Geological Sciences Spring 2001 Newsletter

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Congratulations to our Students as they become Alumni of the Department of Geological Sciences

On March 28 the Department invited graduating students at B.S., M.S. and Ph.D. levels to the Faculty/Staff Spring Dinner. Chairman Cahit Coruh and the Department felt the need to provide a ceremony recognizing the transition to alumni status and the desirability of generating stronger ties between the Department and Alumni. Lynn Glover, Chairman of the Alumni Relations Committee had the following to say:

"Congratulations to the graduating students here tonight on your success at Tech. And welcome to the next stage in your relationship with us as Alumni of the Department of Geological Sciences. In a minute you will understand why you never really get rid of us!

But first let me introduce you to the Department's Alumni Relations Committee, some of whom you already know in other capacities… (introductions).

So what does the Alumni Relations Committee mean to you? Here are the three principal things that we do:

1st - We publish the Department Newsletter

This 30-page publication is your connection to news from your classmates and faculty. It is a medium for arranging reunions. It is also a connection to over 1200 alumni of your Department, some of whom could become your mentors.

2nd - We arrange Alumni/Faculty dinners and programs on campus

Every fall on a Friday during football season we have a dinner for visiting alumni and their guests, which is attended by faculty. Guided tours, local field trips, visits to new facilities such as the Smart Road can be arranged on Friday or Saturday. These dinners have become quite popular. Thirty people attended our first dinner in 1995. Our dinner last fall included 80 alumni, guests and faculty.

3rd - We have now started to bring Alumni/Faculty dinners and programs to major centers of concentration of our alumni. March 16, 2001 we had our first off-campus dinner in Houston, Texas. Houston is a center for petroleum research and exploration and our department has about 95 alumni there. Cahit Çoruh, the Dean of Arts & Sciences, and a few staff and faculty accompanied us to the dinner to meet with over 30 alumni and guests. We toured Texaco and Exxon facilities, gave two brief synopses of relevant faculty research, and saw our graduates in action on the job. We also strengthened the network of alumni and updated Texaco and Exxon on the Department's capabilities and plans for growth.

The Alumni Relations Committee is also available to help you with questions related to alumni affairs and finding classmates, and you will see us on the Department's Home page along with past issues of the Newsletter.

Finally, I should mention why we put so much effort into alumni relations. The Department derives great strength from a close Alumni/Faculty relationship. It is an opportunity to share our successes and to enhance our future together. You are our product and we are judged by your success. Likewise, our growth and recognition will reflect well on you. So you see, we are all in this together.

Now, don't forget to keep in touch. Send us your address when you move and also send a note about your activities for the newsletter.

Thank you, and congratulations to each and all."

Following the dinner one of our alumni, Mr. William A. Moon, BS '55, MS '61, gave an inspiring talk on his career with Texaco exploring for North Sea Oil. During his 25 years in London working on and directing this large oil and gas exploration program a billion barrels equivalent of oil was discovered. For his great contributions the British Crown named him "Officer of The British Empire," an honor received by only one other American in the preceding seven years. We are exceptionally proud of his accomplishments.

In closing the evening, Cahit Çoruh thanked Mr. Moon for his inspiring presentation by saying: "Thank you Mr. Moon for reminding us what a graduate of this department can do. We appreciate you very much for preparing this presentation for us. You reminded us that Virginia Tech Geosciences graduates have had their contributions in solving the world's energy problems. With your presentation, you took us into the geology of the North Sea oil fields. In return, we would like to take you back to your Giles County mapping days. We hope you like this reproduction of the Cascades by Robert Tuckwiller. It is signed for you by Mr. Tuckwiller. Please join me to thank Mr. Moon."

Department History - Faculty Perspective:
More on Geophysics: Reflection Seismology and Heat Flow, 1967 - 1997
Recollections of John Costain

Conclusion - see Fall 2000 Newsletter for Part I

The permanent technical support staff in reflection seismology/heat flow was not entirely on hard money. Mildred Memitt came to work in the Department in July 1979 as a bookkeeper for the DOE-sponsored Geothermal Program. In September, 1979, she took over as Lead Computer Operator for the VAX 11/780 computer that was installed for the processing of reflection seismic data being acquired by the Virginia Tech Vibroseis Crew for the geothermal program. From 1979 to 1998, when she retired, Mildred was on soft money. She was the software applications person. Her support was invaluable, and has been documented by geophysics graduate students in reflection seismology who are invited to recall fondly what they wrote in the acknowledgments of their Theses and Dissertations (http://rglsun1.geol.vt.edu/Mildred.html).

Operating a seismic crew does not conveniently fit in with the schedules of students, so although we started with some student help, we eventually evolved into a full-time non-student seismic crew. The patience, dedication, and competent efforts of the entire crew, especially Wayne Compton (Vibrator Mechanic), Bill Davis (Foreman), Frank Greenlee (Instrument Operator, and the departmental and project support staff are gratefully acknowledged. We worked in a research mode and rarely did things the same way twice ("If we knew what it was we were doing, it would not be called research, would it?" —Albert Einstein), often under difficult and rapidly changing circumstances. For a seismic energy source we only had one single large Model Y-1100A vibrator manufactured by a well-known company named Failing, Inc. If that vibrator malfunctioned, then the entire field operation shut down, but we still had to pay the salaries of the crew. John recalls the day when he walked into the office of our beloved then-Chairman, Dave Wones, and said "Dave, I need to talk with you about the Failing vibrator." "What?!," shouted Dave, leaping up from his chair. "John, you didn't tell me there was anything wrong with the vibrator!" "Wait Dave," replied John while quickly backing out of strike range. "The vibrator is fine. It's not a-failing. It's a Failing. There's nothing wrong with it. I just need you to sign a purchase order for some more supplies." Dave breathed a prolonged sigh of relief, sank back in his chair, and we both got through another day.

