Special points of interest:

* Learn about 2 new courses to be offered in the fall
* Explore areas of research with the faculty
* See what students are doing outside of the classroom
* Congratulations to Dr. Leipnik on his promotion to full professor

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Message from the Interim Chair

Same time, long ago, way before this second newsletter under the editorship of Velvet Nelson rolled off the hot presses, I had assumed that this would be my final swan song of a chairmanship contribution. It would appear not to be so!

For budget reasons that are certainly beyond our Department, and seemingly well beyond the College of Arts and Sciences, last November all new faculty appointments were frozen. This hit us particularly hard as we were already some way along in our search for an Applied Geographer who would chair the Geography and Geology Department. As a result my Acting Chairmanship has been extended for at least another year and we will have to review what our next move might be with regard to a permanent chair.

But not all is doom and gloom – not for me anyway and I think not for the Department. While all new positions were cut off we were able to advertise and fill our vacant Structural Geology position. Next August Joe Hill will be joining us along with his wife, two children and a dog called Darwin. Joe got his BS and MS degrees in Geological Sciences from the University of Tennessee at Knoxville and his Ph.D. is from the University of Missouri at Columbia. His research for his doctorate included contract mapping Mount Rushmore with all the presidential heads. Since then he has continued mapping work in the Black Hills and in the Appalachians. Joe will be teaching Structural Geology and will play an important role in the development of our new modular geological capstone course that will replace the onerous (logistically and financially) infamous “Geology Field Camp”.

One thing this interregnum will allow us to do is to further review both the Geography and Geology curricula prior to a new search for an external chair.

Our proposal for a Masters program in Geospatial Analysis is moving through the University review machinery and looks likely to be approved. With this very positive development and with our restrictions (for the moment) on new faculty we, anyway, need to adjust what we teach and the way that our Geography curriculum will flow from the undergraduate level to the graduate. In Geology our plans are a good deal more vestigial but our Dean has asked us to begin to think about the eventual separation of Geology from Geography. We can (and will) remain friends but each program is likely to benefit from a new independence.

So, while we have no time for forlorn navel-gazing we do have time to take stock of where we are now and where we want to go next. Perhaps a brief hiatus is no bad thing...

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New Courses for Fall 2008

GEOGRAPHY 436: Urban Geography—This course seeks to explain the spatial dynamics of urban phenomena both within and among cities. We will focus on the geographic dimensions of a host of contemporary urban issues, such as: transportation; economic, retail and social change; racial and class segregation; suburban sprawl; population growth; unequal investment; environmental pollution; and land-use dynamics. Special attention will be given to the nature of the North American urban environment, yet the course will include comparative treatment of urban areas from a global perspective. The course may involve a field trip to Houston, TX.

Contact Dr. Strait (bsDoB8@shsu.edu) for more information.

GEOLOGY 332: Forensic Geology—This course is designed to (1) give geology and geography students examples of the practical application of geologic principles to resolving real-life situations, and (2) fill a critical gap in the criminal justice curriculum by offering students an opportunity to not only see how forensic geology can provide them with a powerful analytical tool, but to also introduce them to some of the technologies (e.g., optical mineralogy, x-ray diffraction, particle size analysis, ground-penetrating radar, scanning electron microscopy) that are being used to solve crimes.

Contact Dr. Cooper (bjcooper@shsu.edu) for more information.
Dr. Baldwin: Polar Exploration & the Influences of the “Warm Pole” Concept

This research, in conjunction with Professor Erki Tammiksaar, Centre for Science Studies, Tartu, Estonia, focuses on some of the influences and attractions to explorers of the erroneous but long-held concept of warm climate regions at both poles. While much of the justification of polar exploration involves either the “Everest concept” (because it is there) or a search for a North East or North West Passage from the Atlantic to the Pacific, much of nineteenth century exploration was effectively drawn because of the possibility of usable temperate lands at these extreme locations. Some of these ideas are rooted in classical antiquity, and some are modern and very strange.
Dr. Albert: Diffusion of Naturopathic State Licensing in the United States & Canada

State licensing of naturopathic physicians is currently in the middle of the early majority stage of diffusion and is occurring in a contagious manner; therefore, spatial proximity is an important determinant in projecting new adopters. This project, co-authored with Ferry Butar Butar, used the proportion of licensed neighbors to all neighbors as a measure for spatial proximity and the S-curve to predict licensing in the remaining early majority and the first half of the late majority states and provinces.

