STONY BROOK UNIVERSITY

Department of Geosciences

2013 Year in Review

Stony Brook University

Letter from the Chair

In 2013, Rich Reeder stepped down after a very successful term as Chair, passing the baton on to me, Dan Davis. Rich will be a hard act to follow…

We look forward to 2014 with excitement, with new faculty searches underway, continued upgrading of our course offerings, and exciting new research directions. A particularly exciting new direction comes with the announcement of a new NASA institute called RIS4E (Remote, In Situ, and Synchrotron Studies for Science and Exploration, pronounced "rise"). Part of NASA's Solar System Exploration and Research Virtual Institute program, RIS4E will be led by Professor Tim Glotch.

The keynote speaker at the Department's May Graduation Ceremony was alumnus Stephen Terracciano (MS '76). Stephen, Chief Hydrologist at the US Geological Survey in Coram, gave the new graduates and their families an interesting perspective on his experiences at, and since, his time at Stony Brook. Graduating senior Jerome Varriale received the Oliver Schaeffer Award, which recognizes both academic achievement and departmental service. Another award honoring the department's founding chairman, Ollie Schaeffer, is the endowed scholarship in his name. That scholarship, supported by Professor Robert Warasila (Ph.D. '76) and the Schaeffer family, was awarded to junior-year Geology major Erick Wright. Ollie Schaeffer's son, George Schaeffer, is pictured at right with Rich Reeder. The David E. King Field Work Award, which is made possible through the generosity of David E. King (MS '84), was awarded to first year graduate student Steven Jaret to support his field research in the Ries impact crater in Germany. Steven's report on a much closer-to-home field trip is found on page 7. The award for excellence as an undergraduate TA went to Christopher Grady, and Katherine Schwarting was our Banner Bearer at the University graduation ceremony. We had a very strong graduating class of a dozen GEO and ESS majors. Graduating magna cum laude, Han Byul Woo was what in geology we call an 'eruption' - that, after all, is what happens when magma comes loudly… In addition to our graduating seniors, we had three graduates in our MA in Teaching in Earth Science program, eight graduating with an MS in Geosciences, and two (Andrea Harrington and Qiang Zhu) graduating from our Ph.D. program. Qiang Zhu also received the President's Award to Distinguished Doctoral Students, a high honor indeed.

In this year's issue of the Geosciences Year in Review Professor Bob Liebermann recounts the early history of the development of mineral physics at Stony Brook. At the American Geophysical Union conference last December, Bob was awarded the Edward A Flinn II award, given each year to an 'unsung hero' who personifies 'unselfish cooperation in research'. On page 8 of this issue Professor Scott McLennan brings us up to date on the Mars Rover Curiosity and our department's close links to NASA's Mars program. Scott was recently lead author of a special report, in the journal *Science*, on results from that highly successful rover. With the advent of the RIS4E center here in the Department of Geosciences, our department's links to exploration of the solar system, dating back to Project Apollo, are destined to grow even stronger over the coming years.

-Dan Davis (daniel.davis@stonybrook.edu)

We love to hear from you. Please continue to let us know what you're doing!

Bob Liebermann: *My Life as a Mineral Physicist at Stony Brook: 1976-2013*

Introduction:

In March 2013, I was invited to give the keynote address at the Final Symposium of G-COE and TANDEM program at Ehime University in Matsuyama, Japan in March 2013. I chose that opportunity to reflect on my career in mineral physics with the title: "Mineral Physics and Bob-san from 1963 to 2013: Role of Serendipity." When Jay Bass heard of this talk, he recommended that I be asked to reprise this talk after the banquet at the 2013 Annual Meeting of COMPRES at Lake Geneva, Wisconsin in June 2013; I modified the title for the U. S. audience: "Role of Serendipity in My Career in Mineral Physics: 1963 to 2013." In October 2013, Dan Davis [the new Chair of the Department of Geosciences] invited me to give this talk at the weekly Geosciences Colloquium and later to adapt it for the Geosciences Newsletter. This article is the result and focuses on my life in mineral physics at Stony Brook from 1976 to the present.

Before Stony Brook

After being an undergraduate in geophysics at Caltech and obtaining a PhD at Columbia University under Orson Anderson, I spent 6 years at the Australian National University [ANU] in Canberra working in the high-pressure laboratory of Ted Ringwood. When I decided to explore the opportunities to return to the U. S. to a tenure-track faculty position, I was fortunate that the Department of Earth and Space Sciences at Stony Brook was conducting a faculty search led by Don Weidner, who was open-minded enough to consider hiring another mineral physicist.

