

The Redbeds



*The Annual Newsletter of the
Department of Geological Sciences
Rutgers, The State University of NJ*

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Geology Museum Open House, Saturday January 31, 2004 (See back page)

Fox Fund receives \$5000 donation!

Welcome to the 2004 Redbeds

The Redbeds is the Annual Newsletter of the Department of Geological Sciences, Rutgers, The State University of New Jersey. The *Redbeds* was reincarnated by then Chair (now Dean) Michael Carr seven years ago and have since grown into a detailed report on research activities, students, awards, funding, and comings and goings in our department. Sent to over 700 alumni, the *Redbeds* is our primary means of informing alumni, friends, and colleagues of our most recent accomplishments. Please write to us and tell us of your activities!

Below. Welcoming field trip to Sterling Mine, Sept. 2003



Field Geology in the Bay of Fundy

Contributed by Roy Schlische

In late August, Drs. Roy Schlische and Martha Withjack led the Rutgers University Field-Geology course in Nova Scotia, Canada. During the 12-day course, the students studied the stratigraphy and structure of the early Mesozoic Fundy rift basin. They mapped several coastal sites on the Bay of Fundy (*Carrs Brook at right*), constructed geological cross sections, and interpreted seismic-reflection profiles from offshore. This integrated approach helped the students unravel the complex depositional and tectonic history of the region.



The Riverview Cottages of Parrsboro, Nova Scotia (*right*), were our homes-away-from-home. The Fundy Geological Museum of Parrsboro generously allowed us to use classroom space for exercises and lectures. We showed our appreciation by donating funds to 'buy a bone' that is part of a prosauropod dinosaur skeleton.



The six undergraduate and graduate students welcomed the opportunity to experience the geology of a region "far" from home at a reasonable cost. Extending our department history of congenial, collegial field trips (e.g., the Godfrey's Ridge Overnight), the students enjoyed the spectacular geology of Maritime Canada, with its

brehtaking coastal scenery (*Five Islands Provincial Park at right*), plentiful seafood, the highest tides in the world, and its slow pace without TV and cell phones.

The Department of Geological Sciences generously supplied financial support for the trip. Donations to the Development Fund or the Steven K. Fox Student Fund are welcome to support our educational endeavors. Just send a note to the Chair indicating that you want your donation allocated to support our students.



View from Wasson Bluff toward Five Islands. All photos by Chris Marietti

Drilling at Sea Girt, NJ

Contributed by K G. Miller (Rutgers) and P.J. Sugarman (NJGS/Rutgers)

The Coastal Plain Drilling Project continued in 2003 with our most ambitious hole yet: a 1600 ft borehole at the National Guard Training Center in Sea Girt, NJ. This project is a collaboration among Rutgers (lead institution, Ken Miller, co-chief scientist; Jim Browning, staff scientist), the NJGS (Peter Sugarman), the Delaware Geological Survey (Peter McLaughlin), Western Michigan University (Michelle Kominz), and the USGS Eastern Region Mapping Team (Gene Cobbs III, Head Driller). Sea Girt targeted thick (nearly 1,000 ft) Upper Cretaceous strata, including a spectacular Cenomanian-Turonian record of Ocean Anoxic Event 2. The Upper Cretaceous at Sea Girt provides the best resolution of sequences from 99-65 Ma, complementing sections at Bass River, Ancora, and Millville, NJ (see Miller et al., 2003 *Geology* and *GSA Bull.*, 2004). We also recovered thick aquifer sands of the upper Englishtown sequence and the Magothy Formation of the famed "PRM", which should yield insights into the hydrostratigraphy of these critical units. Drilling will continue in 2004 with a 700-ft NJGS-funded borehole near the Cape May Zoo to investigate the

hydrostratigraphy of the Kirkwood-Cohansey aquifer. Future drilling includes a pending (tentatively 2005) IODP Mission Specific Platform leg to drill Sites MAT1-3 on the NJ inner shelf (Mountain, Miller, et al., lead PI's) and a proposed 6000 ft hole at Cape Charles, VA to investigate the Chesapeake Bay Impact Structure (Gohn, Miller, et al., PI's).

Sea Girt drillsite, Sept.-Nov. 2003



Keynote Symposium at Seattle GSA

Contributed by Gail Ashley

A Pardee keynote symposium “The paleo-environmental and paleoclimatic framework of human evolution” was convened by Gail Ashley and Craig Feibel in November at the 2003 National GSA meeting. The interdisciplinary symposium brought together researchers (including paleoanthropologists, archaeologists, climatologists, and geologists) who have a variety of perspectives on the continuously changing landscape upon which evolution took place. The objectives were to bridge the scale gap between

local site description representing a snapshot-in-time and regional-to-global climate scenarios spanning the last 7 million years. The ultimate goals were to shed light on the question of whether climate was an active or passive player in the evolution of the human species. Talks ranged from Bill Ruddiman’s overview on the paleoclimate record, Bernard Wood’s talk on the complexity of the hominid family tree, to the latest findings in “Out of Africa” and “Peopling of the Americas.”

The Rutgers Geological Society

Contributed by Lauren Jarmel and Lauren Neitzke

In the spring of 2003 the Rutgers Geological Society was reactivated and elected the following people as the club officers: Lauren Neitzke (President), Dan Konkur (Vice President), Elizabeth Hauxhurst (Secretary), and Lauren Jarmel (Treasurer). In the Fall of 2003, the Rutgers Geological Society was named an official club by Rutgers College and received funding from the college for the club’s field trips. During the Fall semester, the Geological Society attended the Rutgers College Major Fair and conducted a field trip to the American Museum of Natural History in New York City. To Our new website is currently up and running

and can be found at www.eden.rutgers.edu/~rugeo. This website provides useful information about upcoming meetings, events, etc of the Geological Society. Currently, students and faculty may vote for one of the three T-shirt designs online to help pick the new Rutgers Geology T-shirt. The Geological Society has a number of events in mind for the Spring 2004 semester. Some of these events might include trips to the Smithsonian Institute, Sterling Hill Mines, Howe Caverns, and hiking the Delaware Water Gap.

