

Faculty News 2006



Mary Anderson, center, at the National Academy of Engineering induction ceremony in Washington, D.C., with (left) William A. Wulf, President of the NAE, and (right) Craig R. Barrett, Chair of the NAE. (Courtesy of Mary Anderson)

Mary Anderson

2006 was a year for the record books. In early February, I was stunned to receive the news that I had been elected to the National Academy of Engineering (NAE). The NAE has a fixed membership of around 2000; currently the average age is 71 with 4% women. Charles and I went to Washington, D.C. in mid-October for the black tie dinner and induction ceremony. I was thrilled that former students **Charlie Andrews, Yu-Feng Lin, Xiangxue Cheng,** and **Nancy Cichowicz** came to help us celebrate over dinner after the ceremony.

In May, some of the hydro group, including me, went to Golden, Colorado, for the MODFLOW conference with **Chris Lowry** and **Chris Muffels** presenting papers. We also had a gathering of the hydro Badgers with **Charlie Andrews, Craig Eisen, Daniel Feinstein, Kirk Heatwole, Randy Hunt, Chris Langevin, Yu-Feng Lin, Bill Woessner, Kurt Zeiler,** and **Chunmiao Zheng** in attendance. Quite a showing! In June, I went to the Czech Republic for a week long conference on heat flow where I interacted with a diverse group of researchers drawn mainly from various disciplines within geophysics. Charles came along and we managed some vacation time in Prague and Dresden before and after the conference. In July, I spent 10 days in Beijing as the guest of former student **Chunmiao Zheng** (Professor at both University of Alabama and Peking University, China). We participated in AGU's Western Pacific Geophysics Meeting (WPGM) and the opening ceremony of the Center for Water Research at Peking University, which Chunmiao directs. A version of the talk I gave at the opening ceremony ("Ground Water Ethics") will be published as an editorial in the July-August 2007 issue of *Ground Water*. I met many impressive groundwater scientists working in China

and also had the opportunity to become re-acquainted with many Chinese scientists now living and working in the US. Chunmiao generously showed me some of the sights in Beijing including the Forbidden City (photo page 26).

Teaching of my modeling courses continues and I continue as editor-in-chief of the international journal *Ground Water*, a job I still very much enjoy after five years. **Kallina Dunkle** and **Seann McClure** joined my research group in the fall. Kallina is working on a project with **Dave Mickelson** and me involving glacial stratigraphy and groundwater modeling and Seann is working on an isotope project at our research site (Trout Lake Basin) in northern Wisconsin with me and **Randy Hunt**, who is helping to advise the project.

Jean Bahr

Department chair duties kept me quite busy in the last year, particularly with two faculty searches in the spring semester. But I've now made it through half of my three-year term and

the second time through the annual cycle of deadlines seems a little less daunting.

On the research front, my students and I continue to examine a variety of questions related to natural processes and human impacts on groundwater systems. **Jeff Wilcox** is wrapping up a series of column and field tracer experiments, examining the transport of pharmaceuticals and personal care products in ground water beneath septic systems. He has also been busy applying and interviewing for jobs that would start in the fall of 2007. **Rachel Greve** completed her MS thesis work this January on the effectiveness of natural attenuation as a remediation strategy for petroleum contaminated sites and she is also now on the job market. **Laura Craig** has been using a variety of geochemical and isotopic tools to elucidate the fate of nitrate in a riparian wetland, while at the same time planning for this summer's Water Resources Management Practicum in New Orleans (a WRM project being led by **Herb Wang**). **Drew Gower**, a graduate of the University of Virginia and recently returned Peace Corps volunteer, joined my group in September and is planning a thesis project that will take him to Burkina Faso in West Africa to gather data for simulating the groundwater-surface water interactions induced by a network of small dams in that country.

The highlight of the spring semester was the hydro field trip to the Yucatan (described elsewhere in the Outcrop). I also taught Contaminant Hydrogeology (for the 19th time) in the spring, and co-taught Environmental Geology with **Cliff Thurber** last fall. I convinced Cliff to try the "clicker" student response technology that I had used in that class several years ago (at the urging of **Richard Allen**) and we are using this technology again this spring while also participating in a project with other faculty to evaluate and improve ►►



Jean Bahr received the GSA Hydro Division Distinguished Service Award at the national meeting in Philadelphia. Joining her at the awards luncheon are alumni: (front) Bill Simpkins, Hilary Gittings Trethewey, Jean Bahr, Sue Swanson, and Tara Root. Back: Jonathan Levy, Yu-Feng Lin, Tim Eaton, Jeff Wilcox, Mary Anderson, and Peter Riemersma. (Courtesy of Jean Bahr)

the effectiveness of this in teaching.

I enjoyed opportunities to visit with alumni at the AAPG meeting in Houston last spring and at GSA in Philadelphia in the fall. It was particularly nice to see so many UW hydro alumni at the luncheon when I received the Hydro Division Distinguished Service Award!

Phil Brown

Snow has finally come to the upper Midwest to cover the brown grass and cut into my ability to bike to work. The spring semester is starting with four classes on tap and some interesting research taking place in my lab. The field of Economic Geology is undergoing a resurgence that looks like it will be with us for a while. My family continues to be well and is now a bit more spread out than a year ago. Following are a few highlights.

