“It was the best of times, it was the worst of times”

Well, what can I say? Let’s get the “worst” out of the way and end this message on a very positive note. Just like the rest of the world, we are dealing with a budget, shall we say, “challenge”. Our departmental operating budget was cut, permanently, by 10% last fall. We are having to justify student and faculty travel very carefully and another 8% was subject to reversion last week. We do not yet know what next year will bring, but it won’t be good. There is a good chance that our operating budget might be slashed by 20%, 30%, 40% or even 50% (or more!), but we won’t know for several months and we don’t know if these cuts will be one-time or permanent. We will survive but I am sure you realize that such a level of cuts will curtail quite a few of our activities.

Now is the time to say, although I hesitate to say it because I realize the budget crunch hits all of us, that if you have thought about donating to our Foundation accounts (see the last page of this document) then please consider doing so now. Donations have decreased over the past few years and we are finding it difficult to send our students to conferences to present their research findings. This, together with all-important social functions, is the major use of alumni donations and I cannot emphasize enough how your support contributes to the professional development of our students.

Now let’s deal with the “best”! We are currently searching for five (yes, five) new faculty members. As I write this note the searches for a new structural geologist and a new mineralogist/petrologist to replace the retiring Dave Lawrence and Richard Mauger are nearing their conclusions. We are now interviewing for three, new, additional faculty positions. These positions become available as a reflection of the increasingly large student body at ECU. Departments bid for slots and some of us get lucky. This year, as a reflection of our commitment to eastern North Carolina, and in particular, coastal research, and as a response to the past several very productive years, we were allocated two coastal-related positions. We have advertised for a global change/sea-level specialist and for a water resources specialist. The latter position will be a joint appointment with the Institute for Coastal Science and Policy. That institute was also allocated a position and its faculty decided to hire a coastal dynamics specialist. The logical tenure home for that position is Geological Sciences. So, with at least three interviewees per search, you can see that we have a very busy semester. You can also imagine that next year our department will have a different “feel” with fully a third of the department faculty members being new.

So even at a time of budget strife, in many other respects our department is flourishing. We hope to see you at the annual departmental pig-picking in May and share with you our thoughts for the future of geological sciences at ECU.

My very best regards,

Steve Culver

Fellow Alumni,

After reading this newsletter you have to be impressed with the outstanding accomplishments the Department of Geological Sciences has achieved over the past year. Quality instruction, groundbreaking research, and dynamic leadership are the hallmarks of ECU geology today. I am sure you are proud of the faculty and staff, as well as the outstanding academic achievements of the students.

Your financial contributions to the department are vital in order to maintain this level of excellence. Each of us has been affected by the recession, and the department has not been immune. Budget cuts and a drop in alumni donations have substantially affected the department’s ability to fulfill its goals and objectives. The students will be the ones who suffer most from this calamity.

Now, more than ever, your assistance is desperately needed. Please make a commitment to send a donation to assure the continued success of your school. Any amount will be greatly appreciated by the students who will ultimately benefit from your generosity. A one-time donation would be gratefully received but a standing debit will help, and your tax-deductible contribution will help assure the continued growth and success of ECU geology!

Sir Winston Churchill said, “We make a living by what we get, we make a life by what we give.”

So, improve your quality of life in these hard times. Fill out the donation card included in this newsletter. Any amount will help, and your tax-deductible contribution will help assure the continued growth and success of ECU geology!

Thanks for your help. I look forward to seeing you at the pig-picking in May!

Scott Hartness
Fundraising Chairman,
ECU Geology Alumni Society
**Contributions**

**Geology Alumni Fund-General**

Steve Richard Gurley  
Edward R. Yopp  
Mrs. Lorraine Hale Robinson  
Mr. Wells James Barker  
Mr. Robert Ross Allen Sr.  
David Jefferson Vance  
Mr. Richard Crissman Capps  
Mr. James A. Minelli  
Mr. Stanley Scott Lewis  
Mr. Jack s. Moody  
Mr. Richard William Koehler  
Mark Andrew Williams  
Mr. John David Simpson  
Mr. Ralph Allen Amos  
Mr. Cornelius Winkler  
Mr. Michael Wayne Sutton

Mr. Frank D. Charron  
Mr. Christopher Lee Corbitt  
Texaco

**Geology Alumni Century Fund**

Mr. Keith Rea Johnston  
Mr. Charles Lawrence Saunders  
Dr. Charles Q. Brown  
Mr. David Eugene Reid

**The C.Q. Brown School Fund**

Ram Hospitality  
Mr. Charles Lawrence Saunders  
Dr. Charles Q. Brown

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**Expenditures 2008**  
**Geology Alumni General**

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<th>Month</th>
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<tr>
<td>January</td>
<td>Dare Merritt</td>
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<td>Matthew Mann</td>
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**CQ Brown Scholarship Recipients**

Craig Carico  
Cassandra Horton

**Geology Century Fund**

| February  | Stephen Culver         | Holiday Reception Geol/ICSP            | 400.35   |
| March     | David Mallinson        | CSI/GEOL search expenses               | 102.86   |
| April     | Reide Corbett          | Expenses ECU Telefund                  | 51.52    |
| April     | Lauren Metger          | SEGSA travel                           | 144.75   |
| April     | Reanna Camp            | SEGSA travel                           | 164.75   |
| April     | Rebecca Pruitt          | SEGSA travel                           | 129.75   |
| April     | David Harnsberger       | SEGSA travel                           | 144.75   |
| April     | Reanna Camp            | flowers-deceased GEOL student          | 77.98    |
| April     | Univ. Printing&Graphics | duplicate newsletter                   | 307.00   |
| May       | Richard Spruill        | Alumni get-together and Spring Graduation | 518.70 |
| May       | Petals & Pops          | Floral arrangements (baby & funeral)    | 190.02   |
| June      | David Harnsberger       | AWRA travel                            | 399.00   |
| September | Stephen Culver         | Welcome Back Luncheon                   | 132.39   |
| September | Jim’s Liquid Waste     | Porta-potty at Pig Pickin’              | 110.00   |
| October   | Richard Spruill        | Department Retreat                      | 467.20   |
| December  | Dare Merritt           | Supplies Fall graduation                | 29.16    |
Greetings from Rick Miller, the new kid in the department. OK, I’m not exactly a kid, but I did recently join the department in August 2008 and I have a kid’s excitement about being a member of this department. I have a joint position as Professor in our department and as the Program Head for Estuarine and Coastal Processes at the UNC Coastal Studies Institute. Since many of you may not know about the Coastal Studies Institute, I’ll take some time to introduce you to CSI (not to be confused with the TV shows), my professional background, my family, and what I’ve been doing since I’ve arrived back in North Carolina.