Concurrent with seismic data acquisition, we had a major in-house drilling program with our own drills and drillers and obtained a cumulative total of tens of thousands of feet of crystalline basement core from the exposed Piedmont as well as from beneath the Coastal Plain sediments. We started with a Longyear Model 38 core drilling system and later upgraded to a Model 44. If you are not familiar with drills, one like that is designed to recover core from depths of thousands of feet; it is not for the faint of heart. The core we recovered from crystalline basement is still stored on campus, available to interested investigators, and, in fact, was sampled in April, 2000 by a scientist from Woods Hole. John distributed daily drilling progress reports that were circulated to the other principal investigators, graduate students, research associates, and technical personnel on the geothermal project. These reports were prepared after telephone calls from Bill Coulson, our congenial and dedicated head driller, who faithfully telephoned me at home every evening from the field. One night the call came late, the phone rang, Rose answered, shook me out of a deep sleep and said "It's Bill Coulson." She handed the phone to me and Bill started filling me in on the drilling progress. While he was talking, every once in a while I groggily injected something appropriate like "That's great," "OK', "Hmmm," finally degenerating to something unintelligible (—sounds like zzzzz)— and then I fell asleep, while still holding the phone, and with Bill still talking. Rose tells me she explained the situation to Bill and hung up. It was the first time I ever fell asleep while talking to someone on the telephone. The next time I saw Bill Coulson, he was still laughing.

In late 1980, I received a phone call from our DOE program director in Washington who wanted to know if the objectives of our geothermal program had been reached. We had confirmed the radiogenic model, a deep test well had been completed at Crisfield, Maryland, and Laczniack (M.S., 1980) had used an "integrated finite difference" numerical model to simulate an injection/pumping dipole, demonstrating that the (now) known permeability values in the Coastal Plain sediments were high enough to sustain a

geothermal system. (The economics of a viable geothermal system in the eastern United States were in the capable hands of the Applied Physics Laboratory at The Johns Hopkins University; we were only concerned with the scientific aspects.) I reluctantly said "Yes, we had reached our objectives," and the program wound down to end in June of 1982.

Meanwhile, the Soviet Union was undertaking a successful program of drilling to depths of up to 15 km in crystalline rocks. Everyone has heard of the Kola Peninsula hole (12 km deep) and the Soviets were pursuing an ambitious and successful program of deep drilling for purely scientific purposes in a number of other locations. Why weren't we doing the same thing in the U.S.? We needed to catch up. In 1983, we were invited by Professor Bob Hatcher of the University of Tennessee to contribute our expertise and participate in a multi-university NSF-sponsored study to site the first ultradeep scientific hole to be drilled in the United States, in northwestern South Carolina. The proposed ultradeep hole was slated to reach a depth of 10-12 km, cored all the way. The objectives were to sample Grenville basement and on the way down to core through the allochthonous Inner Piedmont, continue down through the famous Brevard Fault Zone —a structural lineament that extends from Georgia to Virginia and can be seen from orbit and about which some twenty hypotheses had already been proposed regarding its origin and tectonic significance, —on down through autochthonous Paleozoic shelf strata into an Eocambrian(?) basin that was imaged on the regional seismic data, and wind up below that in crystalline basement. The project acronym was ADCOH (**A**ppalachian ultra**D**eep **CO**re **H**ole). Bob Hatcher tried to push the name "AppleCore" but some thought that was too frivolous for a multi-million dollar program. Virginia Tech was to determine heat flow values, design and supervise the field acquisition by GSI of the regional seismic reflection data, process the seismic data, and collaborate with several other universities in the interpretation of all of the data. We were not ADCOH's first choice, though; Cornell's COCORP was, because they had already shot several lines in the southeast. Their calendar was full, however, and additional regional seismic lines were clearly justified. But what resulted from our involvement was a series of regional lines that was heralded as being "the best crustal reflection data obtained to date anywhere in the world." Interpretations of earlier COCORP data were revised. The ADCOH seismic data (Scott, 1987; Laughlin, 1988; Hubbard, M.S., 1990) were so good that I actually heard (tongue-in-cheek, I'm certain) that funds to drill an ultradeep hole in that South Carolina location would now be unnecessary! I was also told that some suspected I was withholding information about why our data were so good compared with that obtained earlier by COCORP —in the same area. Here's the secret, revealed here for the first time! The recording aperture was designed so that the expected normal move out at the depth of the target reflector (top of Grenvillian basement) at the farthest receiver offset would be in the range of 80-100 ms. Furthermore, to avoid any 60 Hz noise I chose an integer two-octave bandwidth with an upper frequency limit as close as possible to, but less than, 60 Hz. Hence, a 12 sec, (1-sec taper on each end) pilot upsweep of 14-56 Hz. Some secret. Sadly, the ADCOH project was not continued after the preliminary site selection investigation was completed, even though the heat flow data predicted benign temperatures at 10 km, and the core and the seismic data would have provided a remarkable pencil of information for subsequent extrapolation and correlation with the geologic framework in all directions, and the fluid pressures at 10-12 km were expected to be simply hydrostatic. Politics soon reared its ugly head about where the best site for an ultradeep scientific hole really should be located. Concerned letters were written by Hatcher and me to the NSF about the apparent political nature of the decision to abandon the ADCOH site, which, even if the site didn't suit everyone, might have launched this country into a multi-hole, ultradeep (15 km) scientific drilling program that might now be a line item in the federal budget.