Fox Fund Supports Students at Field Camp

Contributed by Kathryn Rose

The Steve Fox fund provided three students from Rutgers University with an opportunity to participate in the Eastern Illinois University field camp during the summer of 2003. We stayed at Black Hills State University in the southwest corner of South Dakota. Our studies focused on the history of the Black Hills and its uplift during the Laramide orogeny. We traveled daily throughout the Black Hills mapping the area while familiarizing ourselves with the regional geology. The rigorous map work forced each student to appreciate the necessity of a Brunton compass and utilize previous knowledge of structure, stratigraphy and petrography. Our studies continued with a ten-

day trip throughout Wyoming. During our stay at Yellowstone National Park we aided Wilkes University with their annual GPS ground deformation survey. The survey monitored crustal movement within the thermally charged Yellowstone caldera. Our trip concluded with a day-hike through the Grand Tetons and an amazing view of the regional geology. The opportunity to travel out west and experience the diverse geologic setting throughout the Black Hills provided students with a strong structural background and a new insight into the tectonic history of the west.

Geochemistry Lab News

Contributed by Swisher, Turrin, Feigenson, Wright, McHenry, and Cohen

Noble Gas Lab

A team led by Carl Swisher and Brent Turrin completed our new Noble Gas Lab in 2003. The lab, obtained with funding from NSF EAR and Rutgers, is built around a Mass Analyzer Products MAP 215-50 noble gas mass spectrometer obtained from T. Onstott of Princeton University. The mass spectrometer is designed to measure He and Ar with 90° sector extended-geometry for enhanced separation of Ar and He isotopes. During installation, we modified and upgraded the detector housing of the

mass spec to accommodate a new Pfeiffer SEV 217 electron multiplier, which is larger and more stable than the original. We also modernized the pumping system on the mass spec to accommodate an automated VAT valve, turbomolecular and Vac-ion for improved pumping of residual gases. The mass spectrometer was connected to a fully automated, in-house designed, micro-extraction system with a total volume ~180 cc. The extraction system centers around a central hub with an internal ‘getter’ and ‘cold-finger/trap’ that reduces hydrocarbon and water

interferences prior to mass spectrometry measurement. The new hub was designed by Turrin and Swisher and manufactured in the Rutgers' Physics machine shop by gurus Val Myrnyj, Eric Paduch and Ernie Erskine. While the getter 'cracks' unwanted hydrocarbons, the cold finger operates at temperatures of ~ 90 to 105°K collecting unwanted water vapors, while avoiding external icing associated with older external cold fingers designs used in other labs. Because there is no external icing, the time between thawing and freezing the cold-finger/trap reduces down time requiring reactivation intervals to a month or more instead of once a week. The micro-extraction system (as well as the mass spectrometer) uses automated, air-driven, high-conductance metal valves from VAT Inc. Geological Sciences' Noble Gas System is the first to use high conductance valves from VAT Inc. The extraction system was fitted with dual, newly designed sample chambers. The home grown sample chambers present a low cost alternative IR view port ($\sim \$1800$ vs. $\$15,000$ for commercial ports) with vacuum degassing rates comparable with commercially ports. To fuse and incrementally heat geologic samples to release desired gases for analytical measurement, a New Wave Research Inc. CO_2 laser system was designed in cooperation with Rutgers. The system incorporates a 50 watt Coherent CO_2 laser, focusing mirrors, 2 mm and 6 mm integrator lenses, IR temperature probe, and video camera, all mounted on a gear driven X, Y, Z stage to permit sample selection, focusing and image collection. All aspects of the mass spectrometer operation are automated, controlled using an Apple Computer X-Serve, operated with software written by colleague Alan Deino, specially modified for Rutgers.

Brent Turrin, Godwin Mollel, Carl Swisher, and our Noble Gas System. The new experimental quadrupole is at the left forefront, the laser and extraction systems are at left.

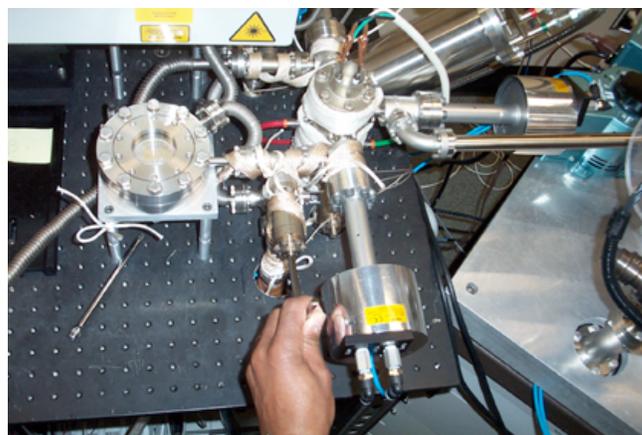


The new lab became fully operational in early Fall 2003. The system was set up primarily for $^{40}\text{Ar}/^{39}\text{Ar}$ geochronology with the intent to add He measurement capabilities. System calibration, sample analyses and data collection are underway and final modifications to software implementation of newly integrated components such as a fully automated IR temperature

probe and additional vacuum pressure monitoring are being finalized. The system is capable of running 24 hours, 7 days a week, and has already made over 7,000 separate argon isotopic measurements (including standards, samples, and blanks). Initial analyses from the new lab have concentrated on current NSF funded research. A suite of samples from Costa Rica, as part of ongoing research by Michael Carr, Mark Feigenson, graduate students Fara Lindsay and Louise Bolge, yielded the first dates from the lab, and are helping constrain the geochemical evolution of Central American magma systems. Graduate student Godwin Mollel has been busy working on dating volcanic centers of the Ngorongoro volcanic highlands in Tanzania. $^{40}\text{Ar}/^{39}\text{Ar}$ dates from these volcanic centers are revising our ideas as to the duration and relative age sequence of the various volcanoes that fed airfall and erosional sediment into the classic Olduvai Gorge and Laetoli basins. The timing of these eruptions will give us a better understanding of Olduvai's landscape evolution, part of a project with Rutgers' Archaeologists.