Ms. Liu: Farmers’ Coping Responses to Low-Flows in the Lower Yellow River

Water scarcity in northern China has been a constant topic of concern in China. The frequent dry-up in the Lower Yellow River has caused disruption of water supply to irrigated agriculture, which has posed a great threat to farmers’ livelihoods. With its aim to assess farmers’ vulnerability to water shortages, this research focused on farmers’ coping mechanisms and adaptive strategies by examining the experience of farming households in three villages in Shandong Province to cope with a sequence of low-flows occurring in the lower Yellow River between 1990-1999. The three villages studied with different vulnerability profiles have exhibited different patterns of adaptive process, and key factors contributing to the process have been identified, such as community leadership and innovators’ influence.

Dr. Leipnik: Geospatial Infrastructure of the Ukraine & Other States of the Former Soviet Union

This research on GIS development in the Ukraine, co-authored with Dr. Pavel Anpilogov of Kyiv National University, found that, while very detailed and accurate, 1:25,000 scale topographic maps with 1:10,000 scale maps of urban areas (an example of which is shown in Figure 1) were developed during the period of the Soviet Union, new mapping is not taking place. These digitized maps are in an ESRI vector GIS with layers for topography, major roads, hydrography and the boundaries of counties (oblasts) and regions (rayons) and municipalities (gorsoviets). However, the maps have not been updated since the mid 1980’s, and many desirable layers of data are non-existent. The areas where this GIS data are being most actively used are in gas pipeline mapping (shown in Figure 2), in public utilities, and telecommunications applications.

Existing state licensing naturopathic doctors with projections through diffusion categories. Source: Albert & Butar, 2004

Figure 1 (above): Kyiv water supplies utilities GIS. Figure 2 (right): Gas pipeline GIS
In this ongoing research, the proposed working hypothesis is that relative downward movement along the south side of the south-eastward projection of the Ticul fault caused the observed reversal of drainage from northward to southward near the end of the Miocene and created a local basin of later Miocene/Pliocene deposition with its center beneath the large flat terraces on the west side of Chetumal Bay. However, other intriguing questions are raised by this hypothesis. First, the relative down to the north movement proposed in the literature for the exposed portion of the Ticul fault seems solid. So also, does the existence of a topographic low at Chetumal Bay and the widespread pattern of stream reversals. If the evidence from both ends of the Ticul structure is taken at face value, a scissors-like rotational faulting is implied. Second, if this is so, when did erosion and re-deposition of the Chicxulub ejecta begin and is the ejecta really the source for the terrace deposits near Chetumal? Third, if deposition did not begin until the Miocene, what was going on during the preceding 30 or 40 million years?

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Dr. Strait: Racial Identity & the Epidemiology of Urban Poverty, a Comparison of the United States & Brazil

Previous research that has documented empirical links between racial differences in infant mortality and the relative degree to which different racial and ethnic groups reside within extremely poor urban neighborhoods within the United States. In short, this research provided compelling evidence that racial disparities in infant mortality can be partially explained by the disproportionate concentration of African-Americans within such neighborhoods relative to whites. This project extends this research agenda to an investigation of the dynamics of urban poverty within Brazil. Compared to the United States, racial identity in Brazil is much more fluid, ambiguous and dynamic. Still, despite this “fluidity”, Brazilian racial identity does strongly correlate with a variety of indicators of social and economic status. Thus, this project will offer insight into the complex ways in which the “color line” influences health among urban populations.