Anticipating the end of sustained funding from DOE, we had been looking elsewhere for financial support. DOE said from the beginning that they were not interested in supporting a full-time seismic crew indefinitely. During and after the geothermal program, Lynn Glover, Cahit Çoruh and I received funding from such diverse sources as the Nuclear Regulatory Commission, the U.S. Geological Survey, the Virginia Division of Mineral Resources, Maine Geological Survey, Sohio, Chevron, Southeastern Exploration and Production Corporation (SEPCO), and many others. We wrote dozens of research proposals. In 1981-83, Sohio was delighted to take advantage of any available crew time. Ditto for SEPCO and Chevron. Each project gave us a little more insight into the local or regional geology, and we were given permission to publish the results. In 1984 we three received a grant of $232K from the NSF to upgrade the reflection seismology instruments. From 1982-84 we created the Virginia Tech Vibroseis Consortium (VTVC) and thought up projects that would be of interest to us as well as to industry and governmental subscribers, who contributed $20,000/year. Cahit and I also had a non-vibroseis "Thin-Bed Consortium" that focused on the theoretical aspects of thin bed detection (Marangakis, M.S., 1983; Bryan, M.S., 1985) and the seismic

response expected from sequences of thin beds (Brennan, M.S., 1985) as well as the potential of high resolution seismic data to examine (and reinterpret) the depositional environment of coal (Weisenberger, M.S., 1985). These were exhilarating times for me —especially the learning part and exploring new ideas that were triggered by data arriving almost daily. Although we gave and published many papers, at times it was an exhausting effort and it became obvious that without a sustaining sponsor like DOE or the NSF, we could not maintain a full-time seismic crew. At one point we did have a brief discussion with the NSF, and it appeared that there might have been an "opportunity," perhaps, to submit a proposal and become some kind of a central NSF-supported reflection seismology facility in collaboration with other universities; however, that would mean we would have to become involved with projects that might be of little interest to us. The days of full-time seismic data acquisition were over, and in May of 1988, we sent our inventory of vibroseis and drilling equipment to Virginia State Surplus Property to be put up for sale.

A major contribution that resulted from the collaboration of geologist Lynn Glover and his students and geophysicists Cahit Çoruh and John Costain and their students was an understanding of the tectonic framework along Lynn's "James River Corridor" (later to become part of the GSA DNAG Corridor E-3) in Virginia. The geologic cross section and interpretation that eventually resulted from this collaboration is the most complete and best documented of any geologic/geophysical traverse on the passive margin of the eastern United States. The union of surface geology and the subsurface images obtained by the Virginia Tech seismic crew, as well as our reprocessing of available seismic data from other sources, particularly U.S.G.S. seismic line I-64 and the regional Petty-Ray lines, led to a clear understanding of where the elusive Taconic suture was not located in Virginia. Collaborations with other institutions and agencies made possible extended geographic excursions of the seismic crew, and these, combined with a computer-intensive effort, provided background for geologic interpretation in the Corridor. We were able to recognize similar seismic signatures from the crystalline terranes beneath the Culpeper Basin north of I-64 all the way to Georgia (Brennan, M.S., 1985; Pratt, Ph.D., 1986; Lampshire, 1992; Pappano, M.S., 1992; and unpublished data). We were among the first to integrate the regional seismic data with major potential field anomalies that can be traced from Virginia to Georgia (Pratt, Ph.D., 1986; Pappano, M.S., 1992; Peavy, Ph.D., 1997).

In 1990, Cahit and I turned our attention exclusively to computer-intensive research, including the reprocessing and interpretation of reflection data of interest to us but acquired by others. For the most part, we had been working with vibroseis data, which are different. Such data are conventionally displayed after a "full correlation" with a "pilot sweep;" however, a "partial correlation" is also possible, which allows you to look considerably deeper into the crust to depths never before seen on a particular data set. Pratt (M.S., 1982; Ph.D, 1986) used this technique with remarkable success in central Virginia. Furthermore, Çoruh and Costain published about a procedure that results in a considerable increase in seismic resolution. We called this "vibroseis whitening." Çoruh took this idea much further and showed that the increase in resolution could be recovered from *any* seismic source, whether offshore, onshore, vibroseis, or explosives! In addition, Çoruh introduced what he called the "automatic line drawing" (ALD), which minimized the subjective drawing of lines on a seismic record section to emphasize the location and quality of a reflector. Now we let the computer generate a quantitative measure of reflection quality on the basis of coherency and continuity between traces, and plot out a trace whose amplitude was a measure of this coherency. These novel computer algorithms, and so many others, provided financial support for our program for many years. It wasn't just "vibroseis whitening" and all the rest, but also Cahit's novel approaches to imaging and interpreting deep as well as shallow subsurface structures, and combining the two using composite refraction-reflection stack sections, that kept our research creative and stimulating over the years (Laughlin, M.S., 1988; Sen, M.S., 1991; Moore, M.S., 1997). We have several years of results that await publication.

One of our more publicized examples of reprocessing with partial correlation, vibroseis whitening, and the ALD was the U.S. Geological Survey I-64 vibroseis line across central Virginia (Pratt, Ph.D., 1986), a line that was acquired by GSI. This image remains the best regional look at the reflective upper crust and Moho in the eastern United States, and provided support that eastward crustal thinning was a Mesozoic feature. In South Carolina, the unprecedented clear deep crustal images of Domoracki (Ph.D, 1994) from reprocessed Conoco data obtained by using only two vibrators gave us new insight into the geometry and root zone of the Blue Ridge Master Decollement and associated major thrusts and should remain a reference standard for the southern Appalachians for years to come. Minnich (M.S., 1996) revisited an industry reflection seismic data set and enhanced its temporal and spatial resolution. We even reprocessed some of our own data (Belcher, M.S., 1984) and were pleasantly surprised to discover that the

version of Belcher's thesis published in the SEG journal Geophysics was later selected by an editor for inclusion in a special volume on vibroseis data acquisition and processing.