Prior to coming to ECU I was with NASA for 21 years at the Stennis Space Center in Mississippi but lived in Slidell, Louisiana with my wife JoAnn. We have two children, Virginia and Richard, Jr. Virginia lives in Chicago and Richard lives in Huntington Beach, California with his bride Jessica. During my time at NASA I was classified as an Oceanographer and I held several positions including research scientist, Office Chief, Chief Scientist, and Senior Scientist. Many people are surprised that NASA, a space agency, has Oceanographers but it actually makes sense. NASA is the nation’s research and development agency for Earth observations from space (remote sensing) using airborne and space-based instruments. While at Stennis I used remote sensing as an integral part of my research to study coastal processes; at times remote sensing was the focus of research. I also was very active in developing innovative technologies for monitoring complex coastal systems. Although my research interests are diverse, the primary focus of my research is on the role that coupled terrestrial-aquatic systems play in global biogeochemical processes (with an emphasis on river-dominated coastal margins and sediment transport), as well as the transport and fate of environmentally important materials. To date, my research has been interdisciplinary in nature and is often targeted at addressing critical societal issues in the coastal zone hence, my recent appointment to the UNC Coastal Studies Institute.

The UNC Coastal Studies Institute was established in 2003 to be an inter-university research institute located in Manteo on Roanoke Island. CSI’s mission is to conduct applied research, offer educational opportunities, and provide community outreach programs that embrace the unique history, culture and environment of the maritime counties of northeastern North Carolina. There are five main research areas at the Coastal Studies Institute: Estuarine Ecology and Human Health, Estuarine and Coastal Processes, Coastal Sustainability and Human Dimensions, Coastal Sustainability and Engineering, and Maritime History. Each research area will be lead by a Program Head and as I mentioned above I am the Program Head for Estuarine and Coastal Processes and I am the first Program Head to reside on the Outer Banks (yes, I’ve made the sacrifice for the department and live on the OBX). A truly exciting part of CSI’s and our department’s future is that soon we will break ground for a state-of-the-art campus for coastal research. The campus will include labs, dormitories, faculty living places, and deep water access to facilitate our departments’ research. I encourage you to visit the CSI web site [http://csi.northcarolina.edu/](http://csi.northcarolina.edu/) to get more information because our department is a major leader in establishing coastal research in the region.

But, what have I accomplished since I arrived in August? Good question! I often feel that I’m in a Twilight Zone episode where I run and run but get nowhere. Actually, I’m pleased to report that although my life is incredibly chaotic at times, I’ve accomplished a lot as I try to serve two masters (ECU and CSI). Of course the first order of business was to get to know people and for people to get to know me. My message was (is) to present the integrated goals of my activities at ECU and CSI and how I will work to make our department a leader in the use of remote sensing for studying/monitoring coastal environments. I have met with some of our colleagues at Elizabeth City State University, UNC Chapel Hill, UNC Institute of Marine Science, UNC Wilmington and NC State and I’m scheduled to present several seminars over the next two months. I have also given several seminars to the general public. Another major task was to acquire the tools (aka toys) necessary to conduct my research. I’m happy to announce that I (we) now have a killer remote sensing lab. I’ve been very busy downloading a lot of imagery (e.g., MODIS, SeaWiFS, Landsat) of North Carolina and trying to quickly infuse remote sensing products into research around the state. I hope soon that you’ll see examples on our web site, journals, and in glossy publications. I also have a robust optical profiling package to be deployed from a ship or small boat. The package has an ACS, AC-9, Eco-VSF3, CDOM and Chlorophyll a fluorometer (all from WetLabs, Inc) and a SeaBird FastCat CTD. Data from this package will be used to “ground-truth” the satellite images as well as examine material transport and fate. On the writing front I have submitted two “full” proposals to NASA, one white paper proposal to RENCI, and made contributions to three other proposals. Some funds are starting to come in to work on applying remote sensing to studies of coastal North Carolina. I also have a project as part of the Gas Ex III experiment in the Southern Ocean that I’m transferring from NASA.

I started teaching in the department this semester. I’m teaching GEOL6950 Geological Data Analysis and I’m really...
enjoying it. As the name implies, I’m covering Data Analysis from a perspective that the students will be taught basic statistical principles including test of hypothesis. However, the course is more than a statistics course – it is a data analysis course and we’re covering various methods to organize and graphically display data using common software packages including SAS, Sigmaplot, Surfer, and Excel. The students have a class project, sort of a mini graduate thesis project in which they research a problem, formulate a hypothesis, collect data, analyze their data, draw inferences from their results, and then “publish” their data using figure formats specified by a journal of their choice. The students seem excited about the class (at least so far) and have been very engaged. So it’s been fun for all.

As I mentioned above it’s great to be back in North Carolina. What I meant was that I went to Duke as an undergraduate (OK, stop all the booing) and I attended NC State for my Ph.D. I’ve always felt at home in North Carolina and now I’m living the dream. Everyone at ECU, especially everyone in our department, has been great to me and now I feel at home at East Carolina University.

Steve Culver

During the past year several of us have produced three documents designed to help the general public, politicians, agencies and coastal managers to deal with the myriad problems that besiege our coasts. Printed in-house, these full color, glossy documents would grace any coffee-table. Their titles, “North Carolina’s Coasts in Crisis: A Vision for the Future”, “Shoreline Change Within the Albemarle-Pamlico Estuarine System, North Carolina” and “Past, Present and Future Inlets of the Outer Banks Barrier Islands, North Carolina” adequately communicate their content. Please feel free to email me if you would like a copy of these documents. At the great risk of sounding like a broken record, when you receive your copy, in return please consider making a donation to one of our Foundation accounts (see the last page of this Newsletter). This would be a very nice way for former students to help current students attend conferences and present their work.