In December, an agreement with Pfeiffer Vacuum led to an extended loan of a high resolution-high sensitivity quadrupole mass spectrometer. The goal is the development and application of quadrupole mass spectrometers to high-resolution isotopic measurements of noble gases. Quadrupole mass spectrometers are significantly smaller, lighter, and less expensive than sector mass spectrometers. Such and instruments might be used to make Ar measurements as well as He isotopic measurements at sea as part and helium-tritium tracer studies. The quadrupole was delivered to Rutgers in pieces in early December, modified and installed by Turrin and Swisher, and coupled onto the Noble Gas System. Testing of the quadrupole for noble gas work is underway.

The systems sample chamber and central hub housing the getter and cold trap.



TIMS Lab

Mark Feigenson, Dean Michael Carr, and Chair Ken Miller have recently received NSF funding to purchase a new, multicollector thermal ionization mass spectrometer, to replace the older, single collector VG Sector. Moving up to multicollector analysis will obviate the need for ion beam stability or long run duration, and will allow us to analyze much smaller samples. In addition, the new generation TIMS have been demonstrated to achieve 0.000010 external precision, better than twice the precision of our current mass spectrometer. This may lead to enhanced constraints on Sr-isotope stratigraphic studies, and may also tighten the mixing models proposed for magma generation beneath Central America. The sample throughput with the new instrument will be considerably higher than in the past. Rutgers existing aging mass spec has been limping along this past year and everyone is waiting anxiously for the delivery of the new system. Graduate students Fara Lindsay, Ian Saginor, and Mike Reilly can be seen pacing the hall in anticipation. Currently, the mass spec room is being renovated to accommodate both the new instrument and the old single collector and installation of the new TIMS is expected in early 2004.

Stable Isotope Lab

The Stable Isotope Laboratory will be doubling its capabilities in 2004 with the acquisition of a new mass spectrometer. Funded largely from an NSF Biocomplexity Award, an Isoprime continuous flow mass spectrometer from GV Instruments is scheduled to arrive early in 2004. Lab Director Jim Wright says the the mass spectrometer will have Elemental Analyzer and Gas Chromatograph peripherals to perform bulk and compound specific stable isotope analyses on organic material. Graduate students Cindy Liutkus and Sam Henderson eagerly await the new system. Initial work using the new mass spec will focus on understanding interactions among biogeochemical cycles, plankton evolution, and climate during the Mesozoic. In addition, graduate students and faculty alike at Rutgers are already planning application of the new capabilities to address a wide range of research issues involving modern and ancient biogeochemical systems. This new mass spectrometer will join the Micromass Optima mass spectrometer which has made over 15,000 measurements since 2000.

Microprobe Lab (RUM)

Researchers have been busy collecting data in the Microprobe lab this year. Graduate student Rebecca Rodgers has been conducting igneous and metamorphic petrology and mineral chemistry research on samples from the oldest ophiolite suite

known in the world, at 2.5 billion years. Surprising preliminary results of this pilot study indicate that oceanic crust during the Archean is remarkably similar to the modern ocean floor, and that this ophiolite shows a subduction zone (rather than a spreading center) signature. Graduate student Fara Lindsay is starting a project on the first mantle xenoliths discovered in Central America. These are feldspar-bearing dunites, olivine clinopyroxenites, and orthopyroxenites, most likely of lithospheric origin. The most interesting observation about these xenoliths is the presence of small veinlets of differing composition, indicating either metasomatism or the movement of melt through small cracks or fissures. Lindsay McHenry is finishing her dissertation research on Olduvai Gorge tephrostratigraphy. She has used the microprobe to find unique geochemical "fingerprints" for a series of hominid-constraining tephra layers using the compositions of volcanic glass and phenocrysts. This "whole assemblage" approach provides an alternative to the traditional "volcanic glass only" methods of tephra correlation that can be applied even in situations where glass has been completely altered. Other research in the electron microprobe lab has included tephrostratigraphic work by Godwin Mollel, Craig Feibel on tephra from Ethiopia, analyses by undergraduate student Emily Bjonnes on silicates in achondritic meteorites, and analyses by graduate student Alissa Henza using the newly-installed universal stage (on the petrographic microscope) that allows petro-fabric analysis.

Meteoritics Lab

The meteoritics laboratory is an experimental petrology lab in which faculty and students study issues related to the formation of our Solar System. The lab's major focus is trying to determine the dominant processes that affected the primordial material from which the planets were formed from the primitive cloud of gas and dust known as the Solar Nebula. Lab Director Roger Hewins, post-doc Bosmat Cohen and graduate student Joe Bosenberg, as part of funding from NASA Origins and Cosmochemistry grants, are currently looking into the processes that controlled the chemical composition, isotopic make-up and texture of crystallized mm-sized round objects found in primitive meteorites, called chondrules. What was the process that resulted in their formation and did it have any influence on the formation and composition of the Earth? The lab itself consists of four DelTech furnaces, which have the ability to reach extremely high temperatures (2000°C) at low pressures. Composition of the atmosphere in the ovens can be controlled creating conditions that are thought to have prevailed in the solar nebula. In the lab this year, Bosmat Cohen, has been busy studying the evolution of iron isotopes during processes such as reduction