Start of my career at Stony Brook [1976 to 1983]

I arrived in December 1976, shortly after the birth of our third child [two of whom are Australians] and was welcomed by the faculty, graduate students, and staff. Several of the senior graduate students of Prewitt and Weidner [Alan Kafka, Hubert King, Louise Levien, and Mike Vaughan] took me under their wing and "taught" me how to become a faculty member. When the Provost Sei Sujishi learned that my first proposal to NSF Geophysics [which I wrote while still in Canberra] had been approved for funding, he immediately freed up the start-up funds which enabled me to place an order for a 500-ton hydraulic press from Harwood Engineering and a girdle-anvil, high-pressure apparatus from Pressure Systems Research. This equipment was delivered in September 1977 and installed in Room 375 of the ESS Building with the help of Tony Vidmar [our new technician] and Alan Major [consultant from Ringwood's lab at the ANU]. Vidmar and I had been flown in Fred Gwinner's plane to Boston to visit the Harwood factory to assess the needs for installing the new press [Fred was foreman of the departmental Machine Shop]. On our return to campus, we had to educate the Facilities and Engineering unit at Stony Brook about the difference between weight/force and pressure, as they were nervous about installing such a heavy press on the third floor.

In Spring 1977, I served on the Graduate Committee and had a chance to get an early look at the applications for Fall 1977. We were successful in recruiting Paula Davidson from Brown University, with lobbying from Louise Levien and as

Bob and technician Tony Vidmar contemplating how to bring the press to upright position

Al Catalano [machinist extraordinaire] and Alan Major from ANU with Tony Vidmar checking hydraulic connections.

Bob Liebermann: *My Life as a Mineral Physicist at Stony Brook: 1976-2013*

the result of a return visit to campus by Paula. I learned that Jay Bass was unhappy at Arizona State University and looking for a new institution to continue his Ph.D. studies. I contacted Jay and invited him to apply to our Department. He did, and arrived in August 1977 with Davidson. Although both Paula and Jay ultimately decided to pursue their doctoral dissertations under the supervision of other Earth Science faculty [Don Lindsley for Paula and Don Weidner for Jay], I have always taken a special pride in helping to recruit them to Stony Brook.

My first teaching experience at Stony Brook was in the Spring 1977 semester, in which I offered ESS 607: Topics in Geophysics; I chose to adapt my informal lectures on "solid-state geophysics" from the ANU and enjoyed having Robin Reichlin and Doug Anderson in the class [along with Kafka, King, Levien and Vaughan who sat in for moral support]. This course was modeled after one I took from Orson Anderson at Columbia in the 1960s [and which later evolved into his book "Equations of State of Solids for Geophysics and Ceramic Science"]. In Spring 1978, this course was approved as ESS 556: Solid State Geophysics; over the next 35 years, I have taught this course another 13 times and profited from having an outstanding series of geophysics and geochemistry graduate students enrolled. For my last class in Fall 2013, the students were among the best in 36 years; perhaps because they were all women.

The period 1976-83 was an active period of recruiting new faculty in geophysics by Don Weidner and me. We were very fortunate that the strong geochemistry group stepped back and allowed the new geophysics program to reach maturity. During this period, many new geophysics faculty were hired, some of whom stayed to pursue their careers [Teng-Fong Wong and Dan Davis] while others moved on to other institutions [Brad Hager, Jay Melosh, Rob Comer, Cliff Thurber]. The addition of Wong and Davis expanded the research programs in experimental geophysics, while the later appointments of Bill Holt and Lianxing Wen opened up new opportunities in global geodynamics and seismology.

Most significantly, Ann Lattimore joined the group as an Administrative Assistant in the mineral physics group in the early 1980s and served with distinction for the next 25 years until her retirement in 2007. While my own research laboratory was in its infancy, I profited by collaboration with a series of visiting scientists who came to the Brillouin spectroscopy laboratory of Don Weidner to measure the elasticity of single crystals of mantle minerals which they had synthesized in their home laboratories, including Eiji Ito, Hiroshi Sawamoto, Nozumu Hamaya and Akira Fukizawa. When Don published his new elastic moduli of single-crystal SiO_2-coesite, he included ultrasonic sound velocity data which I had obtained on a polycrystalline specimen at the ANU. As his first research project at Stony Brook, Jay Bass engaged a junior faculty member in the Department of Applied Mathematics in an investigation to obtain the elastic properties of minerals from joint inversion of data from acoustic and static compression experiments.