Last August I finished up my stint as Interim Director of the Institute for Coastal Science and Policy. It was good to return full time to Geological Sciences. Three of my coadvised coastal geology graduate students completed their degrees. Chris Stanton got a job with the federal government, Becca Pruitt is working for the NC Geological Survey, and Mike Hale started with an oil company in Oklahoma where two of our recent graduates also work. Another coastal geology student, Lauren Metger, will finish this semester as will Pete Parham who is working on his coastal plain PhD dissertation under the guidance of Riggs, Mallinson and Culver. Five more coadvised students are working on coastal/shelf projects; Kelly Best, Katie McDowell, and Andrew Dietsche on North Carolina projects, Reanna Camp on a project off New Zealand and David VandeVelde on a project off the Mississippi delta. I’m also teaching Paleontology again, after Don Neal kindly filled in for me last year. We had a great field trip yesterday to the classic fossil collecting locality, Lee Creek Mine. That’s the good thing about fossils. Climates change, sea level rises but fossils are forever.

Best regards (and I hope to see you at the pig picking),

Steve Culver

Michael A. O’Driscoll

Hello, I hope you had a good year. Even with the gloomy economic forecasts, this past year has been a good one at ECU. We have been very fortunate to have a variety of interesting projects funded and great students to work on them. Current projects are located in upstate New York, central Pennsylvania, along the Savannah River, Georgia, and within various watersheds in eastern North Carolina.

Lately, there has been a lot of interest in the protection of isolated wetlands, due to several recent U.S. Supreme Court decisions (SWANCC and Rapanos). The court is split on the definition of wetlands that the federal government should protect (jurisdictional). The status quo is that a wetland must have a direct connection with a navigable waterbody to receive federal protection. A debate has ensued that is complicated by hydrological intricacies; how frequently do connections occur between isolated wetlands and the river network and do groundwater connections matter? The legal debate requires scientific guidance and this has resulted in a great demand for more information on the interconnections between surface water and groundwater systems. Our recently completed work on the hydrogeology of isolated karst wetlands in central Pennsylvania has been able to provide a scientific basis for the management of isolated wetlands in the Appalachian Valley and Ridge setting.

A bit closer to home, we have been working on developing a better understanding of the effects of land-use change on stream and groundwater hydrology in Coastal Plain settings. These studies in the NC Coastal Plain have
shown that urban stormwater inputs often result in stream channel incision and a corresponding decline in the groundwater table. The net effect of intense urbanization in a Coastal Plain watershed is the desiccation of the floodplain, a condition referred to as urban riparian drought. This alteration in hydrology can reduce a floodplain’s ability to filter and store sediment and nutrients, and result in declining water quality downstream.

In another study focused on land-use impacts on water quality, we have been studying the effects of geologic setting on septic systems in Carteret County. As coastal populations grow, the density of septic systems along the NC coast is increasing. Along many stretches of our coast, a high density of septic systems exists; in some coastal communities over 200 septic systems per square mile can be found. Studies have shown that over 50 septic systems per square mile may increase public health risks. In the ongoing Carteret County study, preliminary results suggest that the depth to the water table and soil type have a strong link with septic system treatment. In coastal areas where soils are sandy and the water table is shallow, septic systems may be less effective at removing nitrogen and bacteria from wastewater than in regions with deeper groundwater tables and more clay-rich soils. In these settings, where septic systems are less effective at treating water quality, shallow groundwater contamination may occur. The results suggest that current septic system regulations may need to be re-evaluated in coastal areas in order to better protect coastal groundwater quality.

Looking to the future, we will be a different Department next year. I will miss Richard Mauger and Dave Lawrence when they retire. Our seminars will never be the same. Otherwise, the coming year promises to be an exciting one in the Department with new hires, new students, new projects, and new courses. This summer we will offer a science enrichment camp, for which I will spend three weeks teaching hydrology to African-American middle school students from Pitt County. In the fall I will start teaching The Geologic Component of Environmental Science and continue to teach Environmental Geology, Geohydrology of Drainage Basins, and Physical Geology. Currently, I am advising 4 M.S. students and 1 Ph.D. student. A few will graduate this year. Between teaching, advising, research, and chasing around two-year old twins, there is never a dull moment.

Best wishes for the coming year,

Mike

Sid Mitra

I hope this blurb finds everyone doing well and looking forward to the spring. The organic geochemistry program at ECU is officially set up and rolling along. The lab, located in Science and Technology 233, is a state of the art facility with several instruments dedicated to isolating and fingerprinting trace levels of natural and synthetic organic compounds from all sorts of samples: sediments, rock, tissue, water; you name it – we analyze it! Details of some of our ongoing projects will be forthcoming in the next newsletter.

The first departmental graduate student has joined the lab: Ms. Nidhi Patel who is working on climate and carbon sequestration, has been climbing a steep learning curve, trying to learn about Holocene droughts and how they may have affected fires and subsequent black carbon formation. Incidentally, some of the preliminary work from our group leading to her formulating her thesis question will be featured on the Discovery Channel News Network in late February (http://dsc.discovery.com/news/news.html).

Two undergraduate students from ECU’s biology department have also joined the group. Joshua Bartel is working on isolating trace organic contaminants from Florida oysters in the hopes of figuring out if oysters can be used as environmental sentinels for water quality. This is important to determine as Florida’s natural resource agencies attempt to restore the water quality in the Everglades. Caitlin Bell, also from ECU’s biology department, has joined our group and is working on isolating the chemical Triclosan from samples in the Tar River and attempting to correlate its concentration with antibiotic resistance and river hydrology. Widespread triclosan occurrence in the environment is speculated to be a significant contributor to antibiotic resistance but many of the
existing studies have been done in labs. Triclosan and antibiotic resistance in the natural environment is equivocal. Caitlin’s research is testing the hypothesis that environmental levels of triclosan are related to antibiotic resistance. All of the students have been working hard in the early part of the spring 2009 semester properly learning their laboratory techniques, something that is integral to the quality of the work we do. In the coming months, they’ll all be hitting the field to collect samples related to their work. We also picked up a stray in the lab. Sheri Balko from ECU’s Department of Anthropology is using lipids and organic carbon isotopic signatures to find out if the grave site she is working on is truly the grave of Governor Richard Caswell in Kinston, NC, the first governor of North Carolina.