and evaporation. This is part of the quest to understand the isotopic composition of chondrules. Many chondrules show no to very little isotopic mass fractionation and yet have more than likely experienced some evaporation during their formation. Bosmat is also interested in the reduction of FeO in the presence of hydrogen gas. Hydrogen was the dominant gas in the solar nebula and iron metal is extremely common in chondrules. Therefore, knowing the extent of iron reduction in the presence of hydrogen is extremely important. If this process is found to be inefficient other iron metal forming mechanisms need to be considered more seriously e.g. desulfurization by evaporation of S from sulfide. There are many details to check before a model such as shock wave heating can be widely accepted. Joe Bosenberg, a part time Ph.D. candidate who works with the meteorite collection at the American Museum of Natural History, has been busy studying the presence of O¹⁶-rich relicts in chondrules. He is conducting experiments in which he compares the extent of time needed to equilibrate oxygen isotope

relative to Fe-Mg exchange. This is important for figuring out how long O¹⁶-rich relicts could have "survived", and ultimately determine the duration of chondrule formation (minutes, hours, or days?). Joe also studied the formation of phosphoran olivines, which are found in a number of pallasite meteorites. He has discovered that such olivines cannot form in equilibrium and therefore represent a disequilibrium phase and are probably the result of later recrystallization. This year, we welcome in a new Ph.D. student, Elodie Tronche, who is coming to us from the Muséum National d'Histoire Naturelle in Paris, studying with Francois Robert. She will be conducting experimental work on Aluminum-rich chondrules. Undergraduate independent research student, Dan Koncur, has been working on the preheating of chondrules due to the approach of a glowing shock wave which finally melts them as it passes. The shock wave model is a highly popular model, which provides a detailed heating mechanism necessary for the formation of chondrules.

Department News

Despite what you may have read in the local papers, more happened at Rutgers this year other than the discussion about the now abandoned merger with the medical school. Our department has garnered unprecedented kudos (see below) and a rapidly growing national presence. International awards of scientific excellence were made to 5 faculty members in this year alone. Three faculty members serve on the panels that determine the future of the new Integrated Ocean Drilling Program, including the Vice Chair of the founding corporation. We have established new ties with Cook College, the Department of Marine and Coastal Sciences (DMCS), the Department of Environmental Sciences (DES), and the Institute for Marine and Coastal Sciences (IMCS), while still maintaining our close ties to the Faculty of Arts and Sciences and the 12,000 undergraduates at Rutgers College. We are currently negotiating a joint hire with Cook College and the Department of Environmental Sciences in hydrogeology. Graduate applications doubled last year and we recruited a talented class of graduate students for a total of 20 full-time students (8 TAs, 3 Fellows and 9 GAs). Peter Rona (joint IMCS/Geological Sciences faculty member) and Rich Lutz (a member of our graduate faculty) were the scientific advisors on the first IMAX movie co-produced by a university, *Volcanoes of the Deep Sea*. The most exciting news is that we have hired an architect for the Earth and Oceans Building to be built on Cook Campus joint with IMCS.

We have been extensively discussing methods of integrating Rutgers resources across the Earth,

Oceans, and Atmospheric Sciences. Though a long-term strategic plan (10+ years) might unify IMCS, DMCS, Geological Sciences, and atmospheric components of DES into one school/college/division, we currently envision a more gradual integration of these resources. Physical co-location on Cook Campus will encourage cross-disciplinary studies. We need to make resources in other departments readily accessible to our graduate students. To do this, we have proposed to form a central coordinating office for the three separate graduate programs in Geological Sciences, Oceanography, and the Atmospheric option of Environmental Sciences. We have established excellent working ties with the Deans of Cook College for the first time since the 1980 reorganization.

Our department has truly distinguished teaching ratings for the Spring of 2003. For teaching effectiveness we obtained 4.46/5.0, while for overall quality of the course we averaged 4.3/5.0 for the 21 sections rated by undergraduate and graduate students. Congratulations to Vadim Levin who in his first time teaching earned a perfect 5.0. Andrew Kulpecz topped the list of graduate students with a 4.9. The number of majors is down to 25 from our steady state of 30, but the quality is great (see Kudos). We now teach over 2700 students per year with the expansion of Introductory Geology 101 to 15 academic year sections! Geological Sciences is extremely popular for RC students to fulfill their science requirement and virtually every 101 class closes out! My own son, a first-year student in RC, had trouble getting into 101 even though we are adding sections as fast as

we can find qualified instructors. Despite the growth, we maintain rigor and quality with our new 101 instructors. We said goodbye to long-time 101 lecturer Lloyd Burckle who retired, but welcomed Carl Swisher, Don Monterverde, Lindsay McHenry, Jerry Delaney, and Bosmat Cohen to the top-ranked 101 crew of Roy Schlische, Claude Herzberg, Mark Feigenson, and Pete Sugarman. There is no second team here!

Old traditions continue, with the annual Christmas party at the museum, the Spring log cabin party, and Rutgers Geology students in the field (see lead article) and new traditions have begun. We initiated a welcome back field trip in the Fall (see opening picture) followed by a picnic on the quad at Busch that was a blast and attended by the Executive Dean of

FAS, Holly Smith. We plan a Spring get-together over science and beer!

Teaching and working with graduate students remain part of our core commitment, but a great research university is judged on its research. We are achieving national attention as leaders in the disciplines of Volcanology, Paleoceanography, Biogeochemistry (including joint faculty in IMCS), and Basin Analysis. Strong programs in Structure, Meteoritics, Quaternary Studies (including ties to Anthropology), and Geophysics add to our national prominence. Our goal is to become one of the top 10 Geological Sciences departments in the country, and I believe we will achieve that goal.