My first graduate student, Barbara Leitner, synthesized a single crystal of pyrope garnet in Don Lindsley's petrology lab and measured its elastic properties in Weidner's Brillouin lab for her M.S. thesis project. In collaboration with Charlie Prewitt and his postdoc Satoshi Sasaki, we documented the crystal structure of $CaGeO_3$-perovskite using a specimen synthesized in my lab at the ANU. During this same period, Susan Narbut and Ann Sirinides completed their M.S. theses in my laboratory. A separate project on attenuation and dispersion in anelastic materials pursued by Ann Singer was not successful but during my sabbatical in France in 1983-84 supported the anelasticity grant from the NSF, I published a theoretical paper with Jean-Paul Poirier on the activation volume for creep and its variation with depth in the Earth's lower mantle.

Ann Lattimore with Don Weidner and Bob on the occasion of her retirement in 2007

When I visited Stony Brook for an interview for a faculty position in 1976, the Chair Pete Palmer asked me what my plans for conducting geophysical surveys of Long Island; I think that Pete was disappointed when I told him I had no such plans. However, a few years later, the U.S. Nuclear Regulatory Commission, which was funding a Northeast Seismic Network to monitor local earthquake activity, invited Weidner and me to acquire seismic monitoring equipment and install it on Long Island where the Shoreham nuclear plant was scheduled to open shortly. Over the next 5 years, we operated seismic stations in the Mashomack Preserve on Shelter Island and in the Caumsett State Park on Lloyd's Neck. For their M.S. thesis research, Ellyn Schlesinger conducted a seismic noise survey on Long Island and Richard Wilkinson conducted an intensi-

Bob Liebermann: *My Life as a Mineral Physicist at Stony Brook: 1976-2013*

Hiroshi Sawamoto and Akira Fukizawa with Don Weidner and Bob Liebermann during their visits to Stony Brook to measure the elasticity of single crystals in Weidner's Brillouin spectroscopy laboratory, using specimens synthesized in their home laboratories in Japan. Other visitors with crystals included Nozomu Hamaya and Eiji Ito.

ty survey to confirm the location and focal mechanism of an earthquake that occurred beneath Long Island Sound near Greenport in October 1981. When Neville Carter left for Texas A&M, Teng-Fong Wong and I inherited his liquid pressure system, which led to an M.S. thesis by Tom Ruubel measuring velocities in natural rocks from the Ramapo fault system. While the pursuit of this local seismology project diverted some resources from our other funded projects [including important contributions by Kafka, Leitner and Vaughan], it gave us an opportunity to engage a series of undergraduates in research; these included Emanuel Caiti, Claire Teuten, Linda Gunderson, Thomas Caruso and Kirk Maasch, as well as Noel Barstow [a structural geology graduate student], Schlesinger, and Wilkinson. We also occupied temporary seismic stations, including one in the Morton Wildlife Refuge on Jessup Neck [accessible only using Mike Vaughan's canoe]. One of our helpers in this field work was a paleontology graduate student who insisted that we purchase deer tick collars to protect him from Lyme disease.

As described in detail below, the Stony Brook mineral physics mafia [Liebermann, Prewitt and Weidner] submitted a major instrumentation proposal to the NSF Earth Sciences Division in August 1983 for a new generation of high-pressure apparatus. I then departed for France for a year-long sabbatical leave, my first at Stony Brook. I was lodged at the Université Paris XI in Orsay, outside Paris, with the research group headed by Olivier Jaoul; we commenced a study of atomic diffusion of Fe and Si in olivine at high pressure, which evolved to a 20-year collaboration driven primarily by a series of graduate students and postdocs [Yves Bertran, Paul Raterron, Frédéric Béjina]. As we were not able to transfer our family to Tokyo in January 1984 due to the lack of appropriate accommodation for our "large" family [us and three kids under age 15], we decided to remain in the Paris region and Jean-Paul Poirier generously provided some financial support; this led to a strong collaborative effort focused using transmission electron microscopy to understand the mechanism of phase transformations in minerals at high pressures [driven by postdocs and visiting scientists Jannick Ingrin, James Boland, François Guyot, Isabelle Martinez, Laurence Galoisy] who worked with our graduate students Anne Remsberg, Yanbin Wang and Gabriel Gwanmesia.