The family is doing great! My wife Paula has started teaching several Kindermusik classes at Boyd Lee Park. Sthir, our precocious 3 year old, has a lot to say. Pranab, our 10 month old, is crawling around and exploring his world with much gusto. He’s also making sure we know that he is teething. Last but not least, Angel our dog is aging gracefully and continues to be the most well behaved member of the family. I wish all of you the best for 2009.

Steve Harper

For those of you have wondered why my title has remained “Visiting Assistant Professor” after being at ECU for more than a decade, you need wonder no more! Due in part to some recent nomenclature changes by the ECU Faculty Senate and in part to a decision by the Department of Geological Sciences Personnel Committee, my title is now “Teaching Associate Professor.”

On the teaching front, my typical teaching duties still include sections of Physical Geology and Environmental Geology each semester and Geomorphology every other year. I am teaching Geomorphology lecture and lab this Spring 2009 Semester and have a record enrollment of 18 students. We recently completed a full weekend field trip to the Shenandoah Valley of Virginia to tour Endless Caverns and Grand Caverns and also observed differential soil development on stream terraces along the North River. In late March, we will take another full weekend field trip to the North Carolina Outer Banks.

I am still the Director of the North Carolina Summer Geology Field Course. I will be teaching the Geology Field Course in New Mexico and Colorado in May and June 2009 for the 11th straight year. For the 2009 field course, our enrollment in the Geology Field Course will be ~20 students. Currently, these students hail from ECU, App State, Guilford College, JMU, Temple University, Radford University, and Texas A&M Corpus Christi Campus. This year after ~2 weeks in Abiquiu and Jemez, NM, we will head south for 3 days to the Valley of the Fires and to Carlsbad Caverns before swinging northward to Sipapu-Taos for 18 days and then up to Almont, CO for the last week of the field course.

After the Field Course concludes this year, I may travel to Southeast Asia and China.

Terri Woods

This past year I have not spent much time on my research because we are still waiting for construction of the proposed Reverse Osmosis Water Treatment Plants to be completed in Pasquotank and Currituck Counties. More major-element analyses of water chemistry have been completed and diagrams redrawn. Therefore, I’ll be able to give a more complete summary of our results at the Southeastern GSA meeting in St. Pete next month. Our results suggest that the impact of effluent on local water quality and biota at the proposed sites should not be widespread or significant with only these two new plants in operation.

Most of my effort has been invested in science education in the public schools. The regional competition for Science Olympiad is February 28th and Geological Sciences is again well-represented with 4 teams of graduate students designing and administering events. We’ll again do the “Plate Tectonics” discovery activity for all the student competitors. I again served as a member of the Advisory Board for the Student Science Enrichment Grant Program supported by the Burroughs Wellcome Fund. I thoroughly enjoy this experience and continue to be excited about the great projects these grants support. The Board reviewed proposals from educators to enhance science education in the NC public schools and awarded a little more than $2,000,000 this year. I have consulted for the Department of Public Instruction reviewing NC honors courses and support documents for earth-science classes. I also gave a weekend workshop to 36 elementary teachers on rocks, minerals, rivers, glaciers, shorelines, topographic maps, etc. Although it was a lot to cover I gave them lots of materials (mostly generated for my on-line course) including readings with images, powerpoints of all lectures, potential lab exercises, etc., and they all said they feel much better-prepared to deal with these topics in their classrooms.

Finally, I finished developing my online course in Physical Geology (with a lab) in December and am currently teaching it. Although several students have dropped, because they weren’t ready for the workload of a science course, the remaining students are doing well. They have just started working with their kits of minerals and rocks and are having some troubles recognizing what they are seeing. Think back to your experiences as TA’s and imagine your students learning to ID and describe minerals and rocks without you looking over their shoulder to
answer their questions. I also expect it will be more difficult for them to understand topographic maps on line.

Because I had all the quizzes, study questions and answers, lab exercises, etc. ready ahead of time, the course has not been as much work as I had anticipated, but I only have 10 students this first time. The 20 students to be expected in future classes will require more effort.

David Lawrence

Well, here it is, my retirement from ECU Geology this spring. I’ve enjoyed all the years since 1983: all my time with the undergrads, the graduate students, the faculty, Graham Building, and Terrania (except for the unlamented roaches and rats). The high mountains of Colorado, and my first days at Field Camp in the Jack’s Cabin area with the students scattered all over Radio Tower hill in the fresh smell of sage will be with me forever.

The Gold Hill shear zone paper did get published last summer, and I am still working on the Gaydens Creek fault paper, which I really need to get out, since a low-angle normal fault is pretty rare in the southeast.

As I listen to the gentle clunk of rocks from the Dynamic Earth lab (211) across the hall, I’m resting from throwing out handouts and exams from past semesters of Dynamic Earth, Historical Geology, Geochemistry, Field Methods, Structural Geology, Metamorphic Petrology, Tectonics, Geology of North Carolina Seminar, Field Camp, Geophysics, and Advanced Structure. (Yes, I really did teach Historical Geology, twice.) (Now he tells me!! Steve Culver.) I also need to start culling research and teaching rock suites from Costa Rica, Honduras, Guatemala, New York, Maine, Newfoundland, Colorado, South Carolina, the N.C. Blue Ridge, and Washington State.

The rocks can’t all go with me, because Sally and I are trying to lighten up to move to Spokane, Washington to get a big dog, a big cat, and plant a big garden with lots of garlic varieties. I also intend to look at the complicated fault system along the “silver valley” over near Kellogg, Idaho, and also the low-angle Newport fault in Washington. Before I get too old, I want to go over Little Giant Pass, and into the Napeequa Valley to look at the folds in the schist. And when it’s cold in the winter, there is always boat-building, ice-skating, and skiing.

Drop by sometime, and we’ll take you up to northern Priest Lake to meet a moose.