Current Graduate Students

Mark Baum, F, Ph.D., Structure
 Louise Bolge, P, Ph.D., Petrology
 Joseph Bosenberg, P., Ph.D., Meteoritics
 William B. Bradfield, F., M.S. Structure
 Claire Condie, P, M.S., Volcanology
 Ryan Earley, F, M.S., Geophysics
 Jennifer Elder Brady, F Ph.D., Structure
 Amber Granger, F, M.S., Structure
 Ashley Harris, F., M.S., Stratigraphy
 Samuel S. Henderson, F., M.S. Paleocean.
 Alissa Henza, F., M.S., Petrology?Geophysics
 Alicia Kahn, F, Ph.D, Paleoceanography
 Andrew Kulpecz, F, M.S., Stratigraphy
 Brian P. Lettini, F, M.S. Geochemistry
 Fara Lindsay, F, M.S., Geochemistry

Cynthia Liutkus, F, Ph.D., Sedimentology
 Katherine I. Milidakis, P, M.S. Volcanology
 Lindsay McHenry, F, Ph.D., Quaternary Studies
 Svetlana Misintseva, F, M.S., Stratigraphy
 Godwin Mollel, F, Ph.D., Quaternary Studies
 Donald Monteverde, P, Ph.D., Stratigraphy
 Lesley N. Patrick, F, M.S., Paleoceanography
 Michael Reilly, F. M.S. Petrology
 Rebecca Rodgers, F, M.S., Petrology/Geochem.
 Eric Roman, P, Ph.D., Hydrogeology
 Bill Savarese, P, M.S., Petrology
 Michael E. Serfes, P, Ph.D., Geochem./Hydro.
 Ian Saginor, F, M.S., Petrology

F = Full time; P = part time

2003 Colloquia

Spring semester

Jan. 22 Dr. Julio Friedman, University of Maryland
 "Deposition below the continental edge: 3D-seismic, equilibrium profiles, and phase diagrams for turbidity current characterization"

Jan. 29 David Marchant, Boston University "Late Cenozoic climate evolution from a Dry Valleys perspective: implications for landscape evolution, Antarctic ice-volume fluctuations, atmospheric change, and buried ice on Mars"

Feb. 05 Dr. Timothy Bralower, Penn State
 "The Paleocene-Eocene Thermal Maximum: Resolving the biotic and environmental responses to ancient global warming"

Feb. 12 Dr. Donald Siegel, University of Syracuse, "Isotopic and geochemical investigation of the Saratoga springs, New York: Evidence for continental hotspot activity"

Feb. 19 Dr. Marie-Helene Cormier, Lamont-Doherty Earth Observatory "Sea of Maramara"

Feb. 26 Dr. Bruno Vendeville, University of Texas, Bureau of Economic Geology. "Influence of sediment deposition and salt tectonics in deep-sea fans"

Mar. 05 Dr. Michael Talbot, University of Bergen
 "Deep drilling in the East African rift lakes: the search for the IDEAL drilling site"
 Co-sponsored by Quaternary Studies

Mar. 12 Dr. Maureen Raymo, Boston University
 "Glacial-interglacial changes in ocean circulation and the conveyor belt hypothesis"

Mar. 26 Dr. Vadim Levin, Rutgers University
 "Crustal and upper mantle structure of Kamchatka "

Apr. 02 Dr. Mike Perkins, University of Utah
 "From Trapper Creek, Idaho, to Royal, Nebraska: A tephrochronologist's search for the Yellowstone hotspot" Co-sponsored by Quaternary Studies

Apr. 16 Ying Fan Reinfelder, Rutgers university "Hydrologic Research at the Rutgers Center for Environmental Prediction (CEP) "

Apr. 23 Dr. Tanya Furman, Penn State
 "Continental breakup above a mantle plume: the

East African Rift System” Co-sponsored by Quaternary Studies

Apr. 30 Dr. Frits Hilgen, Utrecht University, The Netherlands. "Sedimentary Cycles and time scales: An astronomical tuned time scale for the Neogene"

Fall semester

Sept. 10 Roger Buck, LDEO, How Stretching, Flexing, Diking and Rheology Affect Normal Faulting

Sept. 17 Alex Kulpecz, The Global Oil Market after Iraq

Sept 24 Heather Stoll, Williams College, Climate, Coccoliths, and the Carbon Cycle: How coccolith chemistry records marine productivity what it says about feedbacks during the Paleocene-Eocene Thermal Maximum

Oct. 1 John Reinfelder & Allen Milligan, Rutgers Univ., C_4 carbon fixation in marine diatoms and its implications for carbon isotope fractionation in the sea

Oct. 8 Tony Broccoli, Rutgers Univ., Evaluating Climate Models Using Records of Past Climates

Oct. 15 Lee Slater, Rutgers Newark, Imaging dynamic subsurface processes with resistivity and induced polarization

Oct. 22 Karen Bice, WHOI, Isotopic evidence for a Cretaceous Thermal Maximum

Oct. 29 Randy Rutberg, Hunter College, Implications of detrital Sr variability for Late Pleistocene South Atlantic paleoceanography

Nov. 12 Phil Gans UCSB, Early Miocene to Recent Evolution of the Costa Rican Arc: Episodicity and time-space-composition patterns of arc volcanism

Nov. 19 Paul Falkowski, IMCS & Dept. of Geological Sci. Rutgers Univ. The Evolution of Eucaryotic Phytoplankton

Dec. 3 Greg Myers, LDEO, Borehole Geophysics and the Ocean Drilling Program...what to do with a degree from Rutgers