Establishment Stony Brook High Pressure Laboratory and evolution to CHiPR and COMPRES: 1984 to 2013

From 1964–1969, I was a graduate student at the Lamont Geological Observatory of Columbia University in both seismology and mineral physics. The first Japanese mineral physicists whom I met at Lamont were Naohiro Soga and Mineo Kumazawa. In 1971, as I was attending the International Union of Geodesy and Geophysics [IUGG] Congress in Moscow and making an academy exchange visit to Czechoslovakia, Ringwood encouraged me to visit the high pressure laboratories in Japan en route back to Canberra. Guided by Soga and Kumazawa, I spent ten days visiting labs in Tokyo, Nagoya, Kyoto and Osaka.

In 1976, Syun-iti Akimoto and Murli Manghnani initiated the series of U.S.-Japan High Pressure Seminars. Tours of the high pressure laboratories of Mineo Kumazawa in Nagoya, Syun-iti Akimoto in Tokyo, and Masao Wakatsuki and Osamu Fukunaga in Tsukuba followed the seminar at Hakone. This opportunity to see the state of the art in high pressure science and technology motivated us to establish the first modern multi-anvil, large-volume, high pressure laboratory outside of Japan.

From 1981-1983, I served on the geophysics panel in EAR and learned early about the decision to create a new program in Instrumentation and Facilities with Alan Gaines as the first Program Director. We [Liebermann, Prewitt and Weidner] decided to submit a proposal for a modern, multi-anvil, high-pressure lab modeled on those in Japan. Our proposal was one of 52 submitted, but the only one in mineral physics/high-pressure; most others were for electron microprobes, mass spectrometers or computers.

Bob Liebermann: *My Life as a Mineral Physicist at Stony Brook: 1976-2013*

Installing USSA-2000 in the High Pressure Laboratory in December 1985. The building had originally been a cooling tower and had fallen into disuse. Charlie Prewitt "discovered" it and we were able to convince the university to renovate it to house the new multi-anvil, high-pressure apparatus in 1985. The installation on Dec. 4, 1985 was recorded by Channel 55 News in New York City, who asked us to halt the installation until their cameraman could arrive; this required us to instruct the crane operator to hold the heavy press in mid-air for a half hour.

With funding approved by IF in late 1983, we began to consider the options for acquiring high-pressure apparatus for our laboratories at Stony Brook University. We considered obtaining "surplus" apparatus from various industrial and government laboratories, but were cautioned against doing so by Charlie Sclar and Taro Takahashi because of concerns about the operating costs of machining cell assemblies, etc.

By the mid-1980s, most of the new developments in multi-anvil, high-pressure apparatus had become concentrated in Japan. In summer 1984, we went on a "shopping trip" to companies and laboratories in Japan to search for high pressure equipment, including Tokyo, Tsukuba, Nagoya, and Misasa.

We decided to import two different types of high pressure apparatus to Stony Brook: (1) a DIA-type, cubic-anvil apparatus modeled after MAX-80 at the Photon Factory (PF) in Tsukuba and named SAM-85]; and (2) a Kawai-type, 2000-ton uniaxial, split-sphere apparatus modeled on the 5000-ton version in the laboratory of Eiji Ito and named USSA-2000.

Team of Gabriel Gwanmesia, Osamu Shimomura, Anne Remsberg, Yosiko Sato, Tibor Gasparik and Charlie Prewitt with author after installation of SAM-85 [named for Shimomura and Osamu Fukunaga, who designed the apparatus].

We were fortunate in the expenditure of that funding when the value of $1.00 US went from 110 Yen in 1984 to 250 Yen in 2005 when we submitted the purchase orders, thanks to the financial policies of the Reagan administration.

Consultation among first users of SAM-85: Jannick Ingrin, Anne Remsberg, Hisao Kanda, Tibor Gasparik and Gabriel Gwanmesia.

In the summer of 1985, SAM-85 was installed initially in Room 375 with the guidance and assistance of Osamu Shimomura and Yosiko Sato. One of the first experiments in SAM-85 was the synthesis of artificial diamond by Hisao Kanda. In December 1985, the USSA-2000 apparatus was installed in a new High Pressure Laboratory at Stony Brook, which had been an old cooling tower (discovered by Charlie Prewitt), and had been refurbished with the financial and logistic support of Stony Brook University. During these installations, we profited from the guidance and advice of many Japanese colleagues. From 1985 to 2002, Tibor Gasparik [Stony Brook Ph.D., 1981] served as the Manager of the High Pressure Lab, with Bob as the Director.

There is more to the story, but for that we will have to wait until next year's newsletter.