Don Neal

Well, this marks the end of 30 years here at ECU and I keep plodding along. With the economy the way it is, I guess I will have to plod along for a few more years but that’s okay since I still like what I am doing…most of the time. I am keeping busy with advising (we have 40 or so geology majors) and assessment, teaching a few courses, and advising one grad student. Some things haven’t changed much except that I am not advising 8 grad students in various states of disrepair at the same time as I have done in the past. You could say older and wiser or, maybe, just older. My grad student now, Megan Ganak, is an “academic grandchild” as she was a student of Joe Allen who was one of my students in the distant past. It is good to keep it in the family. I am still working on some West Virginia gas fields and will present some results at the GSA section meeting in St. Pete.

In addition to the academic stuff, I am still the Secretary-Treasurer of the Southeastern Section of GSA and the National Editor of The Compass of Sigma Gamma Epsilon. Not much time to breathe but breathing is overrated anyway. Hope everyone is prospering. All the best.

Stanley R. Riggs

As ECU’s local curmudgeon, my 42nd year in the ECU Department of Geological Sciences has been great—I look around, smile, take great pleasure in still being a part of the best little program within the University. The Department is very healthy, has excellent leadership, awesome new young faculty, great students, and even has an administration that is in tune with the Department and responsive and supportive of our program. All of you alumni can be extremely proud of your alma mater.

A group of our faculty has produced the following manuscript that many of you may be interested in. The manuscript “Coasts in Crisis: A North Carolina Case Study” is presently in review at the US Geological Survey. This publication considers the problem of coastal hazards from the perspective of a much improved scientific database and understanding of both coastal dynamics and climate change developed by the North Carolina Coastal Geology Cooperative (NCCGC) research program between the USGS, East Carolina University (ECU), and the
The major global shifts in climatic conditions and the associated sea-level responses that have been underway since the end of the last glacial maximum have caused the world’s coastal systems to evolve rapidly through time. Global sea level continues to rise causing the ocean to flood upward and landward across the land surface. Energy associated with tropical and extra-tropical storm systems (hurricanes and nor’easters, respectively) cause this flooding process to be episodic and dramatic as the storm surge and associated waves erode the shorelines and bring massive destruction to human developments built on these dynamic coastal margins.

The coastal zone of North Carolina that we know today is not permanent. It has evolved throughout its history. These changes, which can be both imperceptibly gradual or sudden and violent, continue today and will do so into the future. Humans are moving into this environment in ever increasing numbers accompanied by towns, industry, tourism, and the supporting infrastructure of services such as roads, bridges, water, power, and waste disposal. The changing coastal system is not fragile. It is the fixed human infrastructure that is fragile and can easily be destroyed by natural processes. This is the coastal conflict that we must examine carefully and then manage wisely. The climate is changing, tropical storms and hurricanes will continue to strike our coast as will nor’easters, and sea level is rising at an increasingly rapid rate. We must accept these changes as inevitable but we seem reluctant to do so. This is why our coasts are in crisis.

To preserve the short-term health and allow the long-term evolution of our coastal system, we must allow it to respond to natural dynamics. Society must work towards a better understanding of these ongoing processes or the effects upon human systems will be catastrophic. Natural coastal hazards are understandable and we can learn to live safely and economically with them. However, we cannot and should not ignore or manage the coast as we have done in the past.
Since the publication of the larger “Case Study” could take years to get through the US Government Printing Office, we decided to condense the larger publication into a series of three condensed white papers that are listed below. These publications are immediately available to the politicians, state and local coastal managers, and the public in an effort to educate citizens, managers, and politicians about the ongoing “coastal crisis”. It is now up to the public, elected representatives, and government officials to utilize these scientific data to develop critical resource-use management plans and to make crucial decisions of how to respond to coastal hazards. The three white papers are available in hard copy from any of the co-authors or the ECU Department of Geological Sciences, or they can be downloaded from our web site at the following address (http://www/coastal.geology.ecu.edu/NCCOHAZ/).


In addition, several of us have again worked with Tom Earnhardt and Joe Albee to produce a half-hour program for UNC-TV’s series “Exploring North Carolina”. This program titled “Changing Sands” will initially air at 8:30 on Thursday Feb. 26, 9:30 on Friday Feb. 27, and 6:00 on Sunday March 1. It will also be repeated periodically through 2009 (e.g., April 2, 8.30 pm; April 3, 9.30 pm; April 5 6.00 pm). Science teachers can order free copies of this and other Exploring North Carolina programs from UNC-TV. Other programs that feature ECU faculty include “Climate Change”, “North Carolina’s Other Ocean”, and “Flatland Lakes”.

We always look forward to hearing from each of you, or better yet, come out in the field with us—get your feet muddy and your gills wet before they permanently dry out!

Things are great and life is good! Cheers,

Stan Riggs

Catherine Rigsby

It has been a good year. My classes (Dynamic Earth, Sedimentology, and Sediment Transport and Deposition) went well and my research is moving along nicely. I am still working in northeastern Tibet (the project that would never die!) and I am ramping up the work in the Amazon Basin that I started (with Erin Hemric as my first M.S. student to work in the Amazon) several years ago. The most exciting thing I did this year, however, was serve as host for Professor Edgardo M. Latrubesse and Dr. Samia da Silva Aquino. Professor Latrubesse, who is Argentinean, is ECU’s 2008-2009 Rivers Chair of International Studies (an ECU endowed chair that has traditionally gone to humanities faculty). Dr. Aquino, who is Brazilian, is a physical geographer. Both Edgardo and Samia have spent many years studying the rivers of the Amazon Basin. Samia specializes in fluvial surface processes and Edgardo specializes in the geology and geomorphology of large river basins. During their year in our department we have had great fun discussing current and future projects in the Amazon Basin and beyond. In addition, Edgardo gave talks in the department and elsewhere on campus, led an awesome field trip to the Brazilian Chaco, and co-taught my graduate course in Sediment Transport and Deposition. Samia, Edgardo, and daughter Ada accompanied the sed. transport class on the Cape Lookout field trip – Edgardo serenaded us with Argentinean ballads and even help dig trenches (see photos)! I have enjoyed having them in the department and will miss them next year – although, of course, we will continue to work together on research projects.
I am excited to join the ECU community as a new hire in Biology in August 2008, and more recently to join the Department of Geological Sciences as adjunct faculty this January. My wife Heather, 4 yr old daughter Elke, and our infant son Finn are all enjoying living in Greenville, the (relative) ease of life here compared to where we were living several months ago in Washington, DC, as well as the warm weather which we are all fond of (although I have been congregating with some of the coastal folks at Ham’s for some time now as I was finishing up a postdoctoral appointment).

