreatomagmatic eruptions and showers of ash from the 200 m tall Santiaguito dacite dome that actively grows in the main crater (see photo). Undergraduate students Brian Allen and Ben Kirby have also joined me in dating lava flows in Iceland and tephra in Oregon for the GITS project. For five weeks in July and August, Brian Jicha, undergraduate student Bill Cassata, and I, together with 30 other scientists and crew, sailed aboard the 300 foot research ship M/V Tommy Thompson along the westernmost Aleutian Island Arc. During the cruise we discovered, mapped, and sampled using a dredge, more than 50 submarine arc volcanoes–only two days were lost to rough seas! In the Rare Gas Geochronology Laboratory I also continue to pursue chronostratigraphic studies of the Green River Formation and other lacustrine and shallow marine sediments with Alan Carroll, Toni Simo, PhD students Mike Smith and Lauren Chetel, and MS student Justin Gosses. As the first half of my sabbatical year flew by in the fall, I planned with my family to take in as much of Paris and Brittany as we can next summer, before it is over.

Clifford Thurber

2005 was another exciting year for me. Two of the biggest highlights were the completion of the main phase of drilling for the San Andreas Fault Observatory at Depth (SAFOD) and the publication of the inverse theory textbook authored by Richard Aster (UW G&G MS 1986), Brian Borchers, and myself. New graduate student Ninfa Harrington joined my group in September, and Jeremy Pesicek and Nate Meyer are working hard on their MS theses. Post-doc Yunfeng Liu joined the group in June, while post-doc Jean Battaglia moved on to a position in Europe and post-doc Mike Brudzinski started a job as an Assistant Professor at Miami (of Ohio) University. Associate Scientist Haijiang Zhang and post-doc Heather DeShon continued their excellent work on fault zone, subduction zone, and volcano studies.

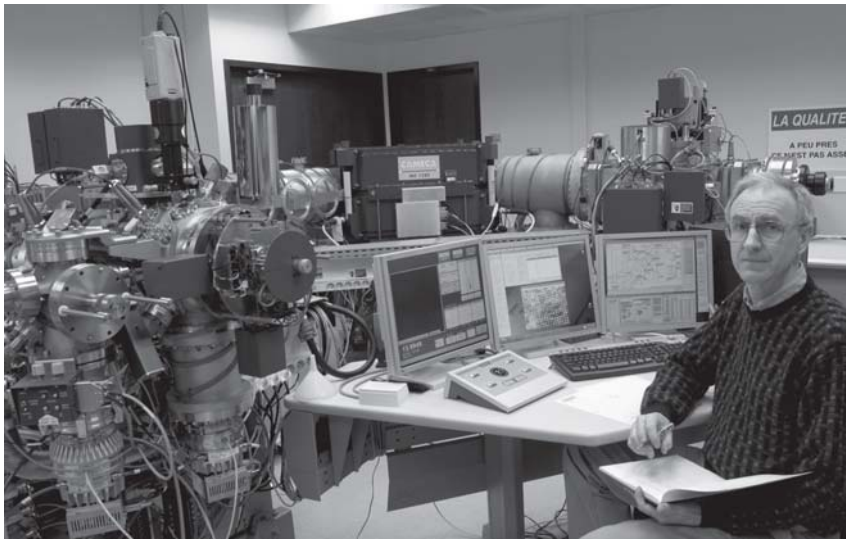
Basil Tikoff

Well, I returned from sabbatical for fall semester. I did get a lot of work done, but nowhere near as much as I had hoped. On the other hand, I put in a couple months of fieldwork in New Zealand and Australia, so I don't suppose I can really complain.

In general, the structure group is doing very well. First, the graduations. Caroline Webber (MS '05) finished up a great Masters thesis on deformation in the Dun Mountain ophiolite

Basil Tikoff and Eric Horsman co-led a field trip to the Henry Mountains after GSA in October.

belt in New Zealand. She has moved on to Houston where she is working for ExxonMobil. The Jessies—Jesse Graham (BS '05) and Jesse Silverman (BS '05) both finished senior honors projects in structural geology. Jesse G worked in Tunisia and did a gravity inversion on some suspected salt-cored anticlines. Jesse S studied fractures in the Sierra Nevada batholith. Jesse G is currently working in Arizona for an engineering firm while Jesse S is applying to graduate schools. Martha Gilbert, who has been our ace rock cutter, graduated and has moved on: She will be missed.



John Valley in the WiscSIMS lab, Weeks Hall, and the new CAMECA IMS-1280.

There is good news about employment and awards. Sarah Titus, who will graduate in spring 2006, managed to get a job in her hometown of Northfield, Minnesota, at Carleton College as the new structural geology professor. Sarah and Eric Horsman, who will also finish in spring 2006, were awarded the CAMPUS-WIDE Teaching Assistantship award. Congratulations are definitely due to them. They have been doing an excellent job of investigating why students have difficulties visualizing in three dimensions. They have also been designing assessments to quantify these results and have been trying new teaching strategies. They are also keeping the structural geology lab operational, in addition to finishing their dissertations.