Geology Students out in the Field

Structural Geology students examine a thrust fault near Catskill, NY

The department looks for every opportunity to offer students experience in the field. Because of where we're located, the most readily available field sites are in the glacial deposits of Long Island. Going elsewhere can be expensive – but with help from generous alumni and friends we can offer our students some wonderful field opportunities

The main classes in which our undergraduates get field experience are our courses in Mineralogy, Structural Geology, Sedimentology & Stratigraphy, and Field Geology. Last spring, Brian Phillips' Mineralogy course travelled upstate and in the spring, the Structural Geology class spent a weekend looking at Taconic and Acadian thin-skinned folding and thrusting near Kingston and Catskill New York. This fall, Troy Rasbury's Sed-Strat class visited classic sedimentary structures in the Ordovician Austin Glen Formation, near Poughkeepsie, NY. They also explored the sediments of Hither Hills on Long Island's south shore, where there is a push moraine – a kind of small-scale tectonics due to a glacial push during the most recent ice age. Other students working with Gil Hanson and Dan Davis have been doing geological and geophysical fieldwork in and around the Stony Brook campus.

This October, a group of eight students participated in the annual New England Intercollegiate Geological Conference (NEIGC). Since 1901 (except for the years during World Wars I and II), NEIGC has run a series field trips throughout New England designed to show and discuss bedrock and surficial geology of the area with particular focus on getting students out in the field. The trips are known for being exceptionally well run, both logistically and scientifically.

Steven Jaret reports that:

This year's trips certainly lived up to their reputation. Our group, six undergraduates and two grad students, braved Columbus Day traffic and an 11-hour drive to Millinocket, Maine for two days of field trips. Our first day was an overview through the recently identified Chester Shear Zone. Cross-cutting relationships and Ar-Ar geochronology suggests that this small shear zone post-dates the dominant Acadian folding. This trip, led by a group from Indiana University, highlighted the small-scale structures across the shear zone.

The second trip was to look at Ordovician fossils in the Shin Brook Formation on Sugarloaf Mountain near Shin Pond, Maine. After a beautiful drive through the Maine countryside we proceeded to hike up Sugarloaf Mountain to an excellent exposure of tuffaceous sandstones with excellently preserved bracciopods. The interpretation here was that the bracciopods died in place and were preserved in volcanic ash as the Iapetus Ocean was closing. We then continued to the top of the mountain for incredible views of nearby associated mountains, including Mt. Katahdin, the tallest peak in Maine. From the top you could clearly see the linear chain of peaks formed during subduction associated with closing of the Iapetus.

This trip was enormously fun, but it was also a great learning experience as a student. All of us saw at least one thing which we had heard about in classes but had never seen in the field. We also got to interact with students and faculty from other schools, and we certainly benefited from two days of hearing geology from local experts. Most importantly, this was a chance for us to see a geology that is not easily accessible on Long Island. We all learned a lot! The eight of us are extremely grateful that the department encouraged and supported our participation and we look forward to future field trips. Whoever see the most rocks wins!

Chester Shear Zone exposures along the Penobscot River. From left to right: undergraduates Stacey Rice, Meredith Kraner, Peter Humphrey, Alyssa Armour, Gavin Piccione, and Kerryann Billman, and graduate students Jessica Arnold, and Steven Jaret (kneeling).