You might ask “Why on Earth would a new Biology hire be so keen on joining the Geology Department?” My background is actually more in the Geo-Sciences than in the Bio-Sciences. I call myself a “microbial geochemist”- and basically I look at how geochemical conditions impact microbial communities and their activities, and vice versa. As an undergraduate at the University of Wisconsin, I did some of the initial work on a project describing the microbial communities responsible for acid mine drainage- which has since become a template for studies merging geochemistry and genomics. In graduate school at the University of Washington, I studied the organisms which live in black smoker chimneys at the Mid Ocean Ridges, including those which live near the upper temperature limits for life. An important characteristic in both of the systems are microbial growth on mineral surfaces in polymer-encased structures known as biofilms, whose organic geochemistry I learned to characterize during a postdoctoral appointment at the Carnegie Institution of Washington. While the ecosystems I have described so far seem exotic, even esoteric, understanding the complex and poorly described interactions of microbes with surfaces is an extremely timely area of research- most microbes in natural environments grow as biofilms!

At ECU, my research is aimed at building up genomic, geochemical, and biotechnological tools to improve our understanding of microbial biofilms. A primary focus of this research is the continued exploration of biofilms in hydrothermal vent systems- as these environments resemble those expected to be present early in Earth’s history, and mineral-catalyzed reactions likely played a role in the origins and early evolution of life. Some of the environments where my lab conducts active research include the black smokers of the Juan de Fuca Ridge (near Washington state), the serpentinization-driven system at the Lost City Field (Mid Atlantic Ridge), and the shallow marine hydrothermal system of the Aeolian Island Archipelago (near Sicily). Some of the important scientific questions we are addressing include, “To what extent do mineral catalyzed reactions provide nutrient and energy sources for life?”, and “What are the specific benefits provided by microbial growth on surfaces?”, and “What are the rates and activities of chemical processes catalyzed by the largely undescribed species that inhabit these systems?” Another important topic I am involved with is the study of the “Dark Energy biosphere”, the microbial community which inhabits deep subsurface environments below the continents and oceans and is supported by energy stored in chemical disequilibrium, not photosynthesis. The global extent of this deep biosphere is huge, containing Carbon perhaps equivalent to that in green plants; however next to nothing is know about the microbes which inhabit these ecosystems. Our studies of hydrothermal systems tie in to the larger scale efforts to explore the deep biosphere, which involved the International Ocean Drilling Program, among other entities.

In addition to the research I’ve described, I am also involved in a number of different educational efforts at ECU. I am supervising undergraduate and graduate research on projects in marine biotechnology, biogeochemistry in coastal NC, and hydrothermal vent microbiology. I teach Introduction to Microbiology for undergraduate Biology majors, but other students are certainly open to take the course. In fall 09’, I will begin teaching “Astrobiology: The
Planetary Context of Life” to upper level undergraduates and graduate students (see http://core.ecu.edu/schrenkm/astrobology). The course is intended to improve science education for undergraduates and will involve the participation of guest lecturers from the NASA Astrobiology Institute (NAI). Astrobiology is funded for the next 5 years, through an Education and Public Outreach effort through the NAI, and should be an exciting and fun opportunity for students at ECU.

As a geo-microbiologist with an extensive background in Geology and Oceanography, I anticipate developing numerous collaborations with colleagues in the Department of Geological Sciences over the next several years. I look forward to interacting with both faculty and students from the geosciences, and my laboratory is always open and available as a resource. I am eager to play a role in the growth of interdisciplinary science at ECU!

JP Walsh

This year has been a flurry of activity. I have been working with several students and faculty on a variety of research and outreach endeavors within North Carolina. For example, Lisa Cowart, who is aiming to finish her Masters this spring, has been conducting a project to map and understand variability in estuarine shoreline erosion of the Neuse River estuary; this is part of a NOAA-funded project involving Corbett, Riggs and others. Her work highlights the considerable erosion occurring in some non-oceanfront areas (locally up to several meters per year and averaging >0.5 m/yr along the estuary trunk). To expand on our understanding of estuarine erosion, we are currently working closely with the Division of Coastal Management to map the estuarine shoreline and coastline structures of Beaufort and Hyde counties, and this is the beginning of a larger effort to delineate the shoreline of the state. This contract work will enable other exciting related research. Sophie Dillard, who finished last fall, used in situ measurements of waves and currents along with radionuclide analyses of cores to evaluate seabed dynamics in the Neuse River estuary. Her research quantified the frequency of resuspension and provided new data to highlight the occurrence and importance of wave remobilization. Reide Corbett and I co-advised her thesis and look to expand her work.

Also in the past year I have spent much time building a web site on coastal hazards of NC, in collaboration with others in Geological Sciences and Geography. Please check out the North Carolina COastal HAZards Decision Portal (NC COHAZ for short): http://www.coastal.geology.ecu.edu/NCCOHAZ/. Here you will find access to hazard research and related products by several ECU faculty.

Since last March, I have also been involved in and planning for future research well beyond North Carolina. For example, I have been working in the final year of an NSF project aimed at understanding sediment dynamics and strata formation on the continental slope of New Zealand; several publications are pending. Also, in collaboration with Reide Corbett and others, we created a proposal to build on this work, and it looks like this will be funded by NSF enabling more extensive work in New Zealand in 2010. I have also be fortunate to attend several valuable meetings: a general ASLO conference in France, a Coral Reef Ecosystem Studies workshop in Puerto Rico and a SEPM meeting in Wyoming on Clinoforms. These were all great opportunities to share my work and learn from others. Some highlights of my year include: 1) exploring the mountains of NC with my family, 2) touring the geology of southern Europe and 3) pounding on the sedimentary rocks of Wyoming.