Mineral commodity prices, and in particular gold, have created a strong demand for geologists willing to try the real world of mineral exploration and production. As I reported two years ago, **John Marma**, who had completed an MS in the department, took a job with Newmont in Nevada. He and his family are living in Winnemucca and John loves his job as a geologist at the Midas underground gold mine. **Matt Riederer** is half way through a Master's degree program working on the fluid inclusions and ore mineralogy of the Midas veins and should finish later this year. **Stephanie Maes** has completed her PhD studying magma flow, recharge and crystallization in layered mafic intrusions with an eye on the formation of nickel and platinum group element concentrations. She is beginning her second year as a part-time lecturer at UW-Eau Claire and is actively looking for a tenure-track position.

In June-July I was the Director for six weeks of Field Camp in Park City. The five-school consortium continues to draw 40-50 students each year. Summer 2006 was the 40th anniversary of Camp at the Chateau and this generated an article in the local paper (see a story elsewhere in this newsletter). UW continues to send only about 20-25% of our graduates to Field Camp although I am as convinced as ever that this class is the true capstone experience for Geology majors and I do all I can to convince students that it is a mistake to skip camp to save a few dollars.

My teaching schedule continues to be full and varied. I taught my introductory ore deposits class in the fall and had a (recent) record enrollment of 10 undergrads and grads. Nine of the students and I took a great field trip in September to Winnemucca and toured four completely different Newmont gold properties in three days. We were able to fly to Reno using support from the Cameron Fund—without this support I would never have been able to take all the students (see a story about this trip elsewhere in this newsletter.) The combined Earth Materials course continues to be a real challenge and perhaps the department will be making some changes to the undergrad curriculum. Enrollment in the White Lake mapping course continues to yoyo between three and 12 students depending on the year—(Gary and Hanny continue to offer amazing hospitality and the experience is treasured by all the students lucky enough to have the good sense to attend the course.)

A quick update on my family. Jason continues to work for Epic computer and still lives two blocks from us, a nice happenstance. Peter graduated from Grinnell College last spring and is currently doing all the heavy lifting for the rest of the family—he is teaching middle school math in Washington D.C. with Teach for America. Yikes. Karin, to my great surprise (and pleasure) has become a geology major at Carleton, absolutely loves the whole experience of college, swimming and generally continues to burn several candles at both ends simultaneously. We are happy that our kids continue to do well and certainly know where our paychecks go. Kris continues to be convinced that she has the best job in the world as the librarian at our kids (former) high school a mile from our house.

Hope you have a safe and healthy 2007.

Charles W. Byers

I was able to co-instruct on two courses this past year. In the spring, I shared the teaching of Evolution of the Earth with **Laurel Goodwin** and learned some plate tectonics. This course is now using the 7th edition of **Bob Dott's** book; talk about staying power! In the fall, I teamed up with **Eric Roden** for our soft-rock smorgasbord, Fluids and Sedimentary Processes. Eric's explicitly microbiological approach adds a new flavor to the class, and helps put the discipline of



Guest speaker Carol Lee, Zoology, listens to a question from the audience at Darwin Day 2006. (Neal Lord)



A member of the audience (standing, right) makes a comment at Darwin Day 2006. In the foreground, right, is Tom Wolfe, formerly a programmer for Bob Meyer. The free event, organized by Dana Geary, was attended by over 450 people. (Neal Lord)

Chuck DeMets

The highlight of my past year was the department's hiring of two new mid-career geophysicists, **Kurt Feigl** and **Harold Tobin**, about whom you can read elsewhere in the newsletter. As the chair of the geophysics search committee, I had the pleasure of reading the numerous applications for our open geophysics positions and selecting from those a short list of candidates with exciting and productive research careers. After months of hard work, interviews, and debate, it was gratifying to see the process culminate in the successful hiring of our top two candidates. In my view, they will transform geophysics in our department over the next decade and hopefully longer.

Another notable event in my year was the arrival of graduate students **Daniel Alvarado** from Idaho State and **Manuel Rodriguez** from Honduras, who began their respective graduate studies of Central American tectonics under my guidance. They joined my other student **Francisco Correa-Mora** to create what is probably the

world's largest concentration of Spanish-speaking, finite-element modelers who are studying the earthquake cycle. In addition to my younger "assistants", **Bill Unger**, who "retired" in July of 2006 after a 45-year-long career in our department, continued as a part-time employee of my field program and has been building equipment and installing a network of continuous GPS receivers in western Mexico.

I also managed to host my Russian collaborator **Dr. Sergei Merkouriev** for a month-long research visit, my Mexican collaborator **Dr. Enrique Cabral** for a week, and my Jamaican collaborator **Dr. Margaret Grandison** for a month working on our assorted geodetic and tectonic studies of the Indian Ocean, Jamaica, and Mexico. To my satisfaction, three research were submitted and published from these interactions.

Dana Geary

geomicrobiology into the undergrad curriculum. I also taught my old standby, Principles of Stratigraphy, last spring, for the first time in three years. Now that we relegate sedimentology to the Fluids course, there is plenty of time in Stratigraphy to cover every last method of correlation in mind-numbing detail. A splitter's delight.

In the summer, I went out to the Park City field camp again. What impresses me the most about field camp is the sense of purposeful activity it engenders. Every morning in the Chateau, as thirty students are getting ready for another day of mapping, there is more obvious concentration on the task at hand than one ever sees in a class back in Madison. Not that there aren't the occasional goofy episodes (ask Camp Director **Phil Brown** about the sightseeing train sometime), but overall, the students are there to learn and they have bought into the process.

