

developed a better appreciation for the diversity and innovative approaches of the individuals who make Week's Hall their home away from home. By this time next year, I plan to be inviting you all to tour the new Structure facilities and giving you a timeline for availability of the new and versatile SEM.

### DAVE MICKELSON

Last spring was the second semester of sabbatical and I made the most of it, starting with a research trip to Patagonia in January. Before getting to the field areas of **Brad Sleeth** and **Richard Becker**, Jim Bockheim from Soils, Vin and I drove to Ushuaia, which is on the Beagle Channel, with **Jorge Rabassa**. An interesting and educational trip! **Danny Douglass** is also continuing his PhD work there. We came home to catch up on emails and to finish a manuscript, then left for a two-month stay in the UK. I was very pleased to be hosted by Andy Russell, Peter Knight, and Richard Waller at Keele University in the Midlands. We saw quite a bit of cool and rainy England as I gave talks at five places. I also used the time to catch up on writing projects. The Europe stay ended with three days in Nice (we finally got warm!) to give a paper at the EGU meeting. **Jessica Darter** and **Carrie Moeller** finished their MS theses in summer on reconstructing ice thicknesses and glacier modeling in Norway that **Cornelia Winguth** and I have been working on for three years. **Lindsay Anderson** finished her MS in geology and Water Resources Management, and has taken a NOAA Traineeship in New Hampshire.

In June, I flew to Beijing, where I gave a talk at the Academy of Science and visited with Xiaoping Yang, then to Lhasa where I met Zhou Shangzhe and graduate students from Lanzhou University. We drove two days east of Lhasa to collect boulders on moraines for cosmogenic dating glacial events in the humid area. That was followed by trips to Utah to work with **Ben Laabs**, who finished in December, and to New England. Then the Modern Glaciers of Iceland course was offered again. We had a great class and I enjoyed having former students **John Chapman**, **Steve Brown**, **Sue Rodenbeck-Brauer** join 13 others for the trip.

Back to teaching in fall, I co-taught a course in coastal geomorphology for the first time. It was a little disorganized, but I learned a lot. We are planning another field season in the Uintas, with **Kurt Refsnider** beginning an MS project there. **Betty Socha** and I submitted the Manitowoc and Calumet County report, and **Anders Carlson**, **Sarah Principato**, **Dawn Chapel** and I submitted Sheboygan County. **Steve Kostka** is writing up St. Croix County. I still have an active research program, with proposals pending for projects in Argentina, the Great Lakes area and Tibet. I enjoyed talking with alumni at the Quat reunion at GSA in Denver. Photos of the event are at: [http://www.geology.wisc.edu/news\\_events/QUAT\\_GSA04/index.html](http://www.geology.wisc.edu/news_events/QUAT_GSA04/index.html).

Hope to see many former Quats at GSA this May in Minneapolis or in Philadelphia next fall.



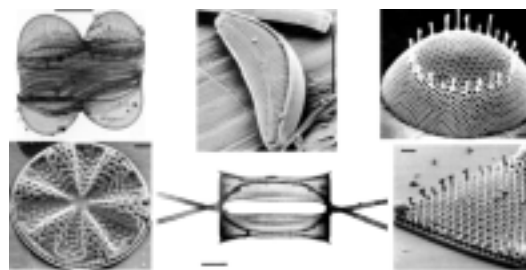
*Dave Mickelson with Zhou Shangzhe, back row, second and third from right, and graduate students and colleagues from Lanzhou University, in the field near Lhasa.*

### NITA SAHAI

Excellent graduate students, supportive faculty colleagues, and a friendly and efficient office staff—sound like heaven? No, it's Weeks Hall!

I have to begin, again, this year by acknowledging the contributions of my students to our program. **Katya Delak**, like myself, is in her fifth year at UW and has significant results for understanding the chemical mechanisms that underlie the process by which organisms such as sponges and diatoms convert dissolved silicon from oceanwater into intricate nanoporous opaline silica (Fig. 1). Using  $^{29}\text{Si}$  NMR spectroscopy, Katya has shown that the process is catalyzed by amines where the conversion rate is faster for the more acidic amines and the longer polyamines (Fig. 2). These results may explain why sponges use histidine and diatoms use polylysine chains in their enzymatic catalysis for producing nanoporous silica. Katya's two manuscripts are in review at *Chemistry of Materials*, and *Inorganic Chemistry*.

