STONY BROOK UNIVERSITY

Department of Geosciences

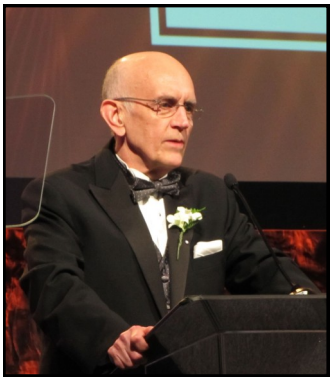
2011 Year in Review

STONY BROOK UNIVERSITY

Letter from the Chair

I was fully expecting my successor to be writing the letter this year, but, as circumstances would have it, I was persuaded to extend my term as Department Chair. A significant factor in my decision is the great deal of support that comes from the faculty, staff, and students, who make the Department such a great place to work. Over the many years that I have been here, the atmosphere in the Department still remains great.

The year 2011 seemed to fly by, with lots of excitement—some good and some bad. On the good side I cite the well-deserved recognition that our faculty and students are receiving. Distinguished Professor Don Weidner was awarded the Inge Lehmann Medal by the American Geophysical Union at their fall meeting in a gala that rivaled the Academy Awards. The Medal recognizes outstanding contributions to the understanding of the structure, composition, and dynamics of the Earth's mantle and core, and it was richly deserved by Don, who has been a pioneer in these areas. It was such a rare occasion to see Don in a tuxedo that I have included a photo to record it!



Don Weidner accepting the Inge Lehmann Medal at AGU

We also welcomed a new faculty member, Deanne Rogers. No stranger to us, as she has been a research faculty member for several years now, Deanne takes up a tenure-track position, adding her expertise in the fields of remote sensing and planetary sciences. Please read the faculty focus later in this issue to learn more about Deanne's research interests. At our May graduation ceremony, we honored Oliver Schaeffer Award recipient Michael Lomonaco and David E. King Field Work Award recipient Caitlin Young.

Oh… and what was the bad news? Well, we had a little fire in the ESS Building that impacted the newly renovated Isotope Lab. The details are provided later in this newsletter by Director of Labs Owen Evans. Despite the damage, we can report that the new Isotope Lab is taking shape and promises to continue our long tradition of leadership in this field.

We have several other initiatives underway in the Department. Gil Hanson continues in his development of a teacher training program. This coincides with a new MS program aimed at providing advanced degree training for secondary school teachers in earth sciences. This effort has been supported by generous donations from Geosciences alumnus Vesna Kundic (MS '05). Professor Bill Holt is leading an initiative to have one of EarthScope's US Array seismographic stations located at Stony Brook. This NSF-sponsored nationwide program, which is scheduled to move into the Eastern US in 2013, will offer great research opportunities for our students and faculty. Two other initiatives promise to enhance our undergraduate teaching. We are currently drawing up plans for a digital technology lab to support our courses. Continual advances in computer-based tools require that we integrate these into courses, and the proposed lab will enable us to do this more easily. A second initiative is replacement of the teaching microscopes that we use for mineralogy and petrology courses. Many of you will remember wrestling with these scopes in various classes. Donations toward either of these initiatives would be greatly appreciated!

In this issue, we again continue our tradition of recalling some of the Department's early history. Thanks to all of you who wrote back with such overwhelmingly positive comments about the previous articles written by Emeritus Professor Bob Dodd. This year, Emeritus Professor Don Lindsley picks up the torch, and tells us more about our Department's early history. (This serves notice that other long-time ESS/Geosciences faculty and staff may be called upon to continue this tradition!) Speaking of long-term service, one staff member deserves particular recognition. Electronics Specialist Ben Vitale retired at the end of 2011, after more than 40 years of service. Ben contributed in many ways to the Department's teaching, research, and social events, and he will be missed. We hope he takes a cue from his friend and colleague Bill Huebsch, who still maintains a close connection with us after retirement.

Finally, let me invite all of our alumni and friends to keep in touch. If you haven't seen the campus in recent years, you will be amazed at the changes, especially the most recent ones. I would also like to thank all of those who have made generous donations in support of the Department. Those who would like to do so can look at the back page for additional information.

Ben Vitale retires after more than 40 years of service.

Rich Reeder

Department Chair

Front cover (from left): Sampling thermal pools in Yellowstone; Field Methods course measuring a stratigraphic section on campus; Structure class in the Mid-Hudson Fold-Thrust belt near Catskill, NY.

Starting ESS IV: Growth Spurt

Donald H. Lindsley, Distinguished Professor Emeritus

Bob Dodd's wonderful accounts of the early days of our department effectively ended in the Fall of 1968 with the arrival of Ted Bence. To continue the story from my own perspective, we need to go back a few months to April, 1968. I was a staff member at the Geophysical Lab in Washington, but while the GL was great for doing research, I knew vaguely that I eventually wanted a teaching position. I had also heard about the exciting new university that had recently been started on Long Island - but it had never occurred me to connect the two.