A Paleocene/Eocene Boundary Stratotype

Contributed by Marie-Pierre Aubry

Global Standard-stratotype Sections and Points (GSSP) provide the means to stabilize chronostratigraphy. These carefully selected (chrono)stratigraphic horizons serve both as definitions for chronostratigraphic boundaries and references for global correlations. The IUGS recently has ratified the proposal submitted by Marie-Pierre Aubry (Chairman) on behalf of the Working Group on the Paleocene/Eocene (P/E) boundary to define the P/E GSSP as the base of a characteristic lithologic succession (the Dababiya Quarry Beds) that occurs in the lower part of the Esna Shale, a well known formation that outcrops extensively throughout Egypt. The GSSP is defined in the huge Quarry of Dabaiya, located on the eastern bank of the Nile Valley, 35 km South of Luxor. The Dababiya Quarry Beds, 3.5 m thick in the stratotypic section and consisting of 5 distinctive units, constitute a remarkable record of the Carbon Isotope Excursion (CIE) and the P/E Thermal Maximum (PETM) whose causes are still being actively debated. Indeed the base of the CIE allows global (i.e., marine-terrestrial) correlations of the base of the Eocene while a host of biostratigraphic data ensures refined correlations in its vicinity. The ratification of the P/E GSSP will soon materialize as a "Golden Spike" is driven into the stratotype section on the occasion of CBEP5, the fifth meeting on Warm Climate and Biotas of the Early Paleogene in Luxor 8-14 February 2004.



Dababiya Quarry, exhibiting the Tarawan Chalk (foreground; with two pharaonic quarries at right), the Esna shales with the Dababiya Quarry Beds that were exploited for their phosphatic content (low cliff) and Thebes Formation in the background, a formation that dominates the landscapes along the Nile Valley. The GSSP is located in the far right face of the quarried Dababiya Quarry Beds. Photography courtesy of Christian Dupuis.

Kudos, External Funding, and Comings/Goings

From Craig Chesner, Director Eastern Illinois Field Camp "I want to take this opportunity to tell you how much of a pleasure it was to have [RU undergraduates] **Dan Koncur, Jaeson Piretti, and Kathryn Rose** as students at our geology field camp this summer. All three students demonstrated a well-balance and thorough classroom backgrounds that prepared them well for field camp. It is very obvious that your program produces outstanding geology majors with strong classroom backgrounds. I hope to see more Rutgers students at the EIU Field Camp in the future." All three were supported by the Steven K. Fox Student Fund.

Lauren Neitzke, a major in our department, attended the Lamont summer intern program where she worked with Steve Pekar

Graduate student **Lesley Patrick** attended the 2003 International Geobiology Course hosted by the USCWrigley Institute for Environmental Studies on Catalina Island, CA. This six week course focuses on how biology interacts with the environment and how these interactions have shaped Earth's evolution.

Amber B. Granger, a graduate student in the Structure group, has received an AAPG Grant-in-Aid.

Graduate student **Alicia Kahn** was chosen by the North American Micropaleontology Section for a 2003 SEPM Mobil Foundation Student Participation grant

Graduate students **Louise Bolge, Cindy Liutkus** and **Brian Lettini** were awarded travel grants by the Graduate School New Brunswick.

Miriam E. Katz was promoted to Assistant Research Professor.

Yair Rosenthal was promoted to Associate Professor with tenure.

Gregory S. Mountain was promoted to Professor I with tenure.

Gail M. Ashley was promoted to Professor II.

We welcome **Keith Sproul** as our new computer technician.

Robert E. "Bob" Sheridan officially retired and we feted him in a great party at the surprisingly nice, new Busch Faculty dining room. Bob is still active in research.

Rutgers became a member of the IRIS Consortium and **Vadim Levin** was appointed the BoD Member for RU.

Ying Fan Reinfelder received an NSF Advance proposal for an education and research program in hydrologic sciences. The proposal includes 4 courses and 3 core research projects that are designed to provide a basic hydrologic education for students in various earth science disciplines on campus and to form a campus-wide research team to address water related issues facing the region.

Rutgers was approved as a full member of the **IODP MANAGEMENT INTERNATIONAL, Inc. (IMI)**. IMI is the governing body for the Integrated Ocean Drilling Program that has succeeded the ODP. This organization is the successor to JOI. The latter

group of oceanographic institutions was responsible for overseeing ODP. Rutgers joined in JOI 1998, opening further participation by US universities. We broke new ground in 1999 and did it again with IMI. **Dennis Kent** was elected as one of 6 members of the board of IMI and was subsequently elected Vice Chair.

Ken Miller was elected Vice Chair of DOSECC and co-chair of the newly constituted DOSECC Science Planning Committee. DOSECC stand for Drilling, Observation, and Sampling of the Earth's Continental Crust. Rutgers joined in 2000. Fifty other organizations (mostly universities) are members. He was also appointed as a member of the IODP Science Planning Committee.

Greg Mountain became a member of USSAC (United States Science Advisory Committee) that determines funding for U.S. participation in IODP.

George McGhee has been invited to be a Guest Participant at the Konrad Lorenz Institute 2004 Altenberg Workshop entitled "Modeling Biology: Genes, Shapes, Environment", which organized by Luciano da F. Costa and Gerd B. Mueller. This workshop is part of a series organized by the Konrad Lorenz Institute of Evolution and Cognition Research. George was also invited to the Vatican Observatory as a Guest Participant in an exclusive conference on evolutionary constraint

The University of Athens awarded both **Bill Berggren** and **Marie-Pierre Aubry** Doctorate Honoris Causa.

Paul Falkowski was elected to the American Academy of Arts and Sciences. The AAAS, founded by Samuel Adams and other in 1780, is not to be confused with the upstart Philadelphia-base organization with the same acronym, which publishes Science.

Two of the nine ISI highly cited researchers at Rutgers are in our department: **Paul Falkowski** and **Dennis Kent**.

Dennis Kent was awarded the Arthur L. Day Medal of the Geological Society of America for 2003. Together with the Penrose Medal, the Day Medal is the highest honor awarded by GSA, the largest and arguably most prestigious earth science society. The award is for "outstanding distinction in contributing to geologic knowledge through the application of physics and chemistry to the solution of geologic problems". In 2003 he was also awarded the Vening Meinesz Medal. This award is from the Faculty of Earth Sciences at Utrecht University and the Faculties of Geodesy and Aerospace Engineering at Delft University of Technology joint collaboration: the Vening Meinesz Research School of Geodynamics (VMSG). It is one of the highest honors in geodynamics.