Scott McLennan: *Postcards from Mars*

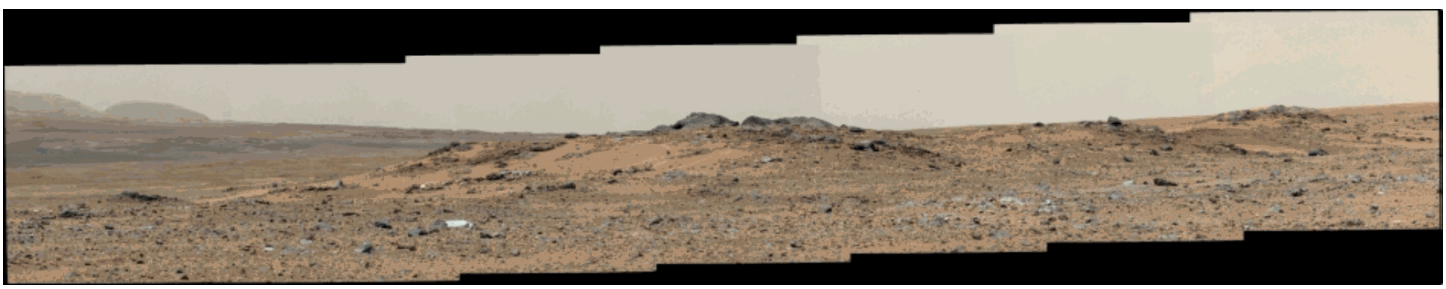
Postcards from Gale Crater, Mars

The past year has been an exciting one for those among us who are interested in Mars. NASA's *Curiosity* rover landed safely in Gale Crater, Mars in August, 2013 and for the past 17 months has been sending back spectacular images and lots of other geochemical and mineralogical data from the red planet. Scott McLennan, who in September returned from a year on sabbatical, is a Participating Scientist on the rover mission and spent time at the Jet Propulsion Laboratory in Pasadena during the first 3 months after *Curiosity's* landed. During that time everyone working with the mission lived on "Mars time" – a Mars day, or sol, is nearly 40 minutes longer than an Earth day – leading to a grueling, ever-changing schedule. Scott's participating scientist research has to do with the sedimentary petrology at the *Curiosity* landing site. On the day-to-day operations of the rover, he serves as one of several Long-Term Planning Leads – a role he has carried out for the *Spirit* and *Opportunity* rovers for nearly 10 years.

Joel Hurowitz joined the Geosciences research faculty in July, coming from the Jet Propulsion Laboratory where he has been a Research Scientist since completing a Caltech/JPL post-doc in 2007, and a Stony Brook Ph.D. in 2006. Joel is also on the *Curiosity* science team and while at JPL, he was the Investigation Scientist for the Sample Acquisition/Sample Processing and Handling (SA/SPaH) subsystem on the robotic arm of the rover. This subsystem carries out the drilling of Martian rocks and delivers both rock powders (from the drill bit) and surface regolith (using a scoop) to the X-ray diffractometer and mass spectrometers housed within the chassis of *Curiosity*. Now at Stony Brook, Joel remains as a co-investigator on the *Curiosity* science team and his operational role is also as a Long-Term Planning Lead.

Over the past year, *Curiosity* has been working at a location called Yellowknife Bay. Sedimentary rocks at this location were deposited in an ancient alluvial fan – lake system and the results have been nothing short of spectacular. Unlike Martian sedimentary rocks discovered nearly 10 years ago by the *Opportunity* rover on the Meridiani Plains that were deposited in concentrated acidic brines, the Yellowknife Bay sediments were deposited by relatively fresh waters that were near-neutral in chemistry – overall a benign and hospitable environment for microbial life. Indeed this represents, by far, the most habitable geological environment yet recorded on Mars and ancient microbes would have been very happy munching on these rocks for food. The results were reported in a series of papers published online by *Science* on December 9 (with print versions following in January). Scott was the lead author on the paper entitled "*Elemental geochemistry of sedimentary rocks at Yellowknife Bay, Gale Crater, Mars*" and Scott and Joel were each co-authors on five of the papers. Joel was also one of five panel members at the NASA press conference held at the Fall AGU in San Francisco where the results were first announced.

Having left Yellowknife Bay in July, *Curiosity* is now making its way to Mount Sharp, a 5 kilometer high mountain of layered rocks situated in the middle of Gale Crater, about 8 kilometers away. Mount Sharp was the original science target