Processing can introduce many pitfalls. We didn't wait until the processing was over before making a geologic interpretation. Cahit emphasized "interpretive processing," which means that we should think about the geology during the processing. Nothing about processing is routine. His emphasis on interpretive reprocessing led us to think about the introduction of the regional geology at the earliest possible stage —starting with the survey data, in what we called "tectonic strike binning." Crooked-line (land) data should be processed, or reprocessed from scratch, by projecting the data in the direction of the regional tectonic strike. Results by Bill Domoracki, Cahit, and me using synthetically-generated 3-dimensional multifold data convinced us that this was the way to go. But there were some problems with some real data. The fold (number of reflection paths from the same "point" in the subsurface) turned out to be highly variable. Sam Peavy cleverly solved the problem by projecting pre-processed CDP gathers — filtered, deconvolved, and corrected for statics — onto the new, straight, dip-directed CDP line and using small gathering bins — 1/5, say, the size of ordinary CDP gathers, thus allowing the collecting of lower fold CDPs into CDPs with more uniform fold. This equalized the fold along directions of regional tectonic strike (Peavy, Ph.D., 1997).

We went far and wide trying to understand how the orogen was assembled, —from Maine where we contributed (in *Geology*) a striking crustal image that included the crust-penetrating, steeply-dipping Norumbega Fault Zone, southwest to Georgia, and west to the New York-Alabama Magnetic Lineament where Deb Hopkins (Ph.D., 1995) showed everyone for the first time (in this location) the Grenville Front Tectonic Zone as well as the deep crustal setting that cradles the Eastern Tennessee Seismic Zone, and east to the easternmost Atlantic Coastal Plain. I received a request as late as 1999 for a reprint of the published version of King's (1980) M.S. thesis, with his Atlantic Coastal Plain correlations between onshore and offshore well logs and seismic data. Our group became experts at imaging and interpreting faults in the sediments of the Atlantic Coastal Plain, an area of critical impact for groundwater use. The results of Yantis (M.S., 1978), Bielanski (M.S., 1981), Dysart (M.S., 1981) clearly demonstrated the potential for the future widespread use of high resolution reflection seismology to define lateral and vertical changes in aquifer geometry in the ancient near-marine and marine sediments of the Atlantic Coastal Plain. Miller (M.S., 1985) applied complex trace attributes to reflection seismic data near Charleston, South Carolina. We reported on numerous exposed and concealed Mesozoic basins and discovered growth faults associated with the continuing(?) deformation of the overlying younger Coastal Plain sediments (D'Angelo, M.S., 1985; Schorr, M.S., 1986; Luongo, M.S., 1987; Pappano, M.S., 1992; Domoracki, Ph.D, 1995; Moore, M.S., 1997). The numerical modeling of Pyrak (M.S., 1983) gave us a clear understanding of how isotherms are warped by the presence of thermal conductivity contrasts associated with these Mesozoic basins, and how this could affect our heat flow values.

You have to look at our published results and interpretations to see what this computer intensive effort did for us. Among other things it revealed a remarkable regional continuity of deep crustal seismic signatures in the hinterland as well the foreland of the Appalachian orogen from Virginia to Georgia (Pratt, 1986; Lampshire, 1992; Pappano, M.S., 1992; Domoracki, Ph.D, 1995; Peavy, Ph.D., 1997). We imaged lithotectonic facies and crustal structure in each of Virginia's two seismogenic zones, the Central Virginia Seismic Zone (Brennan, M.S., 1985; Pratt, Ph.D, '86) and the Giles County Seismic Zone (Edsall, M.S., 1974; Gresko, Ph.D., 1985). Our research gave us confidence to publish in 1999 on a single large crustal antiform that extends from I-64 in Virginia all the way to Georgia, and allowed us to describe and justify naming the unique NW-SE trending zone of earthquake activity from Charleston, South Carolina, to eastern Tennessee the "Bollinger Seismic Zone."

Some old tools were used to obtain new data, but we also took available data and used it to generate new ideas, and we solved old theoretical problems. We suggested reasons for what the Central Virginia, Eastern Tennessee, New Madrid, Charlevoix, and Bollinger earthquake seismic zones might have in common in the framework of "Hydroseismicity," our new hypothesis for the origin of int**RA**plate earthquakes (Needham, M.S., 1987; Setterquist, M.S., 1989; Tsoflias, M.S., 1991). Ecevitoglu (M.S., 1984; Ph.D., 1987) resolved the decades-long historical conflict between the different analytic expressions for the frequency dependence of body wave dispersion (and therefore, Q) and came up with a single exact theoretical solution for the velocity of P-waves versus frequency (called body wave dispersion) that required no arbitrary constants but still agreed beautifully with the approximate results of early workers.

Should an academic institution mount large computer-dependent, field-oriented, equipment-driven programs like those in reflection seismology, earthquake seismology, and heat flow? Or would it be better

to concentrate exclusively on developing new theory and algorithms that might be applied to someone else's data from a different area or continent? If there are interesting local problems but a limited amount of data then clearly the more challenging approach is to do both, which is what we did. McCarron (1984, M.S.) looked into the feasibility of using PS converted waves for seismic imaging long before the use of converted waves became commonplace in the oil industry. Converted waves and 4-D reflection seismology will surely be used in the future to quantify and monitor changes in the fluid regime in shallow groundwater reservoirs. Demirbag (Ph.D, 1990) estimated seismic parameters (velocity, density) from reflection data by generalized linear inversion and bootstrapping. His work was later included in a special volume on AVO. Guo (M.S., 1994) moved into the tau-p domain to increase even further the resolution of the seismic method.

How do you measure the value of such large programs? One of the critical measures is clearly the number and quality of the students attracted to the programs, and ours attracted excellent ones, as well as recruiters from industry, and the attention of other universities. We feel that, collectively, we left a positive imprint on the scientific literature of the southeastern United States. (The imprint we left in Georgia cost the university a fine of $20,000 because of what looked like regularly-spaced pad indentations made in the road by our Y-1100A vibrator. "Moi?", I asked when confronted with this interpretation.)