Chris Gordon (co-advised with Toni Simo), Stephanie Maes (co-advised by Phil Brown) and Skylar Primm are all doing well and are also scheduled to finish in 2006. It is going to be quite a turnover of the old guard. Luckily, Bryn Benford and JoAnn Gage (co-advised by Laurel Goodwin) have joined the group. Bryn is working on faulting in the Twin Sisters ultramafic body in Washington State and JoAnn is working in Australia. Both Bryn and JoAnn were actively engaged in college sports, which means I'll probably be struggling just trying to keep up.

The other endeavor I'm very excited about is teaching a new course on science literacy. I blame my sabbatical: It gave me time to realize that the science community shares some blame in the fact that we are not training a scientifically literate citizenry. I have been working with Nancy Ruggeri (recently moved from the Center for Biological Education) for the last year, on designing a new course from scratch that will address these problems. The course is designed to address science literacy issues and is aimed specifically at freshman, non-science majors. The course proposes a novel, interdisciplinary approach to teaching science: We are integrating all the major sciences in a single course to emphasize their commonalities rather than their differences, and the course presents science as a process of inquiry and discovery not as a pre-established set of facts. (I am seriously brushing up on my molecular biology.) We will use Bill Bryson's ***A Short History of Nearly Everything*** as the textbook for the class, which is a particularly engaging book on the nature of some of the major scientific discoveries and how this is inevitably a humanistic endeavor. I highly recommend reading it—it is highly entertaining and captures some of the wonder of being a scientist (as well as giving amusing renditions of some of the odd characters). One of the main goals of the course is to have students construct a scientific framework of understanding and to build their analytical and critical thinking skills, as well as a scientific knowledge base for life-long learning. Tall goals, indeed! Still, I think this is exciting and I'm motivated to give it a try.

2006 is shaping up to be one busy year. Stay tuned for a lot of graduations.

John Valley

The big event this year was arrival of the ion microprobe. We purchased the first IMS-1280 from CAMECA in Paris (photo). Many of you saw it at the Reunion last May. It's a large radius multicollector instrument that is optimized for stable isotope measurements. It came airfreight, 11 tons in 10 boxes, and then on three flat bed semi's to Weeks Hall. Installation started with fresh snow on March 1 and testing was completed 10 months later. Many people contributed to the success of this project including Noriko Kita, Neal Lord, Lee Powell, and Bill Unger. Jim Kern joined our group this fall to assist with electronics and other technical matters.

Post-docs, Zeb Page and Bin Fu, along with Aaron Cavosie, Noriko, and I presented the first six abstracts of zircon research from the ion probe at AGU in December. The zircons come from many environments, including mid-Atlantic Ridge gabbro, the Sierras, kimberlites, and Archean conglomerates, and range in age from less than 1 Ma to 4.4 Ga. Upcoming

projects include oxygen isotopes in quartz overgrowths in the St. Peter sandstone of SW Wisconsin that Jacque Kelly is studying on for her MS; Penny Lancaster's MS on migmatites from the Adirondack Mountains; and studies of oxygen diffusion in granulites by PhD student Mike De Angelis.

Jade Star Lackey completed his PhD last summer on the genesis and regional geochemistry of granites from the Sierras. Jade Star is now an Assistant Professor at the College of Wooster.

Aaron Cavosie also completed his PhD last summer and is an Assistant Professor at the University of Puerto Rico. His thesis is on the early Archean zircons from Jack Hills in Western Australia. Aaron and Laura have a beautiful house on the surfing beach north of Mayaguez. Mike Spicuzza is down there now checking Aaron's new stable isotope lab as I write this in February. For some reason, this trip required the purchase of new bathing suits, not easy this time of year.

The other news from me is that the gavel of the Mineralogical Society of America officially changed hands last October at GSA as I ended my year as Vice President and became President.

Herb Wang

My year began by attending a workshop in January on the proposed Deep Underground Science and Engineering Lab (DUSEL). The workshop was held at the U. of Colorado and included a brief tour of the Henderson mine about 50 miles west of Denver. I have been part of the Homestake collaboration, which emerged from an NSF competition as one of the two finalists along with Henderson. I participated in town meetings at the December AGU meeting on in situ rock mechanics, hydrogeology and geomicrobiology experiments that are possible in these facilities.

On the teaching front I taught a web-based course on environmental justice as well as a spring break field trip course to New Orleans and Baton Rouge. The trip included expert guidance by local experts such as Wilma Subra, a 1999 MacArthur genius awardee (same year as Jill Banfield's award), and Beverly Wright, director of the Deep South Center on Environmental Justice at Xavier University. For the third summer I led a three-week course in Wisconsin and Illinois on environmental justice. In September, I visited Brownsville, TX and Matamoros, MX to help scope out a three-week summer course on border issues of environmental justice, which will be taught by Tess Arenas, the new Letters and Science director of service learning together with Sandy Magana of social work, and Ben Marquez of political science. Finally, Randy Hunt and I shared the teaching of hydrogeology in the fall semester. Scott Bair from Ohio State spiced up the course for a week with his presentation of the hydrogeology of the Woburn toxics case, which was the basis of the book and movie A Civil Action.

I made a couple of visits to Lawrence Livermore Labs to be a program reviewer and to work with UW physics alum Jim Berryman. Jim won the Maurice Biot medal of the American Society of Civil Engineers for his outstanding contributions to poroelasticity. Jim visited the department in October and gave a seminar talk on how poroelasticity helps find oil. Grad student Danica Dralus spent the summer working at Livermore in Russ Detwiler's lab doing two-phase fluid flow experiments in meter size sand tanks. In the fall I went to Bonn for a second year to be a panel reviewer for the German NSF program on Intercontinental Scientific Drilling.

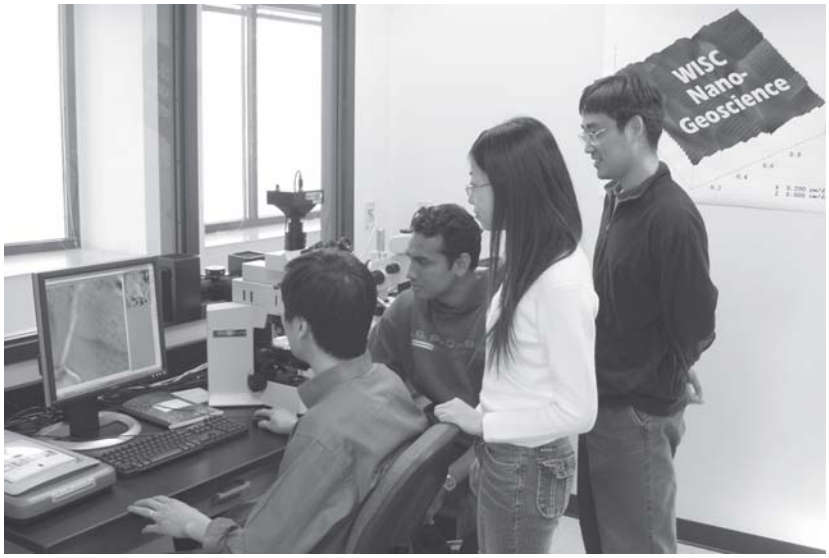
Other meetings or workshops during the year included a workshop organized by Heather Macdonald at William and Mary on what makes strong geoscience departments and another on teaching hydrogeology at the University of Nebraska. Many UW alums attended. I also was a program reviewer of the geology program at Central Michigan University.

It was delightful to have UW alums Tom Burbey and Tim Masterlark visit in February and give seminars on their work on ground deformations due to water withdrawal in Nevada and volcanic deformations observed by InSAR, respectively. Tim has just started a new job as assistant professor at the University of Alabama in the same department as hydrogeology alum Chungmiao Zhang.

I am continuing my appointment as associate dean for

UW-Madison alums at conference center at U. of Nebraska: from L to R: Tim Eaton, Joe Yelderman, Tom Burbey, Laura Rademacher, Maddy Schreiber, Heather Macdonald, Mo Muldoon, Sue Swanson,, Todd Rayne, and Professor Herb Wang.

natural sciences. Part of my duties include being the dean's office visit for about 70 job candidates in the various natural science departments. My opening line is that the purpose of the visit is to show them that the University of Wisconsin has an administration. Other activities included chairing a search committee for a faculty director of the Morgridge Center for Public Service and hearing the occasional grievance. The highlight no doubt though was being the college representative to the dedication of the new Southern African Large Telescope in South Africa. The celebration included a week-long array of activities including seminar talks on South Africa by UW faculty. It was great that Board of Visitors' member Ken Ciriacks and his wife Linda were part of the Wisconsin Ideas trip.



Huifang Xu, at the computer with Rakesh Yeredla, Ting Xue, and Nianli Zhang.

Huifang Xu

My new research laboratories and instruments were completed in the addition to Weeks Hall late summer. I am grateful for support from Alumni to build this facility and for assistance from former department chairman Clark Johnson and our excellent staff members (Ben Abernathy, Lee Powell, Neal Lord, Bill Unger, and Rob Pyzalski) in working on my new labs.

Graduate student Rakesh Yeredla in materials science program is currently working on nano-porous materials for the immobilization of toxic components with low negative charges (i.e. radioactive Tc in the form of TcO_4^-, and perchlorate ClO_4^-) in water. With our new micro-porosimeter and micro-tensionmeter instruments, we are able to quantify nano-pore surfaces and surface hydrophobicity. Through a collaboration with Dr. Mike Abrecht and Professor Pupa De Stasio of the UW Synchrotron Radiation Center, we obtained results showing that nano-porous carbon with C-O or C-H groups on the nano-pore surfaces performs much better than standard activated carbon for immobilizing the low negative charge anion TcO_4^-. Rakesh is also working on photocatalytic reductions of enriched toxic ClO_4^- using semiconductor nano-tubes and renewable solar energy, a potentially promising breakthrough for the future.

Graduate student Nianli Zhang has just started his research on geochemical reactions in nano-porous environments. He is studying the behavior of water in nanopores or nano-tunnels with different pore diameters by using synchrotron radiation FTIR with help from Bob Julian at the UW's Synchrotron Radiation Center. Preliminary results show more broken hydrogen bonds are present in nanopore water than bulk water. The property change of water in nanopore environments will help us to understand many geochemical reactions, particularly in the critical zone, where fluids meet solid earth.

Visiting student Ting Xue is currently researching ferromanganese crusts from seamounts in the west Pacific Ocean in order to understand mechanisms for enriching trace and rare earth elements. The ferromanganese crusts are naturally nanoporous with pore surface areas of ~300m^2/g. The nanoporous surfaces act as sinks for the trace metals and REE in ocean water.

I am continuing my study on chemical properties, magnetic properties, crystal shapes and texture of nano-crystals. Both experimental and computer modeling results show that the tetragonal zirconia is more stable than monoclinic zirconias (baddeleyite) if the crystal size is less then 10 nm. I have collaborated with Professor Eric Roden on microbial induced Fe-bearing mineral formations (funded by NSF last year), and also with Professor Nita Sahai on arsenic removal.

I have taught the courses "X-ray Diffraction", "Crystal Chemistry of Rock-forming Minerals", and the Internet-based course, "Gems." I also co-taught "Earth Materials" with Phil Brown, who is indeed an excellent teacher. I have learned a lot from Phil about how to "entertain" undergraduate students while teaching them. I continued working with Professor Paul Voyles (Materials Science & Engineering) and Professor Ralph Albrecht (Animal Sciences) on an NSF MRI proposal to bring a modern field emission gun STEM/TEM to the UW community for nano-science research.

Emeritus Faculty News 2005

Charlie Bentley

A high point of my year was to participate in the final PhD exam of my former (and last) grad student, Ben Smith, at the University of Washington last summer. Ben was able to use data from the laser altimeter on ICESat not only to measure changes in the heights of elements of the Ross Embayment ice streams and interstream ridges in West Antarctica, but also to use spectral analysis of the surface topography of the entire Antarctic ice sheet (except for a hole around the Pole) to investigate its relationship to the bed topography and ice dynamics. To celebrate his success we went for a climb (i.e. hike) up to a glacier on Mt. Baker.

Otherwise, Ice Coring and Drilling Services (ICDS, a unit of the Space Science and Engineering Center across the courtyard from Weeks) continues to be my main activity. This season (2005-06) we supported coring projects on glaciers in the Dry Valleys, for Karl Kreutz of the University of Maine; at the "WAIS Divide" site (about 60 km northeast of Byrd Station), for Todd Sowers of Penn State, Ken Taylor (MS, 1982) of the Desert Research Institute, University of Nevada, and Mary Albert (wife of Don Albert, UW RIGGS participant) of CRREL; and on Lake Vida, a permanently frozen lake in the Dry Valleys, for Peter Doran of the University of Illinois-Chicago.

ICDS has now nearly completed construction of the new "Deep Ice Sheet Coring" ("DISC") drill, aided immeasurably by help from Lee Powell and Neal Lord, some of whose time was most generously made available to us by the Department. We plan to have the complete drill system built in time for a full-scale test drilling season in Greenland this summer (2006), with Antarctic drilling to commence at WAIS Divide in 2007-08. The DISC drill is the replacement for the "5.2-inch" drill with which the famous GISP2 core in Greenland was collected. It also is an electromechanical drill, but it has many advanced features that make it really the next-generation tool for deep coring in ice.

The WAIS Divide site was chosen partly, as the name implies, because it lies between two drainage basins, which minimizes the likelihood that the site has moved significantly. It is also a location with high snowfall rate, like that at GISP2, so annual layering should be preserved for tens of thousands of years, as it was in Greenland. The ice at WAIS Divide is over 3500 m thick, comparable to East Antarctic sites like Vostok and Dome C, but the East Antarctic sites have only one tenth the snowfall of WAIS Divide so the time resolution at the former is ten time poorer. We expect the cores from WAIS Divide to be matchable with the GISP2 core on nearly a year-to-year basis throughout the Holocene and well back into the last ice age. That should reveal much about the interrelationships between past climate changes in the Northern and Southern Hemispheres.

Carl Bowser

Wondering where the time went, I wasted little time in my "retirement" activities this year. Photography continues to dominate my life. A new digital SLR camera became part of my collection of cameras and I'm now talking about such esoteric subjects as Camera RAW, TIFF, layers, demosaicing and montaging (and you thought geologists were bad with terminology). The scenes in front of the lens continue to grow; last year they included two weeks in the San Francisco, Russian River, Napa Valley, and Ashland, Oregon areas, a week in Puerto Peñasco, Mexico, two weeks each in Phoenix and the Vilas County area of northern Wisconsin.

Now gathering images almost faster than I can process them, enough have come out of the digital and wet darkroom to allow some work to be shown at the Madison Performing Arts Center, Hue Gallery, Fyfe's Corner Bistro, and a new venue, a gallery in Boulder Junction has been offering my works for sale (Moondeer and Friends Gallery). A successful showing of my recent collection of work "Reflections on Water" was displayed in their new basement gallery during the 2005 Madison Area Open Art Studio weekend last October. The gallery is open by appointment, and I encourage those who are in town to call to see them.

Through arrangements with the Camera Company in Madison, I have initiated a series of two and four hour short courses on elementary digital photography, getting the most out of your camera, and Photoshop Elements. I'm actively working on a new web site that I promise to have up by the end of March <http://www.silverpiximages.com>. You will be able to find some of my images on the site once it's up and running.

Finally as a co-organizer of the "Madison–150" project, a committee of five local photographers and I have organized a "Year in Madison" exposition in conjunction with this year's Madison Sesquicentennial celebration. Images will be displayed in a local gallery space for nearly four months starting this June. Somewhat ambitiously, it's patterned after Edward Steichen's very successful "Family of Man" project published in the mid '50s. We've recently entered into the selection stage of nearly 700 images to find appropriate thematic material that reflect a city on its 150th birthday.

This year marked the long awaited publication of the LTER work on northern lakes in Wisconsin. (Magnuson, Kratz & Benson, Long Term Dynamics of Lakes in the Landscape, Oxford University Press). In addition to co-authoring three chapters in the volume, my illustrations and likenesses grace the pages, as well as the book cover, chosen from some of my aerial photographs of the area.

A trip to GSA in Salt Lake City and a great field trip into the Eocene Green River lacustrine sediments in Wyoming, ably led by Alan Carroll, rounded out a very memorable "professional" year.

In our spare time Judy and I continue to enjoy time visiting family and friends, and the seven grandchildren offer an extra magnet for visits.

Dave Clark

Not much to report from the Clarks in northern California. 2005 was not the best year and much of the year was spent recovering from Louise's knee-replacement surgery at the University of California San Francisco's top-rated hospital after an infection was introduced during the initial surgery. While the leg was saved, getting completely mobile again has been a big job.

I haven't seen the newly completed graduate seminar room that grads now working for Exxon-Mobil funded but look forward to visiting it soon. Former graduate students continue to do good things, at least this is what I guess from Bill Morgan's election to the SEPM presidency and Ron Charpentier's continual world-wide tours trying to figure out how much oil remains. Mark Solien and Bill serve on the Department's Board of Visitors, and, I assume, that most of the others who spent some time with me are doing great things, as well. I would be pleased to hear from any former grads who have time to drop me an email (dlclarksr@sbcglobal.net).

C.S. Clay

The year 2005 was a bit eventful. Jane and I played clarinet and euphonium in the New Horizons Band and solos at the Allegro Music Club. We read Deffeyes book, Hubbert's Peak. There was more than learning than explaining a few Gaussian fits to oil reserves. Remembering teaching environmental geology in the 1970's, I returned to M. King Hubbert's chapter, "Energy Resources" in the NAS-NRC book Resources and Man (1969). Here Hubbert described his methods and predicted that the crude oil production in the lower 48 states would peak before 1980. It did. Too many politicians have ignored world petroleum supplies and believed that the Saudi Arabians could do everything. Poking around in the book stores, I found M. R. Simmons, Twilight in the Desert: the Coming Saudi Oil Shock and the World Economy (2005). Simmons lifted the veil of secrecy over the Saudi Arabia's petroleum history to the present. They are having their own Hubbert's peak. Are these geological experiences outside the realm and education of too many MBAs and lawyers? Jane took our oil studies to her book club.

Katrina and its visit to Bay St. Louis was also too eventful. For many years, I have collaborated with Chris Feuillade, Wayne Kinney, and Woody Nero at the Naval Research Laboratory, Stennis Space Center. Chris and I are studying the scatter of sound waves from a rough seafloor. Woody rode out Katrina on a boat in his yard. Chris weathered the storm at the the Naval Research Lab. Back in Bay St. Louis, Chris had to gut and rebuild the interior of his house. This interrupted my research with Chris.

A few years ago, a paper was published that discounted Dezhang Chu's exact solution for the diffraction of an impulsive sound by a density contrast wedge, geophysics PhD in 1989. Some of the of the discounter's difficulties were understanding that Chu extended the Biot-Tolstoy normal coordinate solution for rigid wedges to an exact solution for density contrast wedges-like seafloor sediments. Since computers are orders of magnitude stronger than when Dezhang did his research here, I believed the discount was worth a reply with an improved formulation and numerical examples. Chris, Dezhang and I wrote the paper, "Space-time variations of the acoustic field scattered from a penetrable isovelocity wedge" J. Acoust. Soc. Am 116. 777-789 (2004). Last year, Chris and I started taking Chu's method to sediment features on the seafloor. In between Katrina and Chris digging out, we are back in science.

Cam Craddock

Thank you to the department for naming the Structural Geology Wing, my home for 22 years, and for the plaque which bears my name. My retirement was in 1996, and it is nice to be remembered.

We continue to live in Cherrywood (Town of Middleton), and I do appreciate being granted an office near the library on the fourth floor. It even offers a south view! We stay close to home most of the year, but we make occasional visits to our children in Plymoth, MN, St. Paul, MN, and Brush Prairie, WA.

In December our son John took on an assignment as a lecturer on a cruise ship out of Argentina, and we signed on for the tour so Dottie could finally have a chance to visit Antarctica. John delivered us to the shore of the Antarctic Peninsula in a Zodiac boat. I had last visited Antarctica in 1980 so this was a 25th anniversary.

The Craddocks: Cam, Dottie, and John, in Antarctica.

Robert H. Dott, Jr.

Roadside Geology of Wisconsin, which appeared in 2004, continued to sell well through 2005. The stock is now almost exhausted, so we are expecting the printing of a new edition soon. The enthusiastic reception of the book is very gratifying; the authors' royalties add modest sums to the Department's coffers.

Nancy and I began the year with a fine trip down the Rio Grande rift in New Mexico (with a night at Truth or Consequences), across southern Arizona (with a night at Tombstone), and then an Elderhostel trip into Sonora, Mexico. This trip took us to a Spanish colonial volcanogenic silver mining center at Alamos. The mine is long abandoned, but the town retains much of the old colonial flavor. The district lies in the western foothills of the Sierra Madre, which are composed largely of enormously thick early Cenozoic volcanic rocks.

The May dedication of the third wing of Weeks Hall, coupled with an Alumni Reunion, was the highlight of the year for the Department. As always, it was wonderful to see so many enthusiastic alumni having such fun. Among the many, my own former students who came were Marjorie Chan, who was a featured speaker, Edith Konopka, Kevin Scott, and Tom Doe. I was asked to reminisce about pre-Weeks Hall days to begin the dedication ceremony (see "Archivist's Corner").

During the summer I led several geowalks for different groups in the Baraboo Hills and also spoke and led a field trip for the Ridges Sanctuary on the Door Peninsula. This required my masquerading as a Silurian carbonate-rock and fossil expert.

In September, Nancy and I took a long overdue trip to Isle Royale and toured the Keewenaw Peninsula copper country; beautiful and interesting places.

Other travel took us to visit grandchildren across the country, which culminated with another summer family reunion at Coos Bay, Oregon—one of my favorite former research areas. In September we participated in a fabulous archaeological tour in Arizona and southwestern Colorado. The theme was the Anasazi and other cliff dwellers, who have interested us for many years.

Bob Dott, left, chats with alum Cal Parker of Bakersfield CA, and Jean Bahr at the West Wing building dedication in May.

After that trip, we flew to Salt Lake City for the GSA meetings. In a session about late nineteenth century American paleontology, I spoke about University of Michigan vertebrate paleontologist E.C. Case, who had a special relationship with my father and became a legendary figure for my sister and me as children. Case had been a pioneer in the study of the lower vertebrates of Permo-Triassic times and was a colorful character who always seemed to be holding a Bull Durham cigarette, which he had rolled himself.

Gordon Medaris keeps me involved in the study of a central Wisconsin patch of quartzite, which we think is an outlier equivalent to the Baraboo Quartzite. Other colleagues also keep me marginally involved in further research on the Cambrian sandstone outlier near Mosinee, WI in which we found several layers rich in stranded jellyfish a few years ago. Continuing work concerns more detailed documentation of the sedimentology and of a rich trace fossil fauna.

It was a bad year of deaths for the Department. It is sobering to have former students Gerard Bond and Tor Nilsen pass away before their older professors. In addition, I was also saddened by the deaths of former colleague Charles Guidotti and Alumni Board member Bob Sneider.

Louis J. Maher

In February Dave and Vin Mickelson drove Jane and me to central Illinois to pick up a used Itasca Spirit motor home. We drove home through a dangerous blizzard; although we had our home on our back, as it were, we did not have any blankets.

Retirement is going well. It was a pleasure to give a lecture on Devils Lake to the Spring term Quaternary seminar. I talked on glaciers and ground water to the staff of a local AKids for the Earth@ program. I attended a week end Quaternary trip to western and central Wisconsin led by Jim Knox of Geography and Dave Mickelson. I enjoyed the dedication ceremonies for Weeks 3 that took place in early May. And at the dinner I was able to secure the 2005 OOPPS Award for Dave Mickelson based on his recalcitrant tractor that climbed trees.

A van load of Wisconsinites attended the Midwest Friends of the Pleistocene trip that dealt with the history of the Illinois River Valley. The North-Central GSA meeting in Minneapolis was also a lot of fun. While there I had the pleasure of talking with three of my former teachers: Professors Wright, Sloan, and Swain. And because Cam Craddock was teaching at Minnesota back then, that made four very sharp gentlemen from my past who are still active!

During July the new Middleton-Morey Airport was officially opened, and I had the job of chief pancake flipper for the local EAA's Fly In. Jane and I took our annual trip around Lake Superior in August. We always go counter-clockwise so that westerly storms pass quickly rather than continuing along with us. I knew my course in climatology would come in handy!

At the end of the year I assembled a collection of photos taken of the Campus and the Geology Department during the period from 1969 to 2005. These will be put in the department's archives. However if you have a fast internet connection you might like to go through them: http://www.geology.wisc.edu/~maher/deptpix/UWpix

The year produced its share of fire, storms and drought, some of which I was able to photograph from the air. I have posted three examples at my web site in case any teachers would like some examples for their environmental geology classes. Point your web browser to: http://www.geology.wisc.edu/~maher/Outcrop05/ and you will find the following:

Drought-510-23.jpg: Green plants in a dry pasture show the position of three different joint sets in the underlying Prairie du Chien dolomite. The site is 1.5 miles west of Mt. Horeb, WI at the junction of Wis-151 and Co-E. Photo taken 21 Sep 2005.

Fire-506-44.jpg (above): Fire at a tire recycling plant near Watertown, WI. Satellite photos showed the smoke plume extended half way across Lake Michigan. Photo taken 19 July 2005.

Storm-509-07.jpg: Tornado damage along the golf course on the north side of Stoughton, WI. Photo taken 22 Aug 2005 four days after the storm.

Gordon Medaris

2005 was another travel-filled year, including snorkeling in Honduras, examining a superb section of mantle rocks in New Zealand with Basil Tikoff, more snorkeling in Bonaire, visiting archaeological sites in Crete and Santorini, paddling in the Boundary Waters, and attending conferences in Minneapolis (NC section of GSA), Nipigon, Ontario (Institute on Lake Superior Geology), Graz, Austria (7th International Eclogite Conference, where the type locality of eclogite was visited), and Stanford (to celebrate J.G. Liou's retirement).

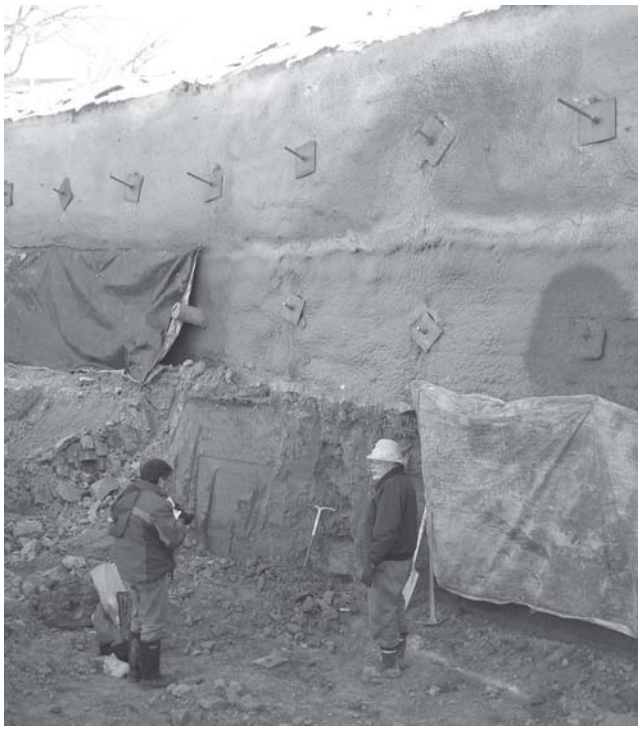
Bob Dott and I revisited the enigmatic Hamilton Mounds area in central Wisconsin, where we discovered the existence of two sequences of Proterozoic sedimentary strata, a younger one of quartzite, correlative with the Baraboo Quartzite, and an older one of meta-arkose, which is intruded by Geon 17 granite. More detailed work is continuing on this project with Brad Singer, Xifan Zhang, Daniel Holm, and Randy van Schmus.

Two papers were published in 2005, one in Contributions to Mineralogy and Petrology with Tom Lapen, Clark Johnson, and Brian Beard on the Sandvik peridotite, Norway, and another in Lithos with Herb Wang, Emil Jelínek, Martin Mihaljevic, and Petr Jakes on Variscan peridotites in the Bohemian Massif. Two other papers on HP and UHP eclogites in the Bohemian Massif are in press with Lithos and International Geology Review, and research on other mantle/HP rocks continues apace.....

Dave Mickelson

2005 was a milestone year for me. Spring semester was like most of the previous 33 years, when I taught glacial geology and seminar. I had the normal load of committee work in G&G and GLE, and some travel thrown in. In May, I taught my last class, but we decided to postpone the retirement party until fall. I enjoyed leading a field trip with Toni Simo for the Board of Visitors. Then began a busy summer of fieldwork and trying to catch up with writing that was several years behind. As I write this in January, 2006, I am still with working on survey reports and a few other papers. I plan to continue doing research, and we have submitted proposals for Argentina and Laurentide Ice Sheet projects.

Danny Douglass completed his PhD, which was jointly advised with Brad Singer. Mike Swenson, finished his MS in fall, as did Richard Becker. I've been very active on shoreline erosion problems, especially in Bayfield County on the Lake Superior shoreline. In a project supported by Wisconsin Coastal Management I am working with the county to develop a science-based setback ordinance to protect future development. I also spent time doing field work with Kurt Refsnider in the Uintas. Then the joys of retirement struck me as Vin and I went to Argentina for two weeks in September, during a time I would normally be teaching. Retirement has also given me flexibility to travel around the state and begin collecting information for a future book.



Steve Forman (left) from U. Illinois-Chicago and Dave Mickelson collecting till samples on the UW-Madison campus..

Tom Hooyer (WGNHS) and I have been getting some good press about samples that we collected from a deep excavation on the west side of Observatory Hill on campus. Lake sediment between two late Wisconsin tills was dated using the OSL method at about 24,000 cal. years ago. These are the first dates on the presence of glacier ice in Dane County, although they fit the regional picture quite well. The photo (previous page) shows Steve Forman from U. Illinois-Chicago (who actually did the dating) and me when collecting the samples.

My kids are all doing well, as is my granddaughter Shaynnah. Vin and I went to Boston to see John graduate with his MS in education. He now has a job teaching math in Madison.

I enjoyed seeing many of you at GSA meetings in Minneapolis and in Salt Lake City (photos, pages 32-33). Many of the former Quats gathered for beer and food at these meetings. Finally, a high point of the year was the retirement celebration organized by Lou Maher and others in the department. I was very pleased to see so many of you here in October, and to hear from many others who couldn't attend. My heartfelt thanks for the gift of a digital projector (and it turns out, a camera as well). I'm already using them for outreach talks. Very special gifts were the letters from many former students that Lou had bound to look like a thesis. This is something I will read over many, many times in the future. Thank you all for your kind words!

Lloyd Pray

Hello, Outcrop browsers. This Badger geologist, emeritus—1989—reports that he and Carrel, each 86, are active and in reasonably good health and enjoying life. We spent most of 2005 at our farm house of 36 years on the near west side of Madison. Much of the holiday season was spent at our recently built, winterized cottage on the south shore of Lake Superior where Lloyd grew up just west of the Apostile Islands, Lake Shore National Park. The contrast between Madison life and that of our northern retreat, one with a plethora of art, concerts, the UW, and yes, MD's, with the quiet beauty of the north is wonderful. We are both busy keeping up with our large family, four sons and wives and 12 grandchildren, ages 8-29, but see them often at home or our cottage. Here at home, Carrel remains dedicated to her painting watercolors and the Madison Watercolor Society, and Lloyd keeps up the farm property such as mowing trails, snow plowing, or gardening: the cottage is a magnet for our sons' families, living in California, Montana, and Ohio as well as for John's family—living in Madison where he is a UW law professor

I continue with interests in geology and former UW students, enjoy department contacts, especially with Bob Dott, Alan Carroll, and Toni Simo (global Toni with students in the US, especially in my "Happy Hunting Grounds" of New Mexico and West Texas and far flung areas of such a Spain, Iowa, and Algeria.) One geology highlight for me in 2005 was the AAPG-SEPM convention in Calgary, Alberta. This drew some 7000 geology-related attendees last June and many UW former students, including Rick Sarg, closing out his SEPM presidency in fine order, Bill Morgan, SEPM officer, Jack Wendte, prominent Canadian carbonate, and Maria Mutti, now professor at Stuttgart, Germany and SEPM officer, U. Kansas carbonates, Evan Franseen and Bob Goldstein, and others. The carbonate Mafia survives! A second highlight of the year was receiving the Distinguished Service Award of the West Texas Geological Society at their annual May banquet. This was especially meaningful for me as much of my UW research and that of area score of thesis students was in WTGS home ground of New Mexico and West Texas. Tom Fekete was citationist at the Midland, Texas meeting. I undoubtedly owe the award to the UW thesis students who worked so hard prying out secrets of the West Texas New Mexico Permian.

Klaus W. Westphal

I spend two days a week identifying and cataloguing mineral and fossil specimens in the collections and the museum. I also oversee the Friends of the Geology Museum's fundraiser, the purchase and sale of minerals fossils, books, T-shirts, and CDs.

Through some "detective work," I identified the origin of a small mineral collection in our repository. I was able to trace it back to the ruins of a bombed-out university museum in the Southern German city of Würzburg, where an American GI, who later became a faculty member of the University of Wisconsin-Madison, had retrieved it in 1945. The specimens were subsequently returned to their rightful place.

Carrell and Lloyd Pray at their cottage on the north shore of Lake Superior, Christmas 2005.