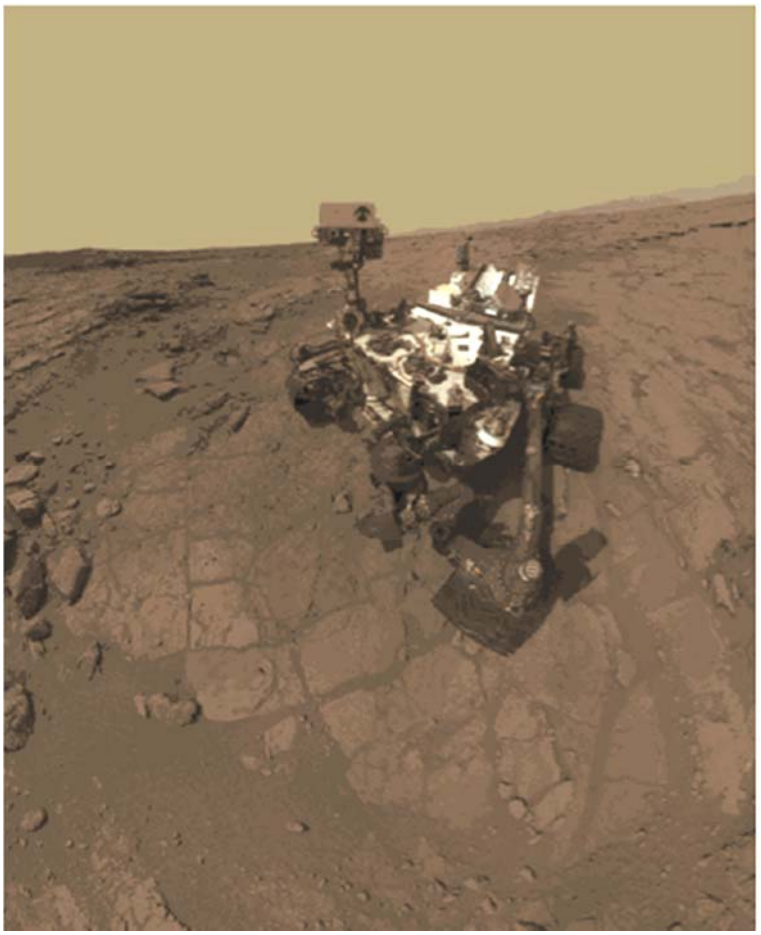


A combination of seven images from a telephoto-lens camera on NASA's Mars rover Curiosity, showing a rise topped by that is informally named Twin Cairns Island about 30 meters away.

Image Credit: NASA/JPL-Caltech/Malin Space Science Systems

Scott McLennan: *Postcards from Mars*

for the rover because the layered rocks may preserve as much as a billion years or more of Martian geological history. Perhaps in a year from now we will begin receiving postcards from that new and exciting location.



Self-portrait of the Curiosity *rover on the outcrops of Yellowknife Bay in Gale Crater Mars. The image is a mosaic taken by the MAHLI camera, which is attached to the robotic arm. Notice the two small holes in the rock just to the left of the rover. This is the "John Klein" drill site from which sample powder was recovered and delivered to Curiosity's internal laboratories. (Photo credit: NASA/JPL-Caltech/MSSS)*

Scott McLennan's Martian research is a natural follow-on to his long-term research interest in the geochemical evolution of planetary crusts. He has collaborated for many years with S. Ross Taylor of Australian National University evaluating the chemical evolution of Earth's continental crust and the crusts of other planetary bodies. Their 2010 book *Planetary Crusts: Their Composition, Origin, and Evolution* won the Geoscience Information Society's Award for Best Reference Work. His work on the Mars rovers and on Martian sedimentary geochemistry and surficial process has featured collaboration with numerous department members over the years, including Nick Tosca, Brian Hahn, Elliot Klein, Eli Sklute and others, as well as Joel Hurowitz.

Scott, though, is far from the only faculty member working on the geology of Mars.

Tim Glotch and his students use remote sensing instruments to determine the mineralogy of the Martian surface, an important indicator of past geological processes such as the formation of the crust and its subsequent weathering in the presence of water - a key indicator in the search of conditions that might once have been favorable for life. His laboratory work in determining the fundamental optical properties of minerals at infrared wavelengths is important in studying the surface of many planetary bodies, including Mars.

Deanne Rogers' work has led to evidence for past groundwater on Mars, leading to some of the strongest evidence yet that Mars may have had conditions compatible with life.

Hanna Nekvasil analyzes Martian meteorites and spacecraft data to understand Martian magmas and their interactions with the Martian crust and fluids within it.

Stony Brook University may be on Long Island, but its Department of Geosciences is, at least in part, focused on Mars!

Don Lindsley's So-Called Retirement…

Hanna Nekvasil writes:

Few of you will have passed through the department without interacting with Don Lindsley. Many of you will have known him as an outstanding teacher or an exceptional researcher. But Don was much more than that over the 34 years of his tenure – he was the institutional memory of the department, the one person who could tell you where those pesky little belts are on the roof that keep the hoods running AND which stairwell will get you there!! Clearly, after 34 years of service, we could not let such an irreplaceable resource simply retire to some sunny beach in Florida. So with the seductive offer of being an unpaid lab tech, student advisor, and all around handyman, he has foregone his sunny beach and steady as the sun has come in daily to work. As he approaches his 80th birthday, I can only speak for all of us when I say "No slacking off; we expect another 10 years of work out of you!"

Don Lindsley writes:

I formally retired from the Department in 2004, having spent the previous two years at half-time as a rampdown to retirement. Nevertheless, I still come in to the Department every morning and help Hanna Nekvasil run the lab she inherited from me. One of my friends tells me that I have "flunked retirement"; others - who are less politically correct - say the proper term for someone who comes to work every day without a paycheck is "retarded". But I'm simply having too much fun to walk away from it all. I get to advise undergrad and grad students without having any responsibility for them - what's not to like?! I also work on some of my own projects, if at a slower pace than before. And recently Tim Glotch was awarded a huge multi-institution, multi-investigator five-year NASA grant to study potential hazards for manned space exploration. Hanna and I will synthesize materials likely to be encountered on rocky objects in the solar system - Mars, moons, asteroids - which will then be characterized through multiple techniques before being exposed to lung tissue and lab rats to assess any toxicity. So there will be plenty to do in the next 5 years!