I was attending the Spring Meeting of the American Geophysical Union in Washington, and had just settled down in the front row to listen to a talk by someone we were considering for an appointment at the Geophysical Lab, when there was a tap on my shoulder. Since I had been specifically asked to attend the talk to evaluate the speaker, I ignored the tap, hoping whoever it was would go away. But the tapping continued, and eventually I turned around with what I hoped was an annoyed glare, only to look into a pair of innocent-looking pale blue eyes set in a smiling face. "Hello," the face said, "I'm Oliver Schaeffer, Chairman of the Department of Earth and Space Sciences at Stony Brook, and I'd like to talk to you."

And so began my involvement with the largest and most ambitious recruitment effort in the history of the Department of Earth and Space Sciences. I learned that Ollie had been talking to two hot-shot young crystallographers - Charlie Prewitt and Jim Papike. Charlie was at Dupont at the time, and Jim had recently joined the U.S. Geological Survey in Washington. Both were big thinkers, and while neither had much interest in coming to Stony Brook by himself, both were willing to consider a package that included themselves, an experimental mineralogist/petrologist, and a thermodynamicist. And so Ollie talked to me and to Dave Waldbaum, then a Post-doc at Harvard. The four of us visited Stony Brook singly and then as a group, and we also talked among ourselves. We informally decided that - if all four received satisfactory offers - we would all accept. I think I was the one who dubbed us "Papike's Army" - which in retrospect probably didn't do justice to Charlie's important role in forming our group. There was a memorable spring evening when Gil Hanson (who had been a fellow grad student with Jim at Minnesota) joined Jim, Charlie, and me sitting at the top of the cliff at Sunwood, looking out over Long Island Sound and making plans for the future. As I recall, we had each brought a six-pack, and the meeting ended only after there were 24 empties.

Charlie Prewitt (left) and Jim Papike

Bob Dodd has referred to the frequent fireworks between Ollie and Sam Goldich in the early days of the Department. I knew Sam by reputation; when I met him he acted pretty much as if he were the Department Chairman! It's no wonder that two such strong-minded people had a hard time working together. During the period of negotiations of the "Army" with Stony Brook, Sam announced that he was leaving. I have to confess that the news positively affected my decision to join the Department - and I may not have been alone in feeling that way.

I think it was June, 1968, when Jim, Charlie, Dave, and I received offers from Stony Brook (things moved pretty fast in those days). I was in a quandry. I had earlier accepted an offer to spend a semester in 1969 at Cal Tech, and while there was no formal agreement, there was a tacit understanding that one purpose of the visit was to allow both Cal Tech and me to decide whether we suited one another. Would it be wrong for me to spend the semester there if I had already committed to Stony Brook? I decided to call my friend Arden Albee at Cal Tech and ask him for his opinion. Arden wasn't in his office, and the phone was answered by his post-doc - a guy named Ted Bence! I tried to explain why I needed to talk to Arden. For some reason, Ted felt it was not appropriate for him to tell me that he was heading to Stony Brook that Fall. Months later he told me that he nearly exploded with laughter when he heard the reason for my call! Anyway, when I finally reached Arden, he assured me that I was welcome to spend the semester at Cal Tech even if I was promised to Stony Brook.

Dave Waldbaum eventually decided to accept a competing offer from Princeton, but Jim, Charlie, and I all accepted our offers during the Summer of 1968. Each asked for a lead appointment, which I think worked well with the situation in the Department. For one thing, the new ESS Building wouldn't be completed for quite some months, so there would have been no place to put us or our laboratories. Charlie and Jim arrived in the Fall of 1969, but since I was spending a semester at Cal Tech and wanted time to finish up at the Geophysical Lab, we agreed that I would start a year later, in the Fall of 1970.

Because we are now the Department of Geosciences and also because I was involved only in the recruitment of geologists, this account tells only that part of the story. But Ollie Schaeffer's grand plan for Earth and Space Sciences also involved marine sciences and astronomy, and there was recruitment in those fields as well. It must have been in 1968 that the Department received a Science Development Grant from NSF to build a program in astronomy. As I recall, that grant funded the hiring of one or two astronomers a year for several years; at the end of the grant period, the University was to pick

[1]Throughout this account I have consciously used the term Chairman rather than the more politically-correct Chair. First - that's the term we used then, and second, virtually all department chairs at that time *were* men. My attempt to evoke the flavor of those far-off days should not be taken to indicate a desire to return to them: it doesn't!

