New Faculty

Introducing Kurt Feigl

Editor's Note: Kurt Feigl joined our faculty as Associate Professor with tenure in August 2006. Kurt's research applies geodesy to tectonics. He teaches graduate and undergraduate courses in geophysics, including new courses on "Eye in the Sky: Monitoring Earth from Space," "Practical Applications of GPS Surveying," "Satellite Imagery and Geodesy," and "Data Analysis for Earth Scientists." Before coming to Madison, he worked as a research scientist at the national CNRS science agency in France for 15 years. His BS and PhD are from Yale and MIT. Visit his web site at <http://www.geology.wisc.edu/~feigl/>.

Kurt Feigl.

As California bumps and grinds, the U.S. drifts away from France, Africa impinges on Europe, and the Midwest remains stable. Politics? No, active tectonics. Watching the Earth move has fascinated me since the 1980 eruption of Mount Saint Helens vaporized a cubic kilometer of rock. Having studied the USGS topo sheets of its formerly beautiful edifice as a teen-age mountaineer, I was intrigued to see a revised version of the map printed in a USGS Professional Paper. The new map shows contour lines in different colors for the topographic elevation before, during and after the eruption sequence of 1980. I could literally see the Earth move under where my feet had been. After visiting the red zone around Saint Helens and taking my first courses in geology and geophysics, I learned that geodesy is for me. As the study of the Earth's shape, geodesy is a metrological discipline that logically includes measuring the changes in the Earth's shape. And that's just what I've been doing for the last quarter century: watching the Earth deform.

I use primarily two techniques in satellite geodesy: the Global Positioning System (GPS) and satellite radar inteferometry (INSAR). Without going into the rocket science, we can use these technologies to measure small changes in the surface of the Earth. How small? Millimeters. For example, the San Andreas Fault system in California separates the North America and Pacific plates, which slide past each other at a rate of about 35 mm every year, on average. Both GPS and INSAR can measure such signals. By comparing the geodetic measurements to numerical models, we can test hypotheses for the mechanical behavior of the continental crust. Besides active volcanoes and faults, other sources of deformation include glaciers and withdrawal of fluids such as water, gas, and oil.

Madison, as it turns out, is a wonderful place for me to pursue these interests because of its strong, ongoing tradition of rigorous analysis of tectonics, as well as the superbly capable scientists working here. I feel fortunate indeed to "inherit" the intellectual riches accumulated by the likes of **Charlie Bentley, Bob Meyer,** and **Nik Christensen.** Similarly, interactions with geophysics colleagues have already enriched my time here in Madison. **Harold Tobin** and I arrived in Madison at the same time, restarting philosophical conversations on how to test hypotheses in the earth sciences that we had begun as under-graduate majors twenty years earlier. Following a suggestion from **Jean Bahr,** we are teaching a year-long graduate seminar together that allows us to interact with a dozen bright graduate students from the structure and geophysics groups as we "take apart" papers, both old and new. With help from the students, we performed (successfully) the "beer can experiment" described in Hubbert and Rubey's 1959 classic paper. **Chuck Demets** and I talk shop about GPS data analysis and finite-element modeling every Tuesday. **Cliff Thurber** and I have already written two proposals together on using seismologic and geodetic data to span the deformation spectrum from interseismic strain rates as slow as 1 mm/yr over 10 km to coseismic strain rates as fast as 20 Hz. **Herb Wang** has patiently tutored me in poroelasticity. **Dante Fratta** was inspired to record the vibrations of the 3rd quarter Jump Around in Camp Randall during the Buffalo game, giving those few students without tickets an opportunity to watch this new faculty member learn from his mistakes in the field.

And the staff is outstanding! Before I even had my UW ID card, I benefited from the skills, experience and insight of **Teresa Egan** for submitting a proposal to NSF, **Bill Unger** for renovating a lab, **Lee Powell** for acting as software guru, **Neal Lord** for GPS hardware, **Ben Abernathy** for computers, and **Marie Dvorzak** for course documents. That all these people consider it their job to help me do mine came as a nice surprise after fifteen years of running my shop by myself in France. Thanks to all these people's efforts, guided by Jean Bahr's "benevolent dictatorship", my first semester as a Geo-Badger has been productive, stimulating, and, yes, fun. I look forward to many more.

Kurt Feigl does field work on the the Memorial Union Terrace during a Badger game Jump Around experiment. Read the related story on page 14. *(Courtesy of Kurt Feigl)*