However, there's more to retirement than coming to the lab every morning. Some of you know that when Jim Lattimer and I were co-Chairs for the last 4 years of the old Department of Earth and Space Sciences (1993-97), I began to teach myself woodturning for relaxation. By 2002 my projects had outgrown the small lathe I had inherited from my father, so I bought a larger, more powerful lathe in anticipation of retirement. To help pay for the lathe and various accessories, I began selling my work through my company *The Well Turned Bowl*. In the past 13 years I have made well over 2000 bowls, vases, candlesticks, and other turned objects. As a bridge to my other life, I inlay colorful minerals into many of my projects. My most popular pieces are made from cherry burl inlaid with malachite.

One of Don's creations—a pierced bowl in box elder, with black walnut and (fossil) red coral inserts; 14" across

Don with his sons Glenn and Bruce after a 6-day rafting trip down the lower Salmon River and Snake River in 2012. Also present were Don and Carol's daughter Janet and 5 of Carol and Don's 6 grandchildren.

Don Lindsley's So-Called Retirement…

Carol and I still live on Woodhull Road in East Setauket and still maintain the house and grounds ourselves. We're both as healthy as we can expect to be at our somewhat advanced stages of maturity. And yes - despite the fact that only a total fool would do so on Long Island - I still grow roses. It's a wonderful life.

At left: Don at his lathe.

Below: A cherry burl bowl with malachite inlay. Bowl is 19"across

Don welcomes you to visit www.thewellturnedbowl.com to get an idea of his work.

(And if you buy anything and mention this newsletter, he'll donate 20% to the Department !!)

We gratefully acknowledge gifts to Department of Geosciences Funds in 2013 from the following alumni and friends:

Andrew Au
Jay Banner
Frederick Bejina
Scott and Barbara Brande
Michael Convery
Robert Eby
Jean Evans
Owen Evans
Barbara Faulkner
Kevin Frank
Linda Gundersen
Gilbert Hanson
James Hill
Jennifer Hill and Family
Sofia Kaczor
Judith Kelley-Moberg
David King
Allan Kolker
Vesna and Tomislav Kundic
Peter Lellis
Louise Levien
Wei Li
Yona Lieberman
Robert Liebermann
Donald Lindsley
Diane McDaniel
Paul Misut
Thomas Norris
Kim Marie Pacanovsky
Pete Palmer
John Parise
Martin Peckerar
Troy Rasbury
Richard Reeder
David Rothbard
George and Carolyn Schaeffer
John Schaeffer
Martin Schoonen
Curtis Sheldon
Paul Siegel
Judith Spiller
John Tacinelli
Kathy Tedesco
Anthony Vidmar
Richard Walker
John Warasila
Robert Warasila
Wenlu Zhu

Stony Brook University
Department of Geosciences
100 Nicolls Road
Earth & Space Sciences Building
Stony Brook, NY 11794-2100

Giving to the Department of Geosciences

The Department of Geosciences takes great pride in the "sense of family" that we have maintained ever since our beginnings in 1965. Your contribution to the Department enriches the experience for current and future students, faculty, and staff, and helps to maintain the atmosphere that you enjoyed. Contributions have been used toward special student scholarships and awards, classroom multimedia upgrades, field trips for courses, and other Departmental activities. If you have supported us in the past, we are most grateful, and hope that you will continue to do so. If you are interested in making a gift to the department, there are several funds to select from. You can give directly online (http://www.stonybrook.edu/sb/giving/waystogive.shtml) or send a check directly to us at:

Department of Geosciences, Chairperson
Stony Brook University
255 ESS Building
Stony Brook, NY 11794-2100

Checks should be made payable to **Stony Brook Foundation, Fund #** (insert number as indicated below).

- Geosciences Department Fund for Excellence (# 250500)
- Department of Geosciences Undergraduate Fund (# 299660)
- David E. King Field Work Award (# 236421)
- Mineral Physics Professorship Fund in Geosciences (# 229280)
- Oliver Schaeffer Endowed Memorial Scholarship Fund (#236537)
- Center for Advancement of Earth and Space Science Education (#264920)

Even if you are unable to support us now, we would still be delighted to hear from you!