Starting ESS IV: Growth Spurt

up all those positions on state lines. All-in-all, the Department made 9 hires in 1968 (although a number were lead appointments)! The 1968 Specula (yearbook) didn't even bother to list the ESS Faculty (or was it that ESS didn't bother to respond to a request?!); 1969 showed photos of 9 faculty (Dodd, Palmer, Schaeffer, Strom, Bence. Smith, Rose, Gross, and Weyl - Hanson must have been away). The 1970 Specula listed 19 faculty in the Department!

Of course, nine hires in 1968 meant a much greater number of recruitment visits and the necessary wining and dining of the candidates. I can't even begin to imagine the demands that were made on the few existing faculty during that immense recruiting effort - especially on Assistant Professors Bob Dodd and Gil Hanson, who were trying to get their research programs going while carrying heavy teaching loads and keeping track of the new building!

From left: Robert Dodd, Allison "Pete" Palmer, Oliver Schaeffer, Steve Strom, Ted Bence. (Photo Coutesy of the 1969 Specula)

Among the geoscience faculty who joined the Department from 1968 to 1970 were Ted Bence, Allison "Pete" Palmer; Pete Rose; Raymond Smith, and two new paleontologists (or, as they preferred to be called, paleobiologists) Peter Bretsky and Jeff Levinton. Astronomers included Toby Owen, Frank Shu, and Michal Simon.

The Department moved into the new ESS Building in 1969 as Jim Papike and Charlie Prewitt joined the team. They were setting up a world-class x-ray crystallography lab but ran into an unexpected snag. They planned for their single-crystal diffractometer to be computer-controlled but Stony Brook's Computer Center was determined to be a monopoly, and there was a strict rule against individuals or even departments possessing their own computers. As a result the purchase order for "Alice" (as the crystallography computer became to be known; she was a PDP-15.) was blocked for a number of months. Charlie and Jim had to submit their resignations before the administration overruled the Computer Center's veto and allowed the order for "Alice" to be placed.

Later on it was determined that "Alice" had excess capacity, so Ted Bence - with immense help from Bill Huebsch and Walter Holzwarth - arranged for the ARL microprobe to be semi-automated and run by "Alice". However, "Alice" was located in the crystallography lab two doors away, and the crystallographers had no compunctions about pushing the "Reset" button if things weren't working properly from their viewpoint. It was, after all, their computer! More than one user of the microprobe discovered that all his or her accumulated data - for both standards and unknowns - was deleted as a result! This problem was alleviated only after Ted Bence successfully fought the Computer Center and obtained a second PDP computer dedicated to the microprobe. As I recall, the initial agreement was that these "private" computers could only run machinery, not crunch the resulting data. The data still had to be submitted to the Computer Center on punch cards for processing. The days of the personal computer were still some years off.

1969 was also the year of Apollo 11 and the first lunar sample return. Ollie was already deeply involved in lunar work, and Jim, Charlie, Ted, and I received a NASA grant to study lunar samples. Lunar samples consisted of "hand samples" and lunar "soil" - regolith. The larger samples were highly sought after, but there weren't very many of them. We learned to request "coarse fines" - 2-4 millimeter grains sieved from the regolith samples. Because these were small and not much desired, we could receive about ten grains from each sampling station, which eventually amounted to about 1000 samples. Yet because most lunar rocks are quite fine-grained, each "coarse-fine" was actually a fairly representative rock sample, and we would split each grain in half, giving one portion to Ollie for mass spectrometry studies, and making a polished thin section - for petrography, microprobe analysis, and x-ray crystallography - of the other. Much of the mass of our half was simply ground away during making of the thin section, and even today there must be a large amount of lunar material in the trap of one of the sinks in ESS Room 229.

Ollie Schaeffer's charge from NASA was to determine rare-gas contents on the lunar samples; age-dating was to be the purview of a certain heavyweight isotoper at Caltech. But Ollie was certainly allowed to measure isotopic ratios of those rare gases, and he soon realized if he irradiated the samples in the Brookhaven reactor he could transform some potassium-39 to argon-39, and that just "happened" to yield an argon40-39 age for the sample! Ollie and his team developed a technique which involved irradiation at Brookhaven and transport of the samples back to Stony Brook while they were officially still too "hot" to be handled. We're told that the car that transported the samples back to Stony Brook - prominently decorated with "Danger: Radioactive" signs - rarely got caught in traffic on the Long Island Expressway. The argon in the irradiated sample was driven off through laser heating and sent to a mass spectrometer, and Ollie's group almost always was the first to publish ages of new Apollo samples. The Caltech heavyweight was reduced to publishing what he called the first "scientific" ages. True, his measurements were more accurate to a couple of decimal places - but I think always within the error of Ollie's already published values.