At the end of the fall semester, one of my advisees from the L&S Advising Center completed his undergraduate work and graduated at the December commencement. His name is **Tim Cluff**, and he majored in Computer Science. Tim is the son of **Bob Cluff** and **Suzy Gavlin**, two of my early grad students back in the 70's. So now I have an "academic grandkid." How the wheel turns!

I organized UW Madison's first annual Darwin Day (held February 11, 2006), an outreach event whose purpose is to inform the public about evolution. We had an all-day symposium with eight faculty speakers (myself included) and a panel discussion. The general theme was the evidence for evolution. Given that ID ("Intelligent Design") was much in the news at that time, we had a very good crowd (>450) and good media coverage (radio, TV, newspapers).

In graduate student news, **MaryRuth Kotelnicki** began her graduate work in the fall. MaryRuth is a devoted trilobitophile and will probably study trilobite behavior using trace fossils. **Matt Kuchta** is studying Pleistocene land snails from glacial Wisconsin. He has discovered many previously unknown localities, and is working on the taphonomy and climatic significance of these deposits. **Erik Hoffmann** continues his work on zebra and quagga mussels, using stable isotopes to examine the variability in environmental conditions that these species tolerate, and to test the hypothesis that successful invasive species come from environmentally-variable source areas. ▶▶



Clay Kelly and Liz Clechenko. Liz hosted a small reception in the lab after she successfully defended her thesis on December 6.
(Mary Diman)

Paul Mayer spent much of the year working for the park service at the Grand Canyon, but continues his work on brachiopod community evolution.

Former grads **Hilary Sanders** and **Jade Star Lackey** became the proud parents of Finn Sanders Lackey January 27, 2007.

Undergraduate students **Matt Tibbitts** and **Bridget Diem** are also working on paleontology projects. Matt has collected samples for stable isotope data from several lineages of large Lake Pannon mollusks in order to determine their ontogenetic ages. Bridget is working with Matt Kuchta on the taphonomy of a Pleistocene gastropod locality. Both Matt and Bridget are supported by the Shell Undergraduate Research Fund.

In August, Sarah, Molly, and I traveled to Budapest to visit and work with **Imre Magyar** and his family for 10 days. Imre and I are still collaborating on several Lake Pannon projects. From there we traveled with Imre to Vienna to meet with colleagues at the Natural History Museum. Following these productive visits, we met Rob in Switzerland for a two-week hiking trip. Along the way we enjoyed an extremely pleasant day above Saas Fee with former faculty member **Lukas Baumgartner** and Benita Putlitz.

Aside from graduate seminars, I continue to teach Evolution and Extinction each spring. Teaching Paleobiology in the fall to a lively group of 15 was engaging—we particularly enjoyed having **Tim Brieske** (a graduate of our department and now a physician) sitting in on the class and providing interesting perspective.

Laurel Goodwin

2006 was a year of change in the structure group. **Basil Tikoff's** message and mine therefore focus on the life passages that have collectively affected us over the past year.

The most profound and lasting change was the death of our predecessor, **Cam Craddock**. Cam's funeral was a time to grieve and say goodbye, but also a celebration of a life well lived. We talk a great deal these days about finding balance between professional and private lives. It is clear that Cam achieved this balance, and in doing so left a lasting legacy in his three children and his graduate students. Two of the latter, **Marcia Bjornerud** and **Jay Nania**, represented the

group. We also learned that Cam's love of silence dictated the distinctive architecture of our wing—formerly referred to as the Isolation Ward, but perhaps more appropriately referred to as the Craddock Wing.

Other changes occurred in infrastructure, the group, and research progress. Our new SEM arrived in February, and by year's end was largely functioning as desired, although we are still working out a few kinks. M.S. student **Kathy Staffier** has become our resident expert on Electron Back-Scattered Diffraction (EBSD), used to study the crystallographic preferred orientation of minerals. PhD student **Jennie Cook** began studying the structural evolution of the San Gregorio fault, part of the San Andreas fault system. We spent some wet, cold March days on the California coast, persuading a zealous park ranger to part with samples of weakly lithified, deformed sediment. Some samples came with long, thin, translucent sea worms (I leave you to imagine Jennie's comments when she first discovered this). Undergraduate **Daniel Hallau** finished a senior research project focused on the deep crust, considering deformation at granulite facies conditions. He graduated with honors in Geology and French, and left to teach English in the Auvergne region of France (the 'Graveyard of Neptunism').

We had a somewhat riotous summer field season in central Australia, with 11 people from three schools (including alumna **Cheryl Waters-Tormey**, now teaching at Western Carolina University, and one of her students) coming and going, engaged in trying to better understand the rheology of the middle and (especially) lower crust. The logistics were daunting, but M.S. student **JoAnn Gage**, who spent the entire summer in 'Oz', held it together and made it work. Undergraduate **Peter Kottke** and M.S. student **Bryn Benford** assisted Kathy Staffier in the field; undergrad **Andy Olson** joined JoAnn. Both undergrads started research projects of different sizes.

A special rite of passage for me took place when **Paul Riley** defended his M.S. thesis—my first UW student to finish. Paul's work yielded new insights into the development of damage zones around shallow crustal faults and their impact on flow above the water table in dry desert environments. He will stay to work with Basil on a PhD.

I leave Basil to talk about **Bill Unger's** retirement and **Toni Simo's** departure. Both are friends from whom we learned a great deal; they will be missed.