In recalling this part of our history, I have emphasized research, but my first love was teaching my undergraduate course in exploration seismology. To those of you who majored in geophysics, I applaud you. It was not an easy route. Most of you are now practicing geophysicists, Chief Geophysicists, CEOs, COOs, Vice Presidents, teachers, owners of your own companies, environmentalists, working for federal or state agencies, or are otherwise gainfully employed. David Worthington (M.S., 1969), CEO and owner of TGS-Calibre, Inc., and now Chairman of the Board of TGS-NOPEC, was the prime mover who spearheaded the successful 1995 fund drive to establish our new 3-D Subsurface Imaging Laboratory in Room 1042 in Derring Hall. Marshall Reiter (Ph.D., 1969) convincingly explained to me at the 1997 GSA convention in Salt Lake City his as-yet unpublished ideas about why there is no heat flow anomaly across the San Andreas Fault. All of you as individuals are the measure of our success and pride, not grant money or any external evaluations of our program. Teaching undergraduate and graduate courses and doing research together is a two-way street, and I have learned much from you. Thanks for all the discussions, for your enthusiasm, and for sharing your ideas.

Message from the Chairman, Cahit Çoruh:

A Review of the Department's Goals and Plans

The Alumni Relations Committee held its first regional alumni-faculty dinner in Houston, Texas, on March 16, 2001(see pages 16 & 17). At the dinner, I shared the goals and plans of the Department as a report to the alumni. As we attempt to rebuild the department with quality people (faculty, staff, and students) and modern infrastructure, it is obvious that we would not reach our goals without feedback and support from alumni. We want to keep our alumni informed, so that they can act as "ambassadors" of the Department and help in enhancing our programs and attracting top students.

As stated in the Five-Year External Review Report (April 2000), "the Department is on an upward trajectory and with the continued support of the Dean and central administration it could break into the top 20 bracket of geological sciences within the next decade." This statement is in the report because the Department has adopted the following challenge: To place the Department in the top 20 geosciences research programs in the country by the year 2010; especially, to move Virginia Tech Geosciences in the top 10 public university programs. This is a compatible goal with the challenge before the University, which is to move Virginia Tech into the top 30 research universities by the year 2010.

We have a challenging goal because we are also committed to providing our students with a high quality instructional experience. We are aware that the major key to this is the quality of our faculty, because a high-quality educational experience can only be provided by people who carry out "ahead-of-time" research and provide "just-in-time" education and training to place students in good jobs and top graduate schools. It would be very difficult to attract and retain the best faculty and students without a robust environment for research and scholarship. We want to continue providing one of the best educations in geosciences by faculty who support instruction with leading edge research.

We recognize that the major research departments will become more dominant and some departments will slide downhill because of the economic parameters. As with industry, a critical and interdisciplinary mass of human resources (faculty, students, and staff) with modern facilities and quality infrastructures are required to be competitive. Similarly, leading edge research, in most situations, requires more collaboration. Therefore, the competition for top faculty and graduate student researchers is intense. I am pleased to inform you that your department is on an upward trajectory because the rebuilding of the Department has resulted in eleven new faculty, and another position is in the process of being filled.

The Department is preparing a strategic plan for 2002-6 and we have defined a set of major attributes for our goals and objectives. The plan calls for enhancing the quality of education by improving curricula, increasing number and quality of graduate students, sustaining the size of our undergraduate students, increasing scholarships and external funding, and increasing diversity. One of our major goals is to increase the number of graduate students from 45-50 to 65 and 75 by 2005 and 2010, respectively. I have been challenging faculty to define "niche" areas in geosciences after reviewing the present profile of the Department so that we can refocus the Department for the needs of the future and attract the next generation of students. My expectations of a "niche" area would include external funding for a good number of graduate students, post-docs and research scientists; multiple job opportunities for students who do research in that "niche" area; and, of course, a dramatic increase in the number of publications, citations, and scholarly impact. I used the opportunity provided by the Houston alumni-faculty gathering and informed the alumni about these challenges before us, so that we can get input and support, accordingly.

It is anticipated that with the support of the College of Arts and Sciences, central administration, industry and alumni we can reach our goals. The support we need is in terms of flexibility in using the resources that may become available with the expected retirements in the next few years along with additional faculty, staff, and graduate student positions. We also anticipate that the Department of Geological Sciences at Virginia Tech will move back in the top 20 geosciences departments in the country by the 2013 National Science Council ranking!

On behalf of the Department, I appreciate the feedback and input from alumni, friends, and industry. I am especially appreciative of the recent increased alumni/friend funding for student support and named scholarships. With encouragement from alumni and friends, we plan to form an Alumni/Student Mentoring Program as another means of alumni support.

Thank you for your encouragement and support!

Richard Bambach Retires

Richard K. Bambach, Professor of Paleontology, the president of our university faculty senate, a leading expert on Duke Ellington's music, and an all-around Hokie, retired on June 1, 2000 after 30 years of relentless teaching and research at Virginia Tech. Richard is one of the most respected paleontologists today and, in all probability, the only one in the paleontology bunch who, despite all his prominence, has remained humble enough and approachable enough to be widely adored by his peers.

Richard came to Blacksburg in 1970 following several years as a faculty member at Smith College. Over the next three decades, he established himself as an internationally acclaimed evolutionary paleobiologist and paleoecologist — a fact recognized recently by the Society of Sedimentary Geology, which awarded him its prestigious Raymond C. Moore Medal for Excellence in Paleontology. Richard jokingly refers to himself as a "casual theorist," and whereas indeed he is informal and easy-going. Few people are as serious about science as he is. Quite early in his career (1972), Richard introduced the concept of time-averaging that nowadays is considered the cornerstone of paleoecological analysis. One of the past presidents of the Paleontological Society alludes so to time-averaging: "It's humbling for me to reflect (that's why I don't do it very often) that much of my own research program is based on one of [Richard's] abstracts."