Starting ESS IV: Growth Spurt

An experimental petrology lab requires lots of machining work, and one of Stony Brook's attractions to me was the superb machine shop being planned for the basement of the new ESS Building - and the superb machinists who would man it. Fred Gwinner headed a team that included Joe Toia and a sleepy-eyed young fellow named Bob Muller. Bob was deceptively mild-mannered and never seemed to be in a hurry - yet he was amazingly productive. I was extremely fortunate that he was assigned to help set up my new lab and keep it functioning. Al Catalano joined the shop a year or two later.

Another new arrival in the Fall of 1970 was Ben Vitale, who joined Bill Huebsch in the electronics shop. For over 40 years Ben and Bill grew with the department, graduating from vacuum-tube technology to solid state electronics and on to automation and information technology. Much of our Department's success in science can be credited to the support of the skilled and dedicated personnel in the shops.

When Ward Melville donated the land on which Stony Brook was built, he evidently envisioned a small liberal-arts college that would serve as a buffer between the mainly well-to-do of the Three Villages and the rest of Long Island to the south. The State, however, had other ideas: it planned to build a major research university - the "Berkeley of the East". Melville's deed of gift stipulated that the buildings be designed in the "colonial style"; state architects responded with a series of dreary pink-brick buildings - dubbed "neo-penal" because the same architects allegedly also designed prisons and reform schools. Someone decided that something had to change. The ESS building in all its poured-concrete glory became the test case for overruling Melville's terms of gift. Somehow the State won, and a new "style" began to dominate the campus.

The ESS Building marked a departure in another way as well, for it was the first campus building that came with its own landscaping. When I arrived in the Fall of 1970, the campus was a sea of mud (something like one-third of a billion dollars of construction was underway!); the ESS building and its finished plaza were a welcome relief from the surrounding turmoil and mess. For better or worse, though, that plaza also became the locus for rallies and protests during those turbulent times. Ollie warned me to call my high-pressure research equipment "pressure vessels", rather than the usual term "bombs". "Bomb" could of course suggest war research - an absolute no-no to the powerful peace movement on campus, and Ollie was concerned that peace activists might attempt to blow up the ESS Building if they thought war research was being done there! I acceded to his request, even though I could never quite fathom the activists' logic.

To give an idea of the turmoil of those long-off days, when I taught my first undergraduate course - petrology - in Spring of 1971, I had seniors who had never taken a final exam, because there had always been riots or protests during what would have been Finals week. They were aghast that I would even think of inflicting a Final on them. I figured that every college grad should experience at least one.

It was not uncommon in those days for the power to fail without warning. Sometimes the cause was a bulldozer severing an underground power line (apparently no one knew or cared where these were), but more frequently the electricians would simply throw a main switch whenever they wanted to connect a new building or make other alterations to the wiring anywhere on campus. This came to a head for me when I was doing some timed experiments on pyroxferroite, a new mineral that had turned up in the Apollo 11 basalt samples. Without going into detail, I was convinced that pyroxferroite must have formed metastably during rapid cooling of the host basalt at the lunar surface, and that if it were held at 900 degrees C for several days it would break down to other minerals. I had carefully separated out 3 pyroxferroite grains from a lunar sample, and was holding them at that temperature, planning to quench them at different times to determine how long it would take for them to decompose to more stable minerals. I had just gotten them up to temperature when the power went out - ruining the timed experiment.

Upon learning that the outage was deliberate but unannounced, I wrote a furious letter to President Toll, stating this action had irreparably damaged three priceless lunar samples, and unless such outages ceased, I could no longer in good conscience accept funds from NASA. I never heard directly back from the president, but something must have happened, because some days later, three workmen (evidently electricians) came to my lab asking if they could see some lunar samples. I obliged - and after oohing and aahing over the samples, one of them asked what the samples were worth. I gave the usual answer in those days of one million dollars per gram (derived by dividing the total cost of the Apollo program by the total mass of samples returned!). Evidently the workmen assumed that each ruined sample must have weighed a gram, because as they left I heard one say to the others "Jeez - we wrecked 3 million dollars!". I didn't bother telling them that each of the ruined samples was in the order of micrograms, not grams! But at least, after that episode, deliberate power outages were (mostly!) announced in advance, a great improvement.

A further advantage of this episode for me was that much of my lab was rewired so as to receive emergency power for the experimental equipment. The ESS Building

Starting ESS IV: Growth Spurt

was designed shortly after the great East Coast power outage of 1965, and stories of people being stuck in Manhattan elevators for very long periods were still fresh in folks' minds. Ollie cleverly took advantage of this by suggesting the building be equipped with an emergency generator, so people wouldn't get trapped in the elevator during outages. But with typical Schafferian ingenuity, he assured that the capacity of the generator was considerably more than needed for the elevators alone, and would therefore be available for equipment as well!