Meanwhile, **Tim Oleson** is working on understanding the thermodynamic basis for why biological cell-membranes self-assemble or rupture when put in contact with different mineral surfaces. Tim has made remarkable research progress in only his second year at UW, by successfully developing protocols for measuring bulk adsorption isotherms and enthalpies of adsorption of cell-membrane phospholipids at mineral surfaces. This work has implications for the early cellular



*Fig. 1. Nanoporous diatom silica.*

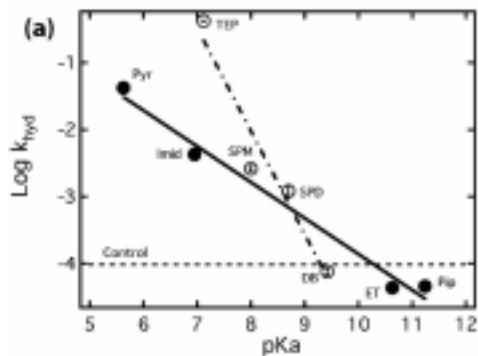


Fig. 2. Conversion rate depends on amine's acidity and length.

evolution of life. **Mark Ciardelli**, our new MS-candidate student, is interested in the arsenic contamination problem in the Fox River Valley, WI. He will pick up where our previous MS student, **Katie Thornberg**, left off. Katie's paper on the arsenic project was published in *Environmental Science and Technology*. Undergraduates, **Emily Kleiber** and **Amrik Ray** worked on arsenic contamination in Bangladesh and on organic-mediated clay synthesis. Our group will grow this spring with the addition of post-doctoral research associate, **Young Lee**, from SUNY-Stony Brook, who will work on metal and organic coprecipitation mechanisms with applications in biomineralization and contaminant remediation.

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. In collaboration with Belgian colleague, **Prof. Michel Anseau**, we have exciting results which suggest that pseudowollastonite (psW) is bioactive because it has a specific structural arrangement of silicate functional groups on the (001) face that provide an epitaxial match for the (001) face of apatite (Fig. 3). Our manuscript is currently in review at *Biomaterials*. It was great fun teaching "Fluids and Sedimentary Processes"

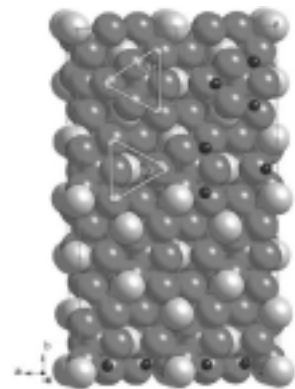


Fig. 3. Plan view of (001) on psW showing silicate groups at 600. Ca=light grey; O=dark

with **Prof. Alan Carroll**. Our group seminar benefited from the participation of **Silke Severmann**, **Heidi Crosby** and **Prof. Huifang Xu**.

I've been fortunate this year in proposal funding—honored to get the NSF CAREER award and an ACS-PRF grant supporting our work on cell self-assembly. I've also been gratified by several



Jose Fransisco Mediato Arribas (IGME) and Oibane Astui Zubika (Campus Nord Barcelona), left, Toni Simo, center, and Leo Piccoli look over data after a day in the field in the Pyrenees.

invitations to conferences and other universities, to teach at a workshop on using computational methods in geochemistry, and have organized symposia on Biogeochemistry and Biomineralization at the ACS and Goldschmidt Conferences. In the "Top 10" list of best news for me this year, is that UW has approved early tenure for me with promotion to Associate Professor. I am deeply appreciative of our entire faculty's efforts to make this happen, especially of our Chair, **Prof. Clark Johnson**. It has been a lot of fun celebrating with my students, colleagues, and friends.

### TONI SIMO

2004 was a busy and rewarding year; it was fun seeing so many of you during my travels and to catch up with your activities. Traveling took a large part of my time; I visited Tunisia three times, Venezuela, Indonesia, Italy, Czech Republic, Norway, Canada, many trips to Spain, and numerous trips to cities, field areas and meetings in the US. My family is doing well and I am having a great time teaching undergraduate core courses and specialized graduate courses.

I continue my collaboration with researchers at the UPC-Barcelona where I advise one PhD student and a postdoc. The project involves studying a Pleistocene delta near Barcelona from an environmental point of view. The delta's aquifers are starting to be contaminated and excess pumping is creating a salt intrusion. The work is fascinating as it integrates thousands of wells, seismic, geochemical well data, and age dates. Some of the material is so good that I am using it for instruction in class. In a similar line of research (environmental sedimentology) **Wasinee Aswasereelert** is completing a MS degree on the Eau Claire shale in Wisconsin. This is a project with **Dave LePain** from the Wisconsin Geological Survey and the shale protects much of the Cambrian aquifer.