Richard has made many major contributions to the field of paleontology including growth, form, and function of bivalve mollusks and corals, evolution of marine ecosystems, ecospace utilization, long-term diversity trends, and causes and consequences of extinctions. Richard has also been a major player in developing global paleogeographic maps and in formulating a more precise system of paleobiogeographic analysis. His research interests go beyond paleontology and include stratigraphy, sedimentology, and structural geology. Indeed, Richard's work provided important insights into the geological history and stratigraphy of the Paleozoic sedimentary sequence in the Central Appalachians and elsewhere.

Above all, Richard has been a dedicated teacher and mentor who has ceaselessly taught undergraduate students and trained an echelon of highly skilled paleontologists, many of whom have gone on to become leaders in the field. *All* of his former students I have met, and I have met many, count Richard among their closest friends in the profession and still seek his expert advice as a teacher and as a scholar. I have been very fortunate as a greenhorn faculty at Virginia Tech to have Richard as my senior colleague and mentor. He has made my first two years at Tech a very pleasurable experience. I will miss as much his sense of humor and relaxed nature as his intellectual brilliance and encyclopedic knowledge. Thank you, Richard.

Although now retired, Richard does not plan to stop or even slow down his research. *Au contraire*, freed of services and teaching, he is working now on numerous projects with new manuscripts surfacing on his desk every other month or so. Richard will move to Harvard this summer as a visiting professor to figure out how exactly and why are the Paleozoic, Mesozoic, and Cenozoic different from one another, and why do we have them in the first place. The best is yet to come.

Michal Kowalewski

Department History –
A Student's Perspective from the Class of '81
February 13, 2001

All:

I hated missing Dr. Lowry's Dinner at the Blacksburg Country Club. I was thinking of him at the time as I was on a geological field trip in the Guadalupe Mountains.

Unfortunately, I will be snow skiing at Keystone with my family during spring break and can not attend the upcoming Houston Alumni-Faculty dinner. I really hate missing this opportunity to see some of my "old" professors and bump into some classmates.

Like Wendy Nielson, I, too, attended Cahit Çoruh's first geophysics-for-geologists class at VT. I can't say I recall the abbreviation for assignment (Ass) phenomenon. I remember him placing a sledgehammer on top of the shothole outside of Derring Hall so the hammer would fly when the profile was taken to image the dolomite (Chepultepec?) Formation just below the surface.

I have mixed memories of my dealings with Dr. Read. As I recall I received a "D" in his Stratigraphy class and threatened to take it over during one of the Faculty-Student dinners. His prompt response was "I wouldn't do that if I were you." I did get even during his Sedimentary Petrography class, by which time I could speak with an Australian dialect. I got an "A" and felt somewhat vindicated.

I knew I was in trouble when the author of the textbook and the professor of Crystallography were the same. The first words out of Don's mouth were something like "The Earth is bathed by light emanating from the Sun with multiple wavelengths yielding many hues and colors". My first thoughts were, Oh boy, here we go! This class whipped me back into shape as a junior transferring from the University of Maryland with little more than business math. Dr. Bloss always had time for my questions.

Dr. Lowry was special to many students. He was my academic advisor and saw me nearly drop out after my first quarter at Tech with a whopping 1.0 average. I had an interim advisor, who's name I will not mention, that loaded my schedule heavily that first quarter which did not help matters. I should have dropped one of the courses but by the time I figured this out, it was too late. I missed the first class of Field Geology and found my first encounter with Dr. Lowry in the field at the quarry just down from the continental divide. Everyone was roaming the outcrop with brunton compass in hand. I was busy trying my best to get a reasonable strike and dip when Wally looked over at me and said, " Remember, no attitude is better than a poor attitude." I took this personally and was shaken up a bit. It was some time later that I learned what he really meant. Well, things worked out for the best and his letter of recommendation was most likely a major reason I landed a job with Cities Service. I still remember Wally saying, "If I had a nickel for every letter of recommendation I have written, I would be a wealthy man." I am sure he knew he was wealthy in other ways in the way he was shaping future professionals.

Many thanks to you guys and I regret not being able to make your dinner. I would appreciate anything you could forward concerning Dr. Imhof's seismic reservoir characterization talk.

Sincerely,

Russ Cooper
Occidental Permian Ltd
Geologist-Integrated Reservoir Mgt.
russ_cooper@oxy.com

Graduate Student Awards

Kevin J. Davis, Graduate Student working with Dr. Patricia Dove, received (April 2000) the Materials Research Society (MRS), Gold Award, for his research. He also received (Februry 2001) the Sigma Xi Best Master's Thesis Award from Georgia Tech,
and the First Place Award in Physical Sciences at the 17th Annual Research Symposium (March 2001) at Virginia Tech. These awards are the result of his paper published in *Science* (Davis, K.J., P.M. Dove, and J.J. DeYoreo (2000) The role of magnesium as an impurity in calcite growth. *Science*, 290, p. 1134-1137). Kevin's work is quoted by Professor Philip N. Froelich, a well known chemical oceanographer, in the following way: "This study is the first to directly determine the actual mechanism by which Mg^{2+} inhibits calcite growth and the molecular-scale role of Mg^{2+} in mediating $CaCO_3$ morphology and growth. Further, this investigation provides a model system by which the thermodynamic and kinetic consequences of impurity incorporation for biomineral formation may be elucidated." Congratulations Kevin!