Ollie Schaeffer was not a strong believer in democracy - at least in his Department. Bob Dodd has told us that in the early days, Ollie would try for consensus in faculty meetings, but if he sensed he might be outvoted, he would say "We don't need to decide this right now." As the faculty grew, Ollie relied less and less on faculty meetings, and more on an executive committee, which consisted of "coordinators" who would represent various segments of the faculty. By the time I arrived in 1970, there were four coordinators who represented the various interest groups among the faculty. Although the names of these groups changed from time to time, they were broadly hard-rock geology, soft-rock geology, astronomy, and (for a short while) marine science. As Bob also related earlier, I learned as hard-rock coordinator to keep my wallet pocket tightly buttoned in meetings, for otherwise I might inadvertently compromise not only my own interests but those of the folks I represented: Ted Bence, Bob Dodd, Gil Hanson, Jim Papike, and Charlie Prewitt. One day the coordinators decided that some issue was too important for us to decide alone, and we insisted that Ollie call a full faculty meeting to discuss it. Somewhat to our surprise, Ollie agreed; but when we went to the meeting we found that he'd invited the entire departmental staff and grad students as well. Nothing substantive could be accomplished. We dubbed it "Ollie's tea party" - and realized he'd never risk letting the whole faculty make any important decisions.

From Bob Dodd's accounts as well as my own, it is clear that Ollie Schaeffer led more as a department Head rather than as a Chairman - with the important proviso that his preferred method of getting his way was by persuasion rather than by fiat. In a very few years he had built the nucleus of a notable department, and I'm not at all sure that anyone else could have done it so well as he did. While the department evolved away from his original vision, he deserves great credit for establishing what today is the Department of Geosciences as well as today's program in astronomy in the Department of Physics and Astronomy.

The Fall Food Festival

Photos by Heidi Jensen

Geology Club Conquers Another Year

By Warren Porter

In 2011, the Geology Club reached new heights with a variety of activities both near and far! The Geology Club membership has remained steady at about two dozen members and has attracted a diverse array of students from many different disciplines. Geology Club activities in 2011 ranged from viewing on-campus lectures to stargazing in extreme eastern Long Island to exploring the mountains of West Virginia. In each of these activities, club members experienced the wonders of the natural world.

Our first activity of the year came in March when we attended the Provost's Lectures given by Dr. Dan Davis & Dr. Malcom Bowman regarding the devastation wrought on northeastern Honshu by a magnitude 9.0 earthquake and subsequent tsunami. These lectures provided many of our members with important context regarding the recent natural disaster as well as the insight needed to understand the risk associated with earthquakes.

The following month definitely proved to be the most exciting. In April, the Geology Club benefitted from resources provided by the Undergraduate Student Government and the Department of Geosciences to travel to West Virginia's Allegheny Mountains. In West Virginia, the club visited Monongahela National Forest and traversed a massive Tuscarora Quartzite formation utilizing a "Via Ferrata". "Via Ferrata", which means "iron road" in Italian, is a method for traversing mountainous terrain quickly and was invented by Italian Soldiers fighting in the Alps during World War I. The Via Ferrata system consists of a series of chains and cables nailed into a rock wall; this system assists climbers as well as catches anyone who might accidentally fall. In addition, the club went to Greenbrier County, West Virginia, which features karst topography; we spent an entire day spelunking in a massive subterranean cavern located in Greenbrier County. Unlike previous caving trips, we spent over four hours underground inserting our bodies into smaller and smaller crevices far beyond the reach of civilization or any light source other than our headlamps.

Despite the excitement of the trip to West Virginia, the club still had enough energy to carry on with annual traditions such as erecting tables at Earthstock and the Shirley Strum Art Festival. The club also competed in the Roth Regatta with a boat modeled after the BP oil rig that we christened the "Shallow Water Horizon". The Regatta's theme was "Superheroes & Super villains". I'll leave it to the reader to decide where our craft fits.

Not to be outdone, the club resumed in the fall with renewed excitement. In October, we joined Dr. Hanson on a field trip to Wildwood State Park in Wading River. At Wildwood, we learned a great deal about Long Island's local geologic history, which is intertwined with glaciation events that occurred throughout the Pleistocene. In November, we took the opportunity to travel once again to Custer Observatory in Southold to observe the Leonid Meteor Shower as well as other extra terrestrial objects including Jupiter, the Galilean Satellites, the Andromeda Galaxy and the Orion Nebula.

This year, the club also finished our project conducted in association with the Sweet Briar Nature Center in Smithtown. This not-for-profit organization devoted to educating young minds in the natural sciences now owns a permanent exhibit put together by the Geology Club. The exhibit features rocks and minerals that were either donated to us or obtained on one of our trips and includes accompanying information about those specimens.