Eric Roden

For my laboratory, my research program, and myself 2006 was a year dominated by building and writing. The building involved two major components: putting into place the final aspects (living and non-living) of the geomicrobiology lab after our summer 2005 relocation from the University of Alabama, and developing and expanding collaborations with people from both within and outside the department. Success was had on both accounts: the lab is now crammed full of instruments (at least 10 major ones); humans (six postdocs, three graduate students, and three undergraduate students); and an ever-widening array of microorganisms from natural environments, growing by (literally) dozens of different metabolic pathways, producing or destroying a wide variety of mineral phases along the way. For me, collaboration is one of the most enjoyable parts of science, and there is no dearth of great people to work with here at UW. Within the

department, I'm now working actively with **Clark Johnson, Huifang Xu, Brian Beard, Nita Sahai,** and **John Fournelle,** and working toward projects with **John Valley** and **Laurel Goodwin.** Teaching-wise I had a lot fun (and a good healthy challenge) co-teaching GEO 303 (Fluids and Sedimentary Processes) with **Charlie Byers** last fall. Outside the department, we're hooked up with (at one level or another) Bill Hickey in Soils, Emily Stanley in Limnology, Tim Donohue in Bacteriology, and Trina McMahon in Civil and Environmental Engineering. The sky is the limit in this hotbed of intellectual activity, with time being the only real limiting factor. Collaborations beyond UW continue, including a new effort supported by the UC Berkeley-led NASA Astrobiology Institute project that took us this summer to Lake Tyrell, a fascinating iron- and sulfur-rich hypersaline lake in Victoria, Australia.

In addition to publishing several journal articles and participating in a seemingly endless stream of proposal submissions (NSF, DOE, NASA, etc.), the writing side of 2006 included completion of a long-standing commitment to a book entitled *Kinetics of Water-Rock Interaction* (edited by Sue Brantley and Jim Kubicki from Penn State, and Art White from the USGS-Menlo Park). The chapter I signed-on for a few years ago wound-up turning into two chapters, one focusing on general principles and microbial iron oxide reduction, and another focusing on a quantitative analysis of the geochemical and microbiological controls on sulfide mineral (pyrite) oxidation. A secondary but non-trivial pulse of writing effort was expended in producing (in collaboration with Dave Emerson of George Mason University) a chapter on microbial metal cycling for the third edition of the *Manual of Environmental Microbiology* published by the American Society of Microbiology. These writing activities have provided a lot of satisfaction, along with fresh sense of admiration for the many analogous previous and ongoing achievements of my new departmental colleagues.

In summary, 2006 was a fantastic first full year at UW, and I look forward expanding and deepening my relationships with everyone in (and many people and programs outside of) Geology and Geophysics in 2007.

Nita Sahai

Hard to believe that this is my seventh year already at UW and so I am on sabbatical—yee ha! Sounds great doesn't it? But hold your horses—fall 2006 was probably one of the busiest semesters I have ever had at UW, where in addition to the usual research activities, I was editing the *Medical Mineralogy and Geochemistry*, Volume 64 of the prestigious *Reviews in Mineralogy and Geochemistry Series* published by the Mineralogical Society of America and the Geochemical Society. The associated two-day workshop was held in December at Menlo Park, CA, where we had almost eighty participants. Going by the feedback we've had, the course was a great success and highlights the new connections being recognized between geochemistry, mineralogy and the medical sciences, especially the interactions of body fluids and reactive chemical species in the body with mineral surfaces present,



The Sahai group, fall 2006: From left: Nianli Zhang, Tim Oleson, Dr. Donald Mkhonto, Mark Stevens, Raj Panneerselvan, Will Welch, Professor Sahai, James Driver, Jie Xu.
(Mary Diman)

for example, as inhaled particles in the lungs or as the inorganic component of normal and pathological mineralization of bones, teeth, kidney stones, calcified arteries, etc. We had participation from researchers in the medical sciences, geochemists, mineralogists, materials scientists, and were funded by NSF and DOE-BES. Our entire group participated at the conference and our students presented three posters.

In summer 2006, we had another successful MS graduate from our group, **Mark Ciardelli**, who worked on devising 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 three new graduate students in fall 2006, **Nianli Zhang, Jie Xu** and **William Welch**, into our group, and hired a new post-doctoral researcher, **Dr. Donald Mkhonto**, from S. Africa. Nianli and Jie are working on experimentally determining the structure-activity relationship of silicate materials such as pseudowollastonite, wollastonite and diopside towards their ability to nucleate hydroxylapatite at their surfaces, with potential implications for designing orthopaedic implant materials. Donald and Will are focusing their efforts on molecular mechanics and dynamics simulations of specific peptides associated with bones and teeth in order to determine their ability to nucleate hydroxylapatite from simulated body fluid and to control subsequent crystal growth.

Graduate students, **Tim Oleson** and **Mark Stevens**, are working towards their PhD and MS degrees, respectively. Their research involves examining the behavior of cell-membrane forming phospholipid molecules when they are self-assembled on different mineral surfaces (e.g., quartz, corundum, anatase, mica), of interest for the development of stable oxide-supported membranes for biosensors. We also have two enthusiastic, and smart sophomores, **Raja Panneerselvan** and **James Driver**, working in our group as part of the Undergraduate Research Scholars program. Our group published ►►

three invited, reviewed book chapters and a research paper in 2006.