Andrew Madden has been selected to receive a National Science Foundation (NSF) Graduate Research Fellowship Award. Congratulations to Andrew Madden on his achievement! Congratulations to Mike Hochella, too, on having a NSF Fellow in his group.

Alumni-Faculty Homecoming Dinner 2000

On October 27, 2000 the sixth annual Alumni-Faculty Dinner was held at the Blacksburg Country Club. Dr. Wallace D. Lowry, Emeritus Professor of Geology was the guest of honor recognized for his profound impact on students and for his contributions to the Department (Newsletter, Fall 2000, p.20, 21).

A record 80 alumni, faculty and guests attended this event. For the first time a program of pre-dinner activities was offered and a number of alumni attended a tour of the Smart Road Research facilities and several had a round of golf with Krishna Sinha at the Country Club.

Michael F. Hochella, Jr., Class of '75

Professor of Geochemistry and Mineralogy

President, Geochemical Society

Interviewed by Lynn Glover, III
April 2001

Professor Michael F. Hochella was recently awarded the Dana Medal (2001) by the Mineralogical Society of America as a mid-career award to recognize his outstanding scientific contributions through original research in mineralogy. Mike is a Professor *and* Alumnus of our Department. He and his wife Barbara M. Bekken have two children Michael, 9 and Katherine, 5. They met and married at Stanford University where Barbara received her Ph.D. in Geological Sciences (Ore Deposits, Economic Geology) in 1989. She is an Assistant Professor in our Department.

Mike, tell me a little about your early history, public schools, interesting stories.

"I was born in Yokohama, Japan, in 1953. My father, a highly decorated B-25 pilot in WWII, was flying missions in the Korean War and also stationed in Yokohama during the early 50's. After the Korean war, he stayed in Army aviation as a test pilot and flight officer. We moved every one to two years, so from kindergarten through fifth grade, I lived in New Jersey, France, Germany, Arizona, and Maryland, in that order. At that point he retired and we stayed in Bel Air, Maryland (just northeast of Baltimore) from sixth grade through high school. I started at Virginia Tech in 1971 as a geology major. I wanted to study aeronautical engineering and become a Navy pilot, but did not gain entrance into the Naval Academy. My second choice was earth sciences at the University of Virginia, but despite a superior high school record, but relatively poor SAT scores, I was rejected there as well. That turned out to be a blessing in disguise because I ended up at VPI which had a far stronger program in which I flourished."

What stands out to you about the university experience?

"My six years at Virginia Tech in the 1970's were magical. I became a scientist in those years, heavily influenced by Wally Lowry, Jim Craig, Dave Hewitt, Charlie Gilbert, Paul Ribbe, and most of all Jerry Gibbs, my M.S. advisor. Jerry hooked me up with one of his former students, Gordon Brown at Stanford University, in 1976, and I started there for my Ph.D. the next year. While finishing my Ph.D., I was fortunate enough to obtain four job offers, three assistant professor positions, and one from Corning. I was so curious about industrial science that I went with Corning. Although it was an incredibly valuable experience, in that they steered me from more traditional mineralogy and crystallography to surface chemistry and physics, the basis of my research interests ever since, I left there after only two years knowing for sure that I was really cut out to be a teacher and academic researcher.

I feel tremendously privileged to have been a student and professor at the only two universities that I have ever been formally associated, Virginia Tech and Stanford. They are equivalents in my mind, contributing remarkable value to the world community."

Would you elaborate on your research interests for us?

"Briefly they are:

1) elucidating the role that mineral surface geochemistry and biogeochemistry plays in major aspects of the earth sciences, including especially environmental issues and geochemical cycling of the elements

2) mineral - microbe interactions from both geochemical and biochemical perspectives, applications to nutrients and toxins in the environment and their mobility

3) characterizing aqueous partitioning reactions at oxide and silicate surfaces; understanding interactions between mineral surfaces and species in solution with applications to aqueous system transport

4) understanding and using sophisticated surface-sensitive techniques such as STM, STS, AFM, BFM, XPS, UPS, AES, SALI, and LEED as atomic structure probes for mineral and glass surfaces; understanding the roles that surface atomic structure, composition, and microtopography play in reactions that take place on mineral surfaces.

I know that you are considered an inspiring teacher. Tell me about your teaching interests.

"My teaching interests are wide ranging, from introductory, mineralogical, environmental, and resource geology to advanced graduate level courses in my fields of specialty. My favorite course each year is "Elements of Geology," an upscale and applied introductory course taught to mostly second and third year civil, environmental, construction, and mining engineers, as well as forestry and resource management majors, numbering about 120 each fall. In one semester, they learn how the earth sciences play a tremendous role in their chosen area of specialization. These students are very bright and anxious to learn about how this dynamic earth impacts what they will be doing in their future careers. I think the consistent 3.8-3.9 student evaluation rating that I get in this course simply reflects how much I love teaching these talented and energetic kids something that I believe will really impact their future and their professional contributions.

My former Ph.D. students and post-docs now number 20. The most rewarding part of my academic career has been watching these enormously talented individuals go off and establish their own successful careers. Half are now professors themselves, and the others have been just as successful in national and government labs, as well as private enterprise."

What do you do when you're not thinking about geology?

"Not deterred from my rejection at the Naval Academy, my number one love outside of family and academics is flying. It's in my blood, and always will be. I have held a pilot's license for 27 years now and have flown extensively in California, New York, and Virginia over the years. My new love is Montana, the home of my wife's family and where we will retire one day. We spend our summers in Montana, and I am in the process of exploring every corner of this magnificent state by air. I love mountain flying in the west, and what better way to see the geology!"

A selection of Mike's accomplishments and positions held is impressive.