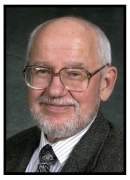
This upcoming year, the geology club has plenty of plans. We hope to revisit the Franklin Mineral Museum in Franklin, New Jersey. We also hope to take a trip to the Catskills as well as to a state park in Connecticut that features Dilophosaurus tracks created 200 million years ago during the Jurassic period.

If you want to stay up-to-date with the latest geology club news, join our group on Facebook. In order to join our Facebook group, simply enter "Stony Brook Geology Club" in the Facebook search bar. The Stony Brook Geology Club can also be contacted by e-mail at sbu.geo.club@gmail.com.

Geoscience Faculty in Residence

Daniel Davis, Professor
Geophysics, tectonics, analog modeling.

Timothy Glotch, Assistant Professor
Planetary geology, remote sensing, Martian surface mineralogy.



Gilbert Hanson, Distinguished Service Professor
Environmental geochemistry, geology and hydrology of Long Island.

William Holt, Professor
Tectonophysics

Robert Liebermann, Distinguished Service Professor
Mineral physics, solid earth geophysics.

Donald Lindsley, Distinguished Professor Emeritus
Geochemistry, petrology.

Scott McLennan, Professor
Geochemistry, crustal evolution, sedimentary petrology.

Hanna Nekvasil, Professor
Experimental mineral/melt equilibria, planetary petrology.

Artem Oganov, Professor
Computational crystallography, high-pressure mineralogy, computational materials design.

John Parise, Distinguished Professor
Crystal structure-property relations, solid state synthesis.

Brian Philips, Professor
Mineralogy, low-temperature geochemistry.

Troy Rasbury, Associate Professor
Sedimentary geology and geochemistry, geochronology.

Richard Reeder, Professor and Chair
Geochemistry and mineralogy relating to near earth's surface processes.

Deanne Rogers, Assistant Professor
Planetary geology, remote sensing.

Martin Schoonen, Professor
Geochemistry of sulfur and sulfides, hydrogeochemistry, catalysis.

Michael Sperazza, Assistant Professor
Paleoclimate change over the Pleistocene and Holocene.

Christiane Stidham, Lecturer
Crustal seismology and tectonics, natural hazards.

Donald Weidner, Distinguished Professor
Mineral physics and the earth's deep interior.

Lianxing Wen, Professor
Seismology, geodynamics, global geophysics and planetary sciences.

Teng-fong Wong, Professor
Rock deformation and fluid flow, physical properties of geomaterials.

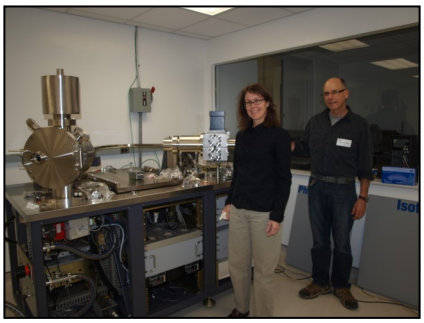
Renovations and Re-renovations in the ESS Building

Owen Evans, Director of Labs

There's a parallel to be drawn between the dated foundation stone of the Earth and Space Sciences Building and the community of people and activities that comprise the Department of Geosciences. Set in place in 1968 to officially mark the opening of another building on a growing campus, the foundation stone is remarkably unchanged by the intervening decades. In a similar fashion, the educational and research activities carried out by the faculty, staff, and students of the Department of Geosciences exemplify the same vibrancy, innovation and accomplishment as their predecessors who first occupied the building.

Unfortunately, there's also a parallel to be drawn between the concrete pedestal that houses the foundation stone and the Earth and Space Sciences Building that hosts our creative and intellectual endeavors. Both the building and pedestal show much evidence of wear and tear resulting from years of neglect. So much rainwater has leaked in through the building exterior that dissolution and reprecipitation of calcite and gypsum are widespread on the inside. The current occupants of the building have even been heard to joke about our ongoing building-wide experiment in water-rock interaction.

The good news is that the State University of New York Construction Fund and the local Campus Planning Design and Construction group are actively bringing this experiment to an end. We are in the midst of a multi-million dollar renovation project to repair the entire building "envelope". Most of the roofs have already been replaced and we're about half way through replacing all 598 windows. Water-damaged interior walls are also being refinished. Restoration of expansion joints and application of a water repelling agent to the concrete will bring the job to completion in about 12 months.