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Dr. Netoff: Eolian Activity at a Giant Sandstone Weathering Pit in the Arid South-Central Utah

Eolian abrasional, depositional, and deflational features indicate exceptionally strong southwesterly winds in a giant sandstone weathering pit near Red Breaks, Utah. Unlike other giant weathering pits in the region, the bedrock floor of this pit is undulatory, and there is a cylindrical, 10 m-high rock pedestal in the center of the pit. Fine-grained (<250 microns) dunal sand on the pit floor is periodically removed by deflation, leaving somewhat coarser (>250 microns) trapped in the pit. Most of the dunal sand is derived from sources other than the pit walls and floor. Abrasional features such as grooves, flutes, mini-yardangs, and dedos occur on the bedrock walls and floor of the pit. Results of this study indicate that there is lateral structural variation in the facies layers adjacent to water-transmitting longitudinal furrows. It is also evident that there has been significant recession of ice (permafrost) away from the furrow walls. The extent of this recession decreases with depth.

Dr. Degenhardt: Active Layer Response in the Vicinity of a Water Pathway

Rock glaciers are important agents of debris transport in alpine and periglacial regions. They serve as primary sinks for ice and water storage in mountainous areas and symbolize transitional forms in the debris transport system. In settings where they occur in association with present or former glaciers, rock glaciers may represent mantled remnants of glacial ice left behind after glacial recession, or debris/moraine-covered tongues of ice emanating from a main glacier body. In order to model the physical mechanisms that control the flow dynamics of rock glaciers, it is essential to understand how these active layer/permafrost systems respond to climate forcing agents over long periods. Such information will improve our understanding of the adjustments that occur within rock glaciers in response to changes in weather and climate. This is expected to have a significant impact on broader studies that involve global warming and climate modeling.

The 2900 km long Indus River which forms in the Tibetan Himalayas is the only river that flows through the Himalayan Mountains.

Dr. Gillespie: The Impact of Military Tank Maneuvers on Eolian Transport & Soil Compressive Strength in South Central New Mexico

The impacts of tank maneuver activity on eolian transport processes and soil compressive strength were assessed at the Fort Bliss Military Reservation. This study was part of a larger set of projects to assess the environmental impact of military operations in the desert environment. Eolian transport processes involving drag velocities, transport rates, and sediment sorting characteristics were assessed in terms of terrain type (grassland, rounded coppice dune field, elongated coppice dune field) and level of impact (number of tank passes) using a portable wind tunnel. The impacts on soil compression were measured using a pocket penetrometer. The results showed that the expected correlations between terrain and eolian processes were weakened as the level of disturbance by tank activity increased. Perhaps most importantly, the study found that, even in a relatively dry, sandy environment, the effects of tanks and armored personnel carriers on soil compression lasted for more than a decade. The changes in soil compaction also extended outward from the tracks several inches and, overall, the compaction substantially limited the recovery of vegetation in the disturbed area. Also, animals tended to use the tracked areas as trails, and this, too, limited recovery of vegetation.
Retardation and thickness of single grains can be easily observed in cross-polarized light with the aid of a polarizing light microscope equipped with a spindle stage. Precise numerical birefringences based on observed retardations and thicknesses are relatively easy to obtain compared to measuring precise refractive indices, \( n \), or optical orientation. Correct interpretation of retardation can be used to determine chemical composition in mineral solid solutions series, observe zoning in minerals, and calculate diffusion coefficients in cation-exchanged zeolites, along with industrial applications such as controlling the thickness of extruded plastic films by real-time monitoring of retardation. Computational methods, based on point-dipole theory, were used to calculate the optical properties of natural and cation-exchanged zeolites, with an emphasis on the numerical birefringences. The calculated birefringences are consistently proportional to changes in cation proportions. The calculated refractive indices generally do not correspond as well with the observed refractive indices as the calculated birefringences correspond to the observed birefringences. Therefore, once a set of electronic polarizabilities was optimized for a specific zeolite, it was possible to model variation of numerical birefringence with changes in composition. This allows the prediction of the effects of natural ionic substitution or artificial cation exchange.

Dr. Cooper: Modeling the Optical Properties of Minerals

Photomicrograph of synthetic olivine in cross-polarized light showing XY-section where birefringence increases with increasing iron content along fractures.