Awards and accomplishments -

Dana Medal, Mineralogical Society of America, 2001 (their mid-career award)
President, Geochemical Society (two year term, 2000-2001)
Alexander von Humboldt Award, 2001. 150 of these awards are given each year worldwide to full professors only, spread over all academic fields.
Fulbright Scholar to Germany, 1998
Fellow, Mineralogical Society of America (elected 1990)
Fellow, Geological Society of America (elected 1998)
Advisory Committee for Geosciences, National Science Foundation, 1999-2002
Mineralogical Society of America Distinguished Lecturer for 1999-2000
Research funding raised to date: approx. $4.5M

Positions held -

Senior Scientist	Corning, Inc.	1981-1983
Senior Research Associate	Stanford University	1983-1989
Associate Professor (Research)	Stanford University	1989-1992
Associate Professor	Virginia Tech	1992-1996
Professor	Virginia Tech	1996-present

First Regional Alumni-Faculty Dinner

The first regional Alumni-Faculty Dinner for the Department of Geological Sciences was held in Houston, Texas on March 16, 2001. These popular dinners have been an annual event in Blacksburg where attendance has grown from 30, in 1995, to 80 last year. The Department derives great strength from a close Alumni-Faculty relationship and this was an opportunity to share our successes and to enhance our future together. We are very mindful of the fact that we have a large outpost of more than 95 alumni in Houston, and so we brought this event to them. More than 50 alumni, friends and faculty attended the dinner.

At the dinner on Friday night several brief talks were given during the dessert course. Dr. Robert C. Bates, Dean of the College of Arts and Sciences, spoke in complimentary terms about the state of the Department. Chairman Cahit Çoruh gave an overview of the Department's goals and plans (See Message from the Chairman, page 2). Then Fred Read talked about his research on "Icehouse and Greenhouse Worlds," and Matthias Imhoff discussed "Seismic Reservoir Characteristics."

On Friday morning the Blacksburg contingent was treated to a tour of Texaco facilities where we saw aspects of their program presented through the project work of our Department's alumni. We thank Mark Sunwall, Area Manager, Western Gulf of Mexico, Mike Strickler '83, and others for this opportunity. Mark Sunwall and John Graham gave an overview of Worldwide Exploration & New Ventures and Upstream Technology, respectively, in addition to technical presentations by Danielle Carpenter, Leslie Moore, Michael Strickler, and Paul Krail. The visit ended with a Tex-Mex lunch.

In the afternoon Brian Coffey, Class of 2000, was our host during a technical visit of ExxonMobil facilities. Thanks to George Sayre for organizing the visit and Brian Coffey for running a smooth program. We also thank George Sayre, Manager – Recruiting New Hire Development, Geoscience Technical Development, and Terry Carius, Recruiting, Geoscience Technical Development for a stimulating and informative discussion of new-hire criteria.

We also attended the St. Patricks Day social event with Virginia Tech Alumni where Dr. Robert Bates, Dean of the College of Arts and Sciences and Cahit Çoruh responded to the questions from alumni. Special thanks to Mike Strickler for essential help in finding a great meeting site. The food and service were outstanding and the enthusiastic response of everyone to the whole affair – marvelous!

Ashley K. Goodrich
(B.S. ’90)

Thanks for the Fall Newsletter! It is fun to read about everyone’s adventures and endeavors. I wish I had more contacts, but I have stayed in touch with Joel Daniel (B.S. ’90) and Mike Jones (B.S. ’91).

I am still down in the Houston/Galveston, Texas area.

For two years now the Onshore Seismic Industry (lower 48) has been in the worst recession since the 1920’s! There are some positive signs that it will increase in activity this year.

I started a seismic and land surveying contracting company about 1 1/2 years ago and have managed to survive the recession by diversifying and targeting other markets. I also got my commercial helicopter pilot’s license during these slooow times by bootlegging time and training ‘on the job.’ My sidearm, and business partner, Tim Lyons (and now demoted to co-pilot), and I have also just started and incorporated our helicopter company this year! We provide the aerial external load support for the seismic crews. If this proves to be another slow year in seismic, we have bid on several USFS fire contracts to fly helicopters for aerial fire fighting (still not as fun as the seismic jobs).

I spent some time in Alaska last summer flying geologists around and rock hounding. They get spoiled having aerial transportation, but it is a ton of fun and a quick way to get to remote sites. However, the aircraft is limited to the payload of rocks. I remember fondly the days of VT field trips and overloading those department vans with our boulder sized “hand samples.” In fact, last year my folks sold their farm and retired to Hilton Head, South Carolina and crated up over 750 pounds of my “samples” to take with them to landscape their new property! (The moving company was really happy about that.) I really miss the deserts out west and the gold industry, and of course, ROCKS! But, I am still having great fun and always learning something new in the oil and gas exploration industry. Who says we shouldn’t have fun with our work? After all, I did learn a few important things from my geology professors at VT!

I put together a fun website at geocities with lots of pictures from a few of my seismic projects in the Deep South states: http://www.geocities.com/oilfieldpilot/index.html.

If anyone is interested in ‘doodlebugging’ (hopefully the industry is going to make a strong return) the next couple of years may prove to be the time to join!

Hello’s and extended thanks once again to everyone in the Geological Sciences Department. I have visited numerous geology departments during my travels, and **none** match-up to ours at VT! Cheers to all!

Ashley K. Goodrich ’90 (still seems like yesterday)

Eleventh Annual V. M. Goldschmidt Conference

The Eleventh Annual V. M. Goldschmidt Conference will be held May 20-24 at The Homestead in Hot Springs, Virginia, with Virginia Tech as host. Conveners of the conference are Robert J. Bodnar and Michael F. Hochella Jr. of Virginia Tech's Department of Geological Sciences. Conference sponsors are the Geochemical Society, Mineralogical Society of America, Lunar and Planetary Institute, European Association of Geochemistry, National Aeronautics and Space Administration, Oak Ridge National Laboratory and Virginia Polytechnic