Troy Rasbury and Gary Hemming during installation of new mass spec

One of our foundation laboratories is also approaching completion of a major renovation and upgrade. Gil Hanson's mass spectrometry lab is now the domain of his former student, Professor Troy Rasbury. Led by Kirk Cochran (School of Marine and Atmospheric Sciences), and in collaboration with her brother in law Gary Hemming (another former PhD student of Gil's), the group was awarded funding for two new mass spectrometers. The lab was emptied and gutted and a completely new interior constructed to host our new state of the art analytical instruments. The first of the new mass spectrometers, an Isotopx Phoenix62 thermal ionization machine, was delivered on August 19, 2011.

Our parallel renovations proceeded smoothly until October 10, 2011 when they collided in catastrophic fashion. Certification of the Isotopx machine had just been completed, and Troy and Gary were running their first independent analyses. The same afternoon, contractors were applying "torch down" roofing materials to the roof above the lab. Torch down refers to use of a propane torch to accomplish a thermal welding of adjacent and overlapping rolls of roofing material. Unbeknownst to the roofers, they inadvertently ignited some of the underlying insulation materials before they finished up for the day in mid-afternoon. Like the Centralia, Pennsylvania coal fire, the unseen embers smoldered their way along for almost 7 hours before they encountered one of the fume hood exhaust duct penetrations rising through the roof from the mass spectrometry lab below. There, in the presence of an increased draft, the embers burst into flame and started to burn the roof in earnest. Air flow from the space below drew the flame and smoke down around the outside of the duct and fed a steady and thick plume of soot-laden smoke into the lab. What wasn't damaged by the smoke suffered collateral damage from the exertions of the local firefighters who extinguished the blaze. Our beautiful new lab and brand new mass spectrometer were in ruins.

Photo courtesy of Christine Sampson/Three Village Patch

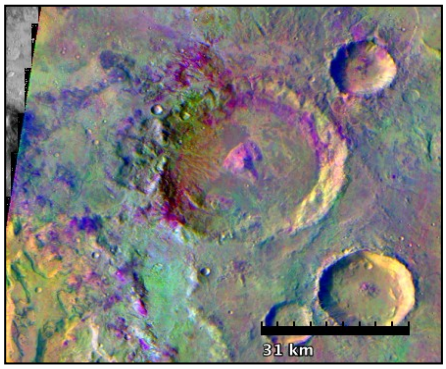
Now, 5 months later, with terrific support from the Research Foundation and Campus Planning Design and Construction, the lab has been restored again and a replacement mass spectrometer is about to be certified. Troy and Gary eagerly await the acquisition of high precision data. Our renovations are back on track and we're all ready for the dust, shuffling of spaces, and sounds of construction to become a memory. There won't be long to enjoy the quiet though – renovation of the grounds around the building are hoped to begin sometime in 2013. Why don't you come for a visit to see for yourself what has changed and what remains the same? If you like, contact the Geosciences Main Office and we'll help you with the details.

Meet New Faculty Member Deanne Rogers

Greetings alumni and friends,

Though I have enjoyed being part of the Geosciences Department for the last few years, I am especially delighted about joining the faculty and having the chance to expand my research group. A little background about me: I grew up in South Carolina, and completed my B. S. degree in Geology at the College of Charleston. After working at NASA Goddard Space Flight Center for a year, I started my graduate studies in geology at Arizona State University. My M.S. and Ph.D. theses focused on understanding the evolution and alteration of Martian crustal materials using infrared data collected by the Mars Global Surveyor and Mars Odyssey missions. While I was a graduate student, I was lucky to have the opportunity to participate in the Mars Exploration Rover missions, working on operations and data analysis for the Miniature Thermal Emission Spectrometer instruments on the rovers. In 2005, I finished my Ph.D. and began postdoctoral studies at the California Institute of Technology. I joined the Stony Brook Geosciences Department in 2007 as a research faculty member, and in fall of 2011 I started a tenure track faculty position. I teach Natural Hazards and I've developed undergraduate and graduate-level remote sensing courses.

The central research objective of my group is to understand the volcanic, aqueous and sedimentary history of planetary surfaces, with a current focus on Mars. This is accomplished via two types of activities: 1) analysis of measurements from both orbiting and landed spacecraft, and 2) characterization of the spectral properties of rocks and minerals in the laboratory, to facilitate interpretation of planetary surface spectra acquired remotely. I am presently building an Earth and Planetary Remote Sensing Laboratory (and will forever be grateful to Owen Evans for single-handedly renovating the lab space!) that consists of high-end computer workstations and a hand-held infrared camera for field studies. This facility complements existing experimental geochemistry, petrology and vibrational spectroscopy laboratories already used for Mars fundamental research here in the Department.