Reide Corbett

Every year I sit to write this update, the first thing to come to mind is our previous Pig Pickn’. Ultimately our last large gathering as ECU geologic community…always a great time, rehearsing old times, creating new memories. I certainly hope to see many of you in a few weeks at the annual event! I’ll try to stay out of the mud this year…I promise Spruill!
Much of my research efforts this year have been spent a bit more locally. Our research group has focused on coastal North Carolina, including issues surrounding sea level rise, marsh sedimentation, shoreline erosion, and estuarine observing. David Lagomasino (Geology MS student) has been working tirelessly on sedimentation in two marshes in the Pamlico River Estuary and Pamlico Sound. His research relates marsh inundation, waves, and shoreline erosion to short-term sediment deposition along a shore perpendicular transects at each location (Figure 1). This work is tied closely with the development of a landscape model by Enrique Reyes (ECU Biology and Institute of Coastal Science & Policy). The hope is to provide realistic parameterization of marsh dynamics that will allow Dr. Reyes to more accurately predict changes that coastal NC should expect in the near future.

Walsh and I have been working to see that North Carolina’s Albemarle-Pamlico Estuarine System receives full benefit from the latest innovations in environmental monitoring, creating an estuarine observing system (Figure 2). We have formed a partnership with Jeffrey Hanson at the U.S. Army Corps of Engineers Field Research Facility and Nancy White and Mike Muglia of the UNC Coastal Studies Institute to establish a real-time observation platform in Albemarle Sound. This observing platform includes an above-water meteorological package, a water quality meter (salinity, temperature, turbidity, dissolved oxygen, chlorophyll), and a bottom-placement instrumented tripod that measures wave heights and the strength of currents as well as water turbidity. Data is being automatically relayed to a server via cellphone. This work has important implications for the fate of pollutants, and our work has demonstrated that the sedimentary record of the Albemarle-Pamlico system provides an excellent history of environmental changes experienced by this volatile region. Recent research efforts have brought us together with several other ECU faculty members, including Lisa Clough (Biology), Joe Luczkovich (Biology, ICSP), Enrique Reyes (Biology, ICSP), and Mark Sprague (Physics), in work whose leitmotif is understanding ecosystem dynamics of the system. It is hoped that the time series of information relayed by this and future observing platforms will bring new understanding to the physical, chemical, and biological processes at work in our estuaries.
**Figure 2.** The Albemarle-Pamlico Estuarine System is the largest lagoonal in the nation and one of the most active severe-storm regions in the world. We are beginning to monitor the system real-time in several key locations. Although these real-time observing systems will monitor chemical and physical properties and send data directly to our computers via the internet, nothing beats a day in the field!

One of our goals is to get our research results out to the public, managers, and those people with political persuasion. Along these lines, I spent some time putting together a glossy summary of our work on shoreline erosion in the Neuse River Estuary (http://www.coastal.geology.ecu.edu/NCCOHAZ/downloads/NC%20Estuarine%20Shoreline%20Change.pdf). This short summary of our NOAA-funded research demonstrates the dominance of erosion along the shore of our estuaries, regardless of shore-type (e.g., marsh, beach, bluff; Figure 3). It is imperative that we better understand the potential changes coastal North Carolina faces in the near future so that we can manage the natural resources appropriately. It is our hope that publications such as these, along with our web-related efforts (NC COHAZ) will provide the public a mechanism to become better informed about their surroundings.
Figure 3. Map of shoreline change rate between 1958 and 1998 (40 years) along the Neuse River Estuary. Areas with higher erosion rates are denoted by yellow to pink, while areas that have accreted are represented by green to purple.

The year has also brought a lot of excitement beyond just our research endeavors. My family and I enjoyed time camping in the NC mountains, a trip to Disney, and some fun times on our 25’ sailboat (although I have since sold it). I was lucky enough to travel to San Francisco for the annual AGU meeting and see my new born nephew. In addition, JP and I spent some time in Europe presenting our research at the ASLO meeting. It was a good meeting, but we also had some time to enjoy the surrounding area (Figure 4)! It was the first time I tasted and swam in the Mediterranean…hopefully not the last. I hope your year was as much fun and productive.

Figure 4. Corbett and Walsh presented recent research results at the ASLO meeting in Nice, France…La Cote d’Azur.
Dave Mallinson

Another busy year has passed, and the department continues to expand and excel. As you all know, we’re in the midst of five searches for new faculty, which is a great sign of the value placed on the department by the administration, and a credit to the performance of the faculty and staff. My work continues in North Carolina, as several of us attempt to understand past changes in the coastal system, and how that may inform us of the changes in store for the future. A new slant on this is using models to hindcast tidal changes in the system in response to past changes in coastal geomorphology and sea level, which we’ve defined based on the geologic record. Over the last year I’ve been privileged to present this research at a number of meetings ranging from the American Geophysical Union meeting in San Francisco to a National Science Teachers Association meeting in Charlotte (among many other forums). In addition, service with the Integrated Ocean Drilling Program Site Survey Panel recently took me to Busan, Korea. Although most of my work remains in the NC coastal system (3 students now, working near Hatteras, Bogue Sound, and Core Sound), I’ve expanded my horizons a bit by doing work with Mike O’Driscoll in up-state NY, looking at geologic controls on groundwater conditions in the Onondaga Formation. Also, I’m gearing up for research in Malaysia in June with Steve Culver and Reide Corbett. So, geology continues to excite and surprise.

Richard Spruill

I hope that this message from the Spruill’s finds all of you doing well. It has been a very busy year, but Lisa and the kids are doing great – Anna (18) is a junior at D. H. Conley, and Alex (20) is enrolled at Pitt Community College – Lisa is as beautiful as ever, and she never waivers in her support of anything that I ask of her, no matter how ridiculous! After almost 30 years at ECU, I remain excited about the Department and I continue to enjoy teaching my classes in Mineralogy/Petrology, along with two courses in Groundwater Hydrogeology. I am working on some really exciting projects in applied hydrology from Savannah, GA, northward to Baltimore, MD, with a side project in Manhattan, KS. Instead of telling you about all of the great things that I am doing right now, I chose to use the rest of my newsletter space to talk about a couple of important issues.