The Rosenstiel School of Marine and Atmospheric Sciences (RSMAS) of the University of Miami awarded the Rosenstiel Award to **Ken Miller**. The Rosenstiel Award recognizes outstanding contributions to marine science, including oceanographically relevant aspects of atmospheric science and fundamental developments in ocean engineering.

NSF funded onshore NJ drilling, targeting Cretaceous sequences. The highlight of this proposal is a 1600 ft borehole at Manasquan, NJ (see above.)

Alumni News

Please send alumni news to Ken Miller kgm@rci.rutgers.edu

Dr. Susan V. M. Maharaj joined the Department of Chemistry at American University. as an Assistant Professor for the Fall '03 semester. She received her Ph.D. from Rutgers University in October, 2000. Dr. Maharaj is studying the links between environmental chemistry, geology and human health. She has published several papers in national and international journals in fields as diverse as geochemistry, coal geology, neurotoxicology, plastic and reconstructive surgery, and planetary science. Dr. Maharaj has established collaborations with academia (Harvard Medical School, Georgetown University, University of Medicine-Romania), government (NIH, U.S. Geological Survey), industry (Center for Occupational and Environmental Medicine-Michigan, Samueli Institute), and the military (Armed Forces Institute of Pathology, Walter Reed Army Institute of Research). Dr. Maharaj is dedicated to serving American University through excellence in teaching and research, and by advising and mentoring students.

Liz Albert (2003) report "I will be going to SUNY Albany. I received a full tuition scholarship and a teaching assistantship. I hope to be working with Dr. Delano, who is working with NASA on their New Frontiers Program."

Kyle Kingman (2003) was admitted to IMCS where he is working with Peter Rona.

Steve Pekar (GSNB, PhD., 1999) will leave his position as Research Associate at Lamont for as a tenure-track Assistant Professor at Queens College effective in the Fall.

Paul Probasco writes: "I'd like to let you know of my own accomplishments of recent and my current doings. In August of this year I officially graduated with a MS in Hydrogeology from Rensselaer Polytechnic Institute. Through my coursework and MS project I received a good exposure to the field of environmental geochemistry. I am now a geologist with EA Engineering, Science and Technology, an environmental consulting firm in Newburgh, NY. The work has been enjoyable for me, and given me the opportunity in the past year to travel to a number of places, including a US Naval Station in coastal Maine and a Superfund site in Vancouver, Wa. I am currently living in New Paltz, NY, which is a pleasant college town located next to the Shawangunk Mtns."

Michael Burke writes: "I am working as a project geologist on a demolition job in Manhattan. We are in the process of taking down a 100 year old Con Edison power plant, and I have been doing all of the geotechnical/environmental work associated with this since March 2000. The job should keep me busy for another 5 years or so. Since graduation, I have been fiddling around with graduate studies in geology, business administration and computer science at Rutgers Newark. Still trying to figure out what the hell I'm going to do

when I grow up I guess. No excitement on the personal side. Still living the life of a serial bachelor. Cheers!"

Marie Ferland (MSc, 1985) writes "I returned to the US in Dec. 1999 after 15 years of studying and teaching in Australia, New Zealand and Fiji (PhD, University of Sydney, 1991). Since August 2000 I have been working at Central Washington University, with my husband Stephen Glasby (Assoc. Prof., Mathematics). I teach in the Dept. of Geological Sciences part-time and also work as the Academic Coordinator for the McNair Scholars Program. In August 2002, I collaborated with the WA Dept. of Ecology in collecting vibracores on the WA/OR inner-mid continental shelf in order to refine the regional sediment budget. We presented preliminary results at AGU - stay tuned!"

Steve Huebner attended and met President McCormick at a recent event alumni event in Bergen County. He remembers Steve Fox well. He is now President of Nroth Jersey Door Center, Inc. in Ramsey, NJ.

Dora Barlez writes "I just returned from a short trip to Prague. I am still teaching at Horace Mann, a private school in Riverdale. I teach AP Environmental Science and eighth grade science. My summer is relatively quiet for the first time- I am writing reviews of environmental science materials for the College Board, participating in a focus group at Columbia for development of a website to be used by teachers of env.sci, and developing some new field trip for my students.

Robyn Berner writes "I graduated with a B.S. in 1998. I worked as an intern at the U.S. Geological Survey Water Resources Division (West Trenton, NJ) from May 1998 to August 1999. Since then I've been working in the private sector as a hydrogeologist/project manager for a company called Gannett Fleming. It's primarily a civil engineering firm, but our office in Princeton concentrates on environmental engineering and consulting. I've been involved in a wide variety of site investigations and remediations. This Fall I'm starting back to school part time at Rider University in Lawrenceville to pursue an MBA degree. I'd like to complement my science background and experience with some business-oriented education. I hope everything at the department is going well. If you ever have students with questions about the environmental consulting field I'd be glad to talk to them.

Nicole Caruso writes "After four years at the environmental consulting firm I was working for in the Harrisburg-area, I decided I needed a change. I wasn't being challenged at work and felt I was wasting time being there. I researched some possibilities and found out about a watershed management project in Peace Corps and so here I am ^ in beautiful Palau. I went through two months of training in Pohnpei (Federated States of Micronesia) and have been here in Palau for one month. I am working for Palau Conservation Society on a watershed management plan for the river that provides

drinking water to 80% of people here, including the city Koror. Palau gets about 60,000 tourists a year, mostly Asians, for scuba diving (the underwater world is fascinating and the Rock Islands, over 300 limestone islands south of Koror, are pristine and amazing). Development is steadily increasing and there is an urgent need for land use planning. But Palau is a very political country, more politicians per capita than any other country in the world. I am working closely with NRCS, local legislatures and community to pull together a resource assessment of the watershed (currently working on compiling all hydrology data available for river and options for sustaining drinking sources for projected growth), delineate conservation areas within watershed, and improve land use practices to decrease sedimentation into the river. I'm really enjoying it and hope to be able to continue this type of work in the states when I return in two years."