False color infrared image of crater on Mars

One example of our current research involves analyses of crater central uplift materials on Mars. Because infrared measurements sense only the upper ~cm of materials, it is not easy to constrain the composition of rocks at depth, except where exposed by geologic processes such as faulting, fluvial erosion, or impact cratering. The image to the left shows a false color infrared image of a ~40 km diameter impact crater in the ancient highlands of Mars. The peak in the center of the crater consists of materials that were uplifted from ~4 km depth during the impact process. In this false color image, the bright purple hue associated with the central uplift, crater walls, and ejecta is due to a relatively high abundance (~20%) of olivine; it is distinct from surface materials that surround the crater. Detailed analyses of this and other crater uplifts will be used to probe the composition of the Martian subsurface and test hypotheses about the formation of the crust.


Rogers' group in the Earth and Planetary Remote Sensing Lab. Left to right: graduate student Cong Pan, undergrads Kaitlin McIntosh and Marta Sowinski, Rogers, and postdoc Craig Hardgrove

In the last year or so, my research activities have also included remote sensing of Earth for both planetary and environmental applications. For example, using AVIRIS (an airborne imaging spectrometer) data, we have been mapping the spectral properties of lava flows and soils within the Mauna Iki flow field in Hawaii. By comparing the remote sensing information with mineralogical analyses of collected samples, we are better able to understand the spectral effects of weathering on basaltic surfaces and apply that knowledge to Mars. Another area of interest includes exploring the potential for using infrared remote sensing to monitor dust emission susceptibility from major sources such as dry lakebed deposits. Because airborne dust plays a significant role in radiative forcing of global climate, and is harmful to human health, this monitoring capability would be an advance for predictive climate models that incorporate and quantify dust fluxes from point sources and might be used to provide an early warning for the potential for environmentally hazardous dust storms. Please refer to my website (http://aram.ess.sunysb.edu/drogers/) for a description of our other ongoing projects.

Deanne Rogers

Alumni Focus: Janet Kaczmarek (BS '92, MS '06)

Janet Kaczmarek (nee Niebling) earned a BS in Geology in 1992 and later a MS degree in Geology (2006) under the supervision of Professor Gil Hanson. Janet has been a science teacher at Sayville High School since 2000, as well as a Stony Brook University Geology 121 research mentor. Some of her favorite memories are with faculty and students from the Department that date back to 1990, and she still maintains a close connection with the Department today. Janet told us, "the Earth and Space Sciences Building is like a second home and will always be a very special place for me."

Janet remembers that Geology Club, for which she served as Vice President and President in 1991 and 1992, was about having fun outdoors while checking out the local geology: "If members were not working on the endless Mineralogy, Structural Geology or Petrology labs, we were completing a 3 day, 30 mile hike on the Appalachian Trail or whitewater rafting on the Delaware River." Kaczmarek's ultimate undergraduate experience was 10 weeks of Field Camp just outside of Jackson Hole, Wyoming.

While a geology graduate student, Janet spent much time as a Teaching Assistant (TA) and received the TA Award in 1993. She ultimately switched her goal from a career in the Environmental Sciences to a career in teaching. In 1996 Janet was hired by the Center for High Pressure Research as an Educational Specialist in the Earth Science Educational Resource Center. One of her duties was to help mentor high school students from Sayville complete research projects as partial fulfillment for Stony Brook's Geology 121 course. Ironically she still continues with this duty today.

Kaczmarek acquired her NYS Teaching Certifications in Earth Science and Chemistry and began teaching at Sayville High School in 2000. As a Honors and Regents Earth Science teacher, Kaczmarek tries to "incorporate her many lab and field experiences into the classroom environment." She encourages all her students to attend the Friday evening "Open Nights". Each year Janet mentors a new group of sophomore students enrolled in SBU Geology 121 course.

In Spring 2006 and 2007 Janet participated in the Research Experience for Teachers project conducted at the Center for Environmental Molecular Science at SBU. This project provided GEO 121 students the unique opportunity to have their research samples run and analyzed at the National Synchrotron Light Source (NSLS) in Brookhaven National Lab (BNL). Using a web-based videoconferencing system set up in the high school classroom, students were able to view and participate in experiments performed at the beamline by Kaczmarek with the assistance of NSLS personnel and SBU and BNL educators and graduate students, without stepping foot in BNL. The photo above shows Janet working at the beamline. Kaczmarek's future access to NSLS beamlines will be through the BNL Office of Educational Program's project called "Introducing Synchrotrons into the Classroom." This year, one of her students' GEO 121 research project will be using the NSLS to run samples of Great South Bay sediments for heavy metals, such as lead and arsenic.

Janet continues to attend workshops and programs hosted by the Department of Geosciences and Brookhaven National Lab Open Space Stewardship Programs, and by Science Teachers of New York State. Here in Geosciences, we're delighted that she's maintained such a close relationship with the Department.

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