First, the Department is an exciting place these days – we have hired lots of new faculty, and they are doing great things, as you will undoubtedly note in this newsletter. We have great leadership in our Chairman, Steve Culver, and our undergraduate and graduate programs are healthy. Second, this is an important year for our Department because both Richard Mauger and David Lawrence have announced their retirement, effective at the end of Spring 2009. We have been searching for their replacements (an impossible task!), and we are pleased that we have viable candidates for both positions.

I want to ask you to help me out with two important things. I know that both Richard Mauger and David Lawrence have been influential people to many of you. From my perspective, I was Mauger’s first M.S. student at ECU, and his influence on my career is monumental. His intellectual curiosity, his attention to detail, his teaching intensity, and his friendship are among the many things that are nothing short of inspirational to me. Similarly, Dave has been a great friend and colleague for years, and I cherish our time at Field Camp together, along with our many discussions of local and regional geology. Now, here is what I am requesting from each of you:

- Please plan to attend the Pig Pick’n this year at our place, where we will have an opportunity to celebrate the careers and contributions of Richard and Dave. In preparation for the celebration, will each of you please send me a few words, or a photograph or two, of some special aspect of your relationship with these two guys (spruillr@ecu.edu). I plan on putting this information together in some special format and to share it at the party. I hope that you will be there to offer congratulations to Richard and Dave – you are welcome to share your thoughts during the ceremony.

- I have worked with Steve Culver to establish a Lawrence/Mauger Retirement Fund, as part of our larger Foundation Fund. Please consider a special and continuing contribution to this fund. We are dedicated to using this fund to support student travel and research, both of which are vital to the health and success of our educational programs. I am happy to report that I have contributed the first $100 to this special fund, in appreciation of the long-term efforts of Richard and Dave. In order to contribute to this special fund, simply write a check to the ECU Foundation, indicating Lawrence/Mauger on the memo line on the check, and mail the check directly to Dr. Steve Culver, Chairman (Department of Geological Sciences, 101 Graham Building, East Carolina University, Greenville, NC 27858) and Steve will ensure that these donations are placed in the proper account for faculty-approved use by our students. See the form attached to this newsletter.
I know that the Department of Geological Sciences at ECU has played an important role in your life, and I am now asking you to help us continue to grow and contribute to the lives and careers of a new generation of students. Dave and Richard, through their consistent and long-lived contributions, have helped to elevate our Department to the current position, as the absolute Best Geosciences Department in the State and in the region. Please consider helping us take the next step forward in our evolution, and that is the undisputed leadership position in ALUMNI support of our efforts. Thanks, and see you at the Annual Pig Pick’n at the Spruill’s.

Jim Watson

Hi Gang. Hope you all are enjoying your lives and careers. This is the year the world has gone from boom to bust, and our department is no exception. Last year we were able to install a new x-ray diffractometer, and then, amazingly, at year-end, the university bought us a new x-ray fluorescence spectrometer. We managed to get slightly used demo units in both cases, which allowed us to get about twice the instrument for the money, and in both cases we couldn’t have wanted anything more at any price. Dr. Mauger has re-run all his samples on the new XRD, and is super-pleased with the results.

Now we are in the year of the bust, and as I write, I am begging money for standards. Who knows….maybe some of those things I didn’t throw away will come in handy as we work through the lean times.

Meanwhile, the amazing John Woods becomes more indispensable with each passing week. He is now the go-to guy for all things computer in the department, and is truly our official boat guru, as well as breathing new life into many a worn out instrument. We both enjoy the occasional opportunity to pitch in with field work. Also….don’t forget the Geology Alumni Weblog. Check it out for photos from last year’s pig pickin. All are welcome to contribute to the blog. Send us your exploits, and we’ll get them posted. Here the location: http://ecu-gas.blogspot.com/

Dare Merritt

Things are good in the Geo office. Michelle Yoder has been on board with us a little over a year and it’s wonderful. My family’s great. Both Allen and I lost our last parent last year, my father (91) from cancer and his mother (90) from injuries as a result of an auto accident. It was an exhausting year mentally and physically but we had them a long time and have adjusted okay. Can’t believe I have been here 29 years this summer. I’m not counting down yet but if I ever have grandkids all bets are off. 😊

Graduates During the Past Year

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<td><strong>Spring 2008</strong></td>
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<td>Cynthia D. Muston</td>
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<td>Katherine Marciniak</td>
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<td>Jena Bradley</td>
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<td>Peter Bradyhouse</td>
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<td>Michael C. Walker</td>
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Dear alumna/alumnus,

Happy New Year! Life continues to be good in your old department. This semester is very busy because we are interviewing for five new faculty members! So we may be crazy in undertaking another major initiative, but here it is.

As part of our strategic plan, we are reviewing the education we provide in the Department of Geological Sciences at ECU. In particular, we are investigating whether your educational needs were met in terms of geologic knowledge, quantitative skills and critical thinking/problem solving abilities. We have devised a short survey instrument to address these questions which takes 10 to 15 minutes to complete. We truly hope that you will complete the online survey (our preferred method of response) or print it and send a hardcopy to Michelle Yoder, 101 Graham Building, Department of Geological Sciences, East Carolina University, Greenville, NC 27858 (Tel. 252 328 6360; Fax. 252 328 4391). Note, we would like to have all responses the end of March (but we will accept them until the end of April).

You can access the survey at http://www.geology.ecu.edu/alumni_survey.htm. If you would like us to send you a hard copy of the survey then please let Michelle know.

I would like to thank you in advance for doing this. Your response will be very important to us as we strive to improve the Department.

Sincerely,

Steve Culver
Chair, Geological Sciences
East Carolina University

Save the Date
Spring Pig Pickin’
Saturday May 9
SPRUILL’S
East Carolina University Foundation, Inc.
Thomas Harriot College of Arts and Sciences
Department of Geological Sciences

Yes, I would like to support the Geological Sciences!
Please use my gift for the following:

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IF YOU WOULD LIKE TO CONTRIBUTE TO A SPECIAL FUND IN RECOGNITION OF THE CONTRIBUTIONS TO ECU GEOLOGY BY DAVE LAWRENCE AND RICHARD MAUGER, PLEASE REFER TO RICHARD SPRUILL’S PIECE IN THIS NEWSLETTER.