Matt Sweet writes "Clint Catania told me about a position available at Killam Associates (now Hatch Mott MacDonald) in Millburn. Well I got the job and I've been here for nearly a year already! Hatch Mott MacDonald is a good, fair company and I hope to stay on the team for awhile, though I have also been considering returning to school for a B.S. to extend my education. I was thinking Geochemistry, or possibly Structure though the two disciplines represent employment in totally different geographical areas! Thanks again for your continued help and consideration, I really appreciate your effort and it makes me proud to be an alumni from Rutgers Geology.

Rusty (John) Gilbert is Team Leader, Stratigraphy & Geostatistics for ChevronTexaco Exploration & Production Technology Company. He writes "I really appreciate you sending the article on Steve Fox and Peter Wolfe. Both were very influential to me being in geology. I really love those guys & sorry I can't go home to visit them. Steve always treated me like a son but when I went to UMass for a MS I really lost touch everyone at Rutgers. After defending my masters I had less than a week to get to California for work w/ Gulf Oil. Steve had a lot of stories & was proud that at least one of his students- Dick came back to Rutgers to teach.

Richard Hyde writes "I obtained my BA degree in Geology from Rutgers in 1970. After my undergraduate studies, I enrolled in the then new Masters degree program at Temple University in 1970. My thesis work there was on the petrology and sedimentology of the Eocambrian Chickies Quartzite in southeastern Pennsylvania with Dr. John K. Adams, also an R.U. alum. Having caught the research bug, I became a PhD candidate at McMaster University under the supervision of Dr. Roger Walker. Most of the thesis work on sedimentary and volcanic rocks in the Abitibi Greenstone Belt (c. 2.5 b.y.) in northeastern Ontario. was published in 1980 in Precambrian Research. In 1977, I started employment with the Newfoundland Department of Mines and Energy mapping a Carboniferous basin in western Newfoundland. Very interestingly, the stratigraphy and other aspects of the paleontology and geology of the area had been studied decades earlier by two individuals associated with Rutgers: Helgi Johnson and J. Volney Lewis. Another Rutgers professor, Peter

Wolfe, also mapped and studied soils in the area. From 1982-1987 I conducted a study of thermal maturation and tectonic elements of the basin and other Carboniferous rocks in western Newfoundland while doing teaching and research at Memorial University in St. John's, Newfoundland. My family (wife, son, daughter) then moved west to Calgary, Alberta where I taught at the University of Calgary and carried out some contractual work on arenite and coal petrology with the Geological Survey of Canada. Now I'm retired near Vancouver, British Columbia. I can't say enough about how proud I am to have my Bachelors degree from Rutgers and to have been part of Geology Hall. A flood of fond memories are now gushing through my head. I could never forget the paleo. field trips of Steve Fox--especially the one all the way out to Ohio. So a big HELLO for those of you who remember me and to those with whom I have not met.

How to help us

The Geology Development Fund is the mechanism for directing alumni contributions to the department. To help the Department, please specify the Geology Development Fund on your contribution. Each month, we get a list of alumni supporters and respond with a thank you (usually). Your generous donations have allowed us to provide summer field camp awards and field expenses for graduate students to conduct their research. Your gifts also have allowed us to leverage University funds to purchase field vehicles for the department.

As noted in last year's newsletter, we are also actively seeking contributions to the **Steven K. Fox Student Fund**. This fund was created in Steve's memory specifically to support undergraduate and graduate Student Research, Field work/camps, etc. To direct contributions to this fund, specify Geology Department Steven K. Fox Student Fund on your contribution. These monies will be used as unrestricted fund to specifically support students, including awards for summer field camps (three awards were made this year for Kathryn Rose, Jaeson Piretti, and Dan Konkur to attend the Eastern Illinois field camp; see "Kudos" above), partial subsidy for Rutgers field camp (see article by Roy Schlische above), and graduate student field and meeting support. We are delighted to have had a pledge of \$5,000 from an anonymous donor this year that made our student support possible. Our goal to convert this fund to an endowed fund once the principal has grown large enough for us to support these activities from the income.





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P R E S E N T A T I O N S

123 Scott Hall

10:00 a.m.

**OCEAN DRILLING IN THE
21ST CENTURY: Should we care
about the bottom of the ocean?**

Dr. Gregory Mountain
Rutgers Department of Geological Sciences
New Brunswick, New Jersey

11:00 a.m.

**THE RISE AND FALL OF SEA
LEVEL: Lessons from the past
100 million years**

Dr. Kenneth G. Miller
Rutgers Department of Geological Sciences
New Brunswick, New Jersey

2:00 p.m.

**NOAH'S FLOOD:
Fact or fiction? Geologic evidence from the
Black Sea**

Dr. Walter Pitman
Lamont-Doherty Earth Observatory
Columbia University

3:00 p.m.

**METEORITES, MYTHS,
AND MOVIES: things that go
bump in the night**

Dr. Jeremy S. Delaney
Rutgers Department of Geological Sciences
New Brunswick, New Jersey

T H R O U G H O U T T H E D A Y

Mineral Sale

135 Scott Hall

Rock and Mineral Identification

202 Geology Hall

For information:

William Selden, Collections Manager at (732) 932-7243 rwselden@rci.rutgers.edu
The Museum entrance is on the corner of George and Somerset Street in New Brunswick, NJ.

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