Dr. Gong: From Census Tract to Police Beat—An Areal Interpolation of Census Data

This research project undertaken with Jason Nix, an undergraduate student in Criminal Justice, seeks to decipher the crime patterns in Houston using Geographical Information Systems (GIS) and remote sensing techniques. Specifically, they want to address the spatial incompatibility problem commonly faced in crime analysis research. Various socioeconomic data and crime statistics are usually collected and aggregated at different spatial zonations of geographical space, making the integration and analysis of these data complicated. Using the beat-based crime counts from the Houston Police Department and census tract-based socioeconomic data, they explore how dasymetric spatial interpolation method may provide an appropriate solution. Through their research they also attempt to create better maps to show the crime patterns, identify crime hot spots, and explore relevant socioeconomic variables.

Dr. Tiller: The March 11, 1837 Petition to the Congress of the Republic of Texas for the Creation of a New County

In the spring of 1837, the Congress of the Republic of Texas received a petition for a new county and land office from 108 Shelby County citizens who mistakenly believed they were living in Red River County. This document, save for a few Mexican-era surveys, is one of the earliest known records relating to northern Shelby (later Harrison) County. From a genealogical standpoint, the March 11 and attached April petitions (jointly referred to as The Petition) provide the reader the names of some of the earliest settlers in the area. For those with a more historical bent, the document offers insight into some of difficulties experienced by those living between the Sulphur and Sabine Rivers in the year immediately following independence.

Robberies in Houston in 2006

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Ms. Fujimoto-Strait: A Comparison of Soil Properties between a Mature Second-Growth and an Old-Growth Forest in the Southern Appalachian Mountains

For centuries, the eastern forests of the United States have been dramatically altered by human activity. Clearing for agriculture, timber harvesting, and urban expansion has an impact on soil quality. The purpose of this study was to address the question: do soil physical properties ever “recover” to pre-logged conditions? By comparing the soil, vegetation, and environmental attributes between an old-growth forest and a mature second-growth forest (i.e. 75 years since logging), this study attempted to understand the “recovery” of soils, in addition to quantifying old-growth soil attributes for a Southern Appalachian forest stand. Data collection entailed both field work in Ellicott Rock Wilderness Area—Sumter National Forest, South Carolina and Coweeta Hydrologic Experiment Station, Otto, North Carolina, and lab analysis. Multiple regression models revealed that differences remained between the logged and unlogged forested stand, even after 75 years of recovery.
I was fortunate enough to attend my geologic field camp in New Zealand for six weeks during the winter break and part of the spring semester. The experience gained from this trip is immeasurable. ‘Hands on’ practice outside of the classroom was amazing, but learning about new cultures and people from around the world was an incredible bonus.

We started our studies on the north coast of the South Island in an area called Golden Bay where we completed structural maps of Farewell Spit. This was followed by a trip to Franz Joseph and Fox Glaciers in the west. We then traveled to the northwest coast to complete a block of work on metamorphic deformation and the history of the collision of the India-Australian Plate and the Pacific Plate. This collisional boundary traverses the east coast of the North Island, has a strike slip component between the islands and reverses direction on the west coast of the South Island.

A road trip across the country landed us in Christchurch where we had a day to enjoy the city and the artisan festival that was taking place. A drive to Picton and a three-hour ferry ride to the North Island put us in Wellington, the capital of New Zealand. We had the weekend off from field work to enjoy the sights of the city and the celebrations of the national horse race, akin to the Ascot races in England. We then traveled to the center of the North Island to complete a block of work on volcanoes and tephra stratigraphy. The volcanoes that we studied included Mount Ruapehu and Mount Ngauruhoe, also known as Mount Doom from the Lord of the Rings movies. (There was also a day off in which I had a chance to skydive over the volcano, watch a rugby match and see the New Zealand All Blacks rugby team win the international rugby championship!)

I highly recommend a field camp outside of the U.S. to anyone that is interested in meeting new people, participating in a different culture and learning more about geology from a different perspective. It was so wonderful to be able to take the knowledge I have gained at Sam Houston in the classroom and share it with other schools of thought as well as incorporating a slightly different interpretation of the material.