So what of the sabbatical, you ask? I had a fantastic six-week break in India. I went on an elephant safari in Kaziranga National Park in the north-eastern state of Assam. Saw wild Indian one-horned rhinos, Asiatic elephants, Asiatic buffalo, boars, three deer species, antelope, and lots of water-fowl including the bar-headed geese that migrate from Siberia. Also went to New Delhi, Agra and Fatehpur Sikri in the north Indian state of Uttar Pradesh, where one can see some of the most magnificent samples of Moghul architecture dating from the 1500s to the 1700s. The Taj Mahal is in Agra. It is absolutely mind-blowing and is easily the most beautiful human-built structure that I have ever seen in any country (the pictures of it don't do it justice). Fatehpur Sikri was the new capital of the Moghuls built by Emperor Akbar in the late 1500s and then abandoned in about 15 years, supposedly because they ran out of water, and had to move the capital back to Delhi. If only they'd thought to check the depth of the water table before building! Among the many neat architectural innovations in the royal palaces and forts of Agra and Fatehpur Sikri, one was an "air-conditioning" system where some rooms had hollow walls through which water could flow, to alleviate the north Indian summer heat, where temperatures can get up in the 120-130°F range. All three destinations, Kaziranga, Agra, and Fatehpur Sikri, are world heritage sites, and my family originates in Assam and Uttar Pradesh. The six weeks in India was also the longest time I have had the luxury of spending in the old home country in the past 17 years combined. So this was a very special trip for me.

Toni Simo

After 18 years of teaching and doing research in the department I have decided to make a career move and accept an offer from URC-ExxonMobil, the research company, effective January 2007. It has been 18 good years at UW and I plan to provide as much support as I can to the department in my new position. I am very excited about moving on and my new career opportunities; it feels like this is the right thing for me to do. Stay tuned for news, your support has always been important to me.

The decision has not been easy (the dark side is the dark side for a reason). When I look back at the past it makes me sad to leave UW-Madison, I see the great people I have been working with and I have great respect for (you all have been fantastic and made my life very happy) and that will be difficult to find anywhere else. However when I look at the crystal ball I see that I need a change and new challenges not available at UW.

As you well know, I am very interested in carbonate depositional systems and how they form. I have done a great deal of work in the field and recently with GPR and shallow seismic, but we always work in 2D or pseudo 3D. After working with 3D I got very attached to the ability to "see" ancient landscapes and interpret them. This is soooooo cool and so interesting that anything else is primitive and does not compare (is this the dark side

whispering to my ear?). I am a sucker for these things as I love science; and I have the advantage that I will be moving at a very high research position that I hope will promote me doing the science that I can not do at the University.

I do recognize that I will miss you all, but I do hope I cross paths with you in the future and if you want to get in touch with me just send an e-mail to toni.t.simo@exxonmobil.com

GO BADGERS!!!!

Brad Singer

The highlight of 2006 was spending four months of my sabbatical in France as a Fulbright Scholar. From April until August I was a visiting scientist at the Laboratoire des Sciences du Climat et de l'Environnement where I was hosted by Dr. Hervé Guillou. This lab is part of a much larger set of campuses at Gif-sur-Yvette, Saclay, and Orsay operated jointly as a Centre National de la Recherche Scientifique (CNRS) and by the French Atomic Energy Commission (CEA). My apartment was located in Gif, about 25 km southwest of central Paris at the end of the RER train line....so, many summer afternoons and weekend days were spent in Paris. My family, Teri and Zoe, and I also, enjoyed the hospitality of many people in Gif who made us welcome in the community. It was also great fun exploring the countryside on my road bicycle and seeing four stages of the Tour de France, including the finale on the Champs-Élysées. Funny thing was, that when Floyd Landis received the winner's trophy, I accidentally backed up into a woman in the crowd and she was wearing a Green Bay Packers t-shirt; I asked and she replied: they were visiting from Wausau. As part of the research on past behavior of the geodynamo, I travelled with Hervé Guillou to the Holy Grail of geomagnetic field excursions, the Laschamps basalt flow in the Massif Central, and to Lipari Island in the Aeolian Islands to sample a lava that records an excursion older than the Laschamps. It remained a busy year in Madison as well. **Brian Jicha** and **Mike Smith** defended PhD dissertations during 2006, **John Hora** continues his dissertation work on understanding the magma plumbing system under Parinacota Volcano in Chile, and **Sarah Greene** joined the group to work on Santa Maria Volcano in Guatemala.



Hervé Guillou and Brad Singer in Chaines du Puys, Massif Centrale, France. Dr. Guillou was Brad's host for his Fulbright Scholarship during the summer of 2006. (Courtesy of Brad Singer)

Clifford Thurber

Things seemed to be operating largely on cruise control in my research group in 2006, but huge changes are in store for 2007. Associate Scientist **Haijiang Zhang** and Assistant Scientist **Heather DeShon** both had very productive years, but both are heading off to new positions in 2007, Haijiang to MIT (although he will retain a part-time position at UW) and Heather to the University of Memphis. **Yunfeng Liu** will also be moving on after finishing a two-year post-doc here. Graduate student **Jeremy Pesicek** successfully defended his MS thesis on a study of Great Sitkin volcano over the summer, and he will try to advance to PhD candidacy by summer 2007. He presented his research at the April SSA meeting and the December AGU meeting. Graduate student **Ninfa Harrington's** research on attenuation tomography around SAFOD has been progressing very well also, and she should be defending her MS thesis by the summer. She had a successful poster presentation at the December AGU meeting. Two new research projects have spawned exciting collaborations with a number of professional colleagues with whom I have never directly worked before, one studying the aftershock sequence of the 2004 Sumatra-Andaman great earthquake, and the other developing a statewide three-dimensional crustal model for California. I enjoyed my return to co-teaching Environmental Geology (GEO 106) with **Jean Bahr** in the fall, and managed to survive adapting to the use of “clickers” for student participation in the lecture hall for that class.

Basil Tikoff

I will remember 2006 as a major year of transitions and departures for the structural geology group, as both **Laurel Goodwin** and I emphasize. When I look at the theses on the shelf, 2006 takes up as much room as the other years combined. Spring semester started out with the successful defenses of **Skylar Primm** and **Chris Gordon**. Skylar worked on a Masters degree on applying wavelet analysis, a new spatial analysis tool for structural geology, to shear zones in the Sierra Nevada. Skylar is now off to teach Earth Science at the high school level, at which I am sure he will do a great job. Chris (co-advised with **Toni Simo**) worked on the mechanical stratigraphy and regional tectonics of South Tunisia. Chris, who certainly won the all-time award for the most traveled graduate student, is even now off traveling somewhere (latest reports are from New Zealand).

Spring semester also saw the graduation of **Sarah Titus** and **Eric Horsman**. Sarah and Eric completed both Masters and Ph.D. degrees in the department. Sarah (unofficially co-advised by **Chuck DeMets**) studied the central sections of the San Andreas fault in California. Sarah is currently in her first year of teaching at Carleton College as the new structural geology professor. Eric studied strain accumulation in shear zones, focusing on a field area in the Sierra Nevada mountains. Eric is currently doing a split post-doc at the University of Wisconsin and the University of California-Berkeley, and living in the Bay area. I credit both Sarah and Eric equally for fostering intellectualism



The main phase of deep drilling at SAFOD ended in the summer of 2006. What remains is a frame and winch system used to install and retrieve borehole logging tools and seismic instruments that are periodically placed in the SAFOD borehole. Standing in front of the A-frame are (left to right) grad student Riley Gannon and co-PI Steve Roecker of RPI, Lee Powell, and Yunfeng Liu. (Cliff Thurber)

and enthusiasm in the structural geology group.

Angela Hull also completed a senior project in 2006 and finished her undergraduate career. Angie was a great addition to the structural geology group for several years, assisting for two summers in the field and helping out with her phenomenal drafting skills.

The last Ph.D. defense of the year was that of **Stephanie Maes** (co-advised with **Phil Brown**). Steph did a great job of straddling the structural geology/economic geology boundary, working on fabrics in intrusive rocks (in a lot of different places). Steph is currently working at the University of Wisconsin-Eau Claire.

In addition to all the thesis defenses, past PhD student **Scott Giorgis** and I led a GSA Field Forum on “The significance of vertical boundaries in the North American Cordillera.” The field forum was held in McCall, Idaho, in July and featured mostly Scott’s Ph.D. work in the area. It seemed to go well and the weather was perfect.

Whew.

There are three other departures that have had a major impact on myself and the structural geology group. **Bill Unger** decided to retire this year, although I was hoping that somehow he would be around forever. Bill was the first person to really make me feel welcome in the department, for which I’ll always be grateful. Although Bill was perennially busy, he was always willing to help out any project you were working on. In fact, Bill facilitated an enormous amount of science. Moreover, he was always excited about all the science that was going on in the department. He taught me how to be a good field geophysicist, by his ability to think ahead about what piece of equipment was going to break next and have a solution ready before it happened. He also taught me a lot about life.

The departure of **Toni Simo** is also significant. Toni and I had sort of worked out a pattern of undergraduate team-teaching, and had been increasingly involved in research together. Toni played a major role in the department, in both research and departmental life. ▶▶

Undergraduates will miss his contagious enthusiasm for rocks and graduate students will miss a good mentor. I will miss a great colleague and a good friend. I wish him luck at Exxon-Mobil.

The death of **Cam Craddock**, the structural geologist prior to Laurel and my arrival, was also a major change for us. Thank you, Cam, for everything you did to make the University of Wisconsin a great place for geology.

So, overall, it was really the changing of the old guard. Still, it is good to look to the future. **Bryn Benford, JoAnn Gage, Paul Riley, Jennie Cook, and Kathy Staffier** are doing a fine job of keeping the structural geology group going.

John Valley

The WiscSIMS ion microprobe lab completed a very successful first year.

Working as a team, **Noriko Kita**, post-docs **Bin Fu, Zeb Page, and Taka Ushikubo**, and I carried out a wide

range of new and exciting projects, both our own research and collaborating with others. We had many guest researchers from as far as France and Australia. The breadth of research can be seen from UW student projects.

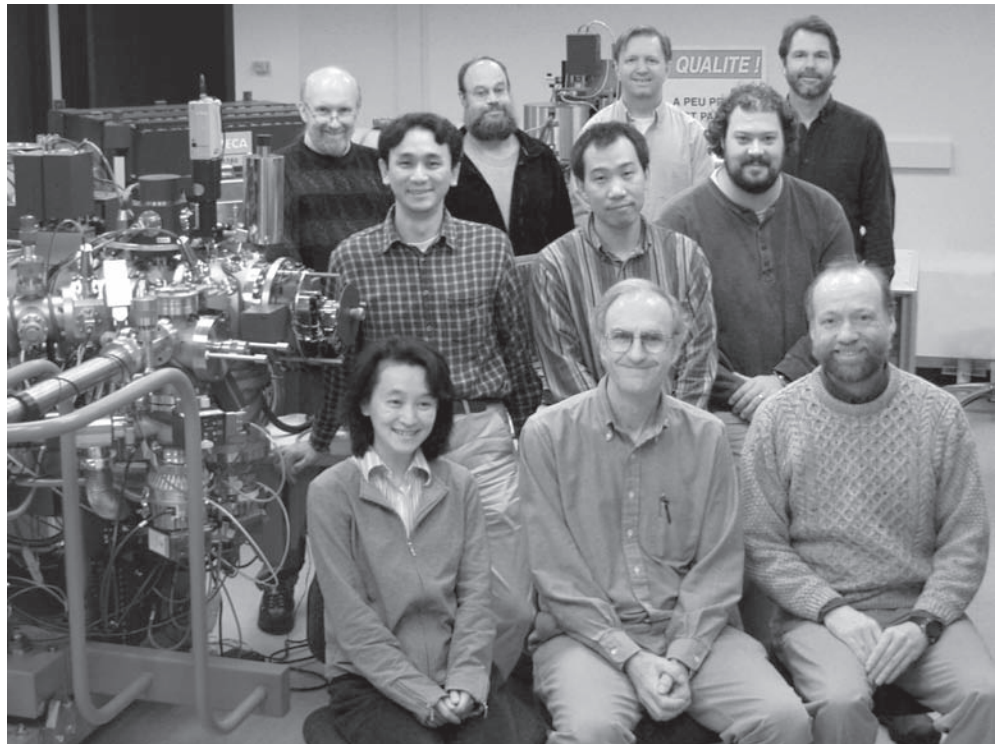
Jacquie Kelly finished her MS last summer on St. Peter sandstone from SW Wisconsin. Using the ion probe, she measured oxygen isotope ratios and found that syntaxial quartz overgrowths formed as silcrete, and not from circulating brines as had been proposed. This discovery became the basis of a successful DOE proposal for study of Paleozoic quartz arenites in the western US. **Alan Carroll** and I will also pursue applications to mud rocks in a pilot study funded by BP that **Jay Nania** helped arrange.

Ian Orland began his MS last fall on speleothems from Sorec cave in Israel. Already he has analyzed $\delta^{18}\text{O}$ in a stalagmite that shows annual banding from 200 to 1000AD. The high spatial resolution of the ion probe allows him to measure sub-annual growth bands and distinguish wet vs. dry months, where previous studies could only resolve decades.

Brian Weidel (Limnology) is analyzing $\delta^{18}\text{O}$ and $\delta^{13}\text{C}$ in fish otoliths (CaCO_3 earstones) from Crampton Lake bluegill in northern Wisconsin for his PhD. The 3mm stones provide a daily record of lake conditions and fish metabolism that can only be resolved at UW.

Penny Lancaster presented her MS results at GSA using the ion probe to analyze single zircons and solve a classic question relating to migmatites. She found that Adirondack leucosomes are in fact the result of anatexis, but the timing is earlier than previously thought.

I also kept busy with duties as MSA President, which contributed to my overdose on meetings last year: spring AGU, Goldschmidt, GSA, fall AGU. Still, **Andr e** and I made time in June for two weeks of hiking with old friends in the Massif Central. It was great. French food with no guilt!



La Qualite! The WiscSIMS group in the lab. Left to right: front, Noriko Kita, John Valley, Neal Lord; middle, Taka Ushikubo, Bin Fu, Zeb Page; back, Lee Powell, Brian Hess, Jim Kern, and Mike Spicuzza. (Ben Abernathy)

Herb Wang

The highlight of my year was spending the summer as a visiting professor at the University of Tokyo's new campus in Kashiwa, about 20 miles northeast of Tokyo in Chiba prefecture. My sponsor was Tomochika (Tomo) Tokunaga, who visited my lab in Madison about eight years ago and who is now an associate professor in Tokyo's Department of Environment Systems. I gave a couple of lectures on environmental justice in Tomo's classes and on poroelasticity at the U. of Tokyo, the geoscience institute in Tsukuba (Science City), and at Kyoto University. Tomo also served as my guide on field outings to Horonobe on the northern tip of Hokkaido where Japan is starting an underground research lab for nuclear waste disposal, Kamioka where Japan has a large, underground neutrino detector as well as a laser interferometer for earth deformation research, and LPG and oil storage caverns near Imabari on Shikoku Island. Rosemary spent the summer with me, and our sons, Michael and Matthew, came to visit. Our two-bedroom apartment was a 20-minute walk to campus through a large park. It also had a tatami room, which was a perfect guest room for our sons. **Steve Carlson's** wife, Yumi, was visiting in Japan just before our return to Madison and she helped me buy a "mamachari" (utilitarian bicycle) to bring back for son Michael.

I was especially interested in taking the tours of underground facilities in Japan, as I have been part of a group of physicists and earth scientists proposing to use the former Homestake Mine as a laboratory for an initiative called DUSEL (Deep Underground Science and Engineering Lab) in Lead, S.D. The mine originally went down to 8000 feet and there are over 350 miles of former drifts and tunnels. I went there twice in the spring for workshops and tours. On one of my trips I sat on the bus next to the Lieutenant Governor and was at the same

table as Governor Rounds for lunch. I saw in a couple of days why it seems as if everyone in South Dakota knows their government officials.

Laura Craig, a double degree candidate in hydrogeology and Water Resources Management (WRM) has gotten me involved in the WRM practicum for the summer of 2007 when the class will investigate a wetland restoration project in the Lower Ninth Ward of New Orleans. She, I, and Natalie Hunt (another WRM student) went to a meeting hosted by the Sierra Club in the Lower Nine in late September where we met with several government agencies, NGO's, and other universities (Landscape Architecture at University of Colorado-Denver and LSU).

Other activities: I gave seminar talks at the U. of South Carolina in the spring and the U. of Minnesota in the fall. In October I went to Berlin to be a panel reviewer for proposals to the German Science Foundation's Intercontinental Scientific Drilling Program. I always find that an interesting comparative experience. I co-taught hydrogeology with **Randy Hunt** in the fall. I continued my part-time job as associate dean in the college. One interesting activity in that capacity is to be on the program committee for the new Wisconsin Institute for Discovery.

Huifang Xu

First, I want to share good news with you. A state-of-the-art field emission-gun scanning transmission electron microscope and high-resolution TEM (FEG STEM/HRTEM) (supported by UW and NSF through NSF's Major Research Instrumentation program) will be installed at the UW campus in the summer of 2007. The new imaging system equipped with the cutting edge technology of spherical aberration correction for electromagnetic lens (called Cs-corrected system) is capable of both structural and chemical imaging at the atomic scale (1 Å, or 0.1 nm spatial resolution!). The new FEG STEM/HRTEM will benefit our research and graduate training in mineral science as well as materials science and life science greatly. **Professor Paul Voyles** (Materials Science & Engineering), **Professor Ralph Albrecht** (Animal Sciences) and I have been working on specifications for the new imaging system.

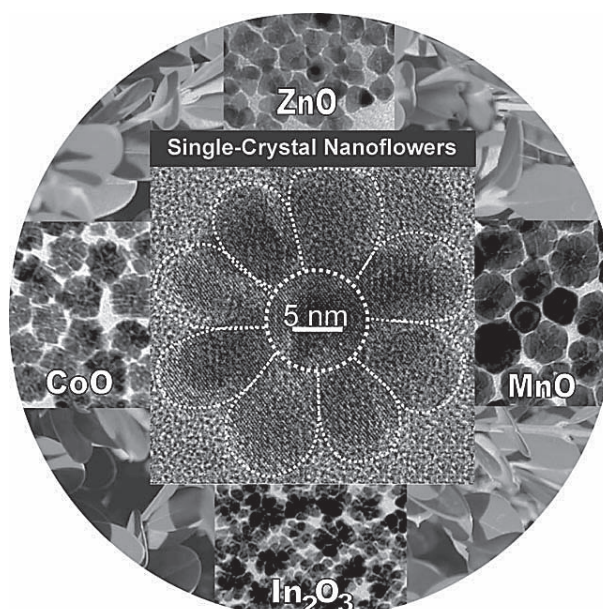
Graduate student, **Rakesh Yeredla** in Materials Science Program has worked on developing integrated functional materials for enhancing photocatalytic oxidation of volatile organic components (VOCs) and production of hydrogen gas from water using renewable solar energy. The research that focuses on clean energy and clean environment will potentially provide a promising breakthrough for the future. Graduate student, **Emily Freeman** joined my research group in August, and started her research on nano-structures and nano-phases of calcite, Fe-oxides, and smectites in terrestrial sediments in order to understand environmental conditions and microbial activity during mineral formation. Visiting student, **Ting Xue** has studied the characterization of natural nanoporous materials in ferromanganese crusts, and speciation of trace elements in crusts from seamounts in the West Pacific Ocean in order to understand the mechanisms and processes for enriching trace elements and rare earth elements. Post-doc, **Hiromi Konishi** joined the group in October and is working on X-ray diffraction and HRTEM of both natural materials and engineered materials.

I am continuing the study of chemical properties, magnetic property, crystal structure, crystal shapes and texture of nano-crystals



Tomo Tokunaga and Herb Wang in an oil storage cavern near Imabari, Shikoku Island, Japan. Everybody in Japan seemed to give the "V" sign when having their picture taken. (Herb Wang)

from both natural and synthetic systems. The research is fruitful. I will co-organize a symposium of "Crystal Shape Control and Shape Dependent Properties Across Length-scales: Methods, Mechanism, Theory and Simulation" at the 2008 Spring Meeting of the Materials Research Society. Nano-phase minerals are very sensitive to local environment changes and can be used as proxies for paleoclimate changes, especially for land sediments, loess and paleosols. Our recent discovery based on authigenic nano-phase minerals from Chinese loess indicates that the late Tertiary was dry and hot in central China instead of the traditional view of a wet and warm environment. My former colleague, **Dr. Yifeng Wang** at Sandia National Laboratories and I published an article in GCA about geochemical chaos for dynamic crystallization of minerals in non-equilibrium systems. I am also collaborating with **Professor Eric Roden** on microbe-induced nano-phases of Fe-bearing minerals. ●



Wisconsin nano-flowers "bloom" on a cover of *Angewandte Chemie, International Edition*. (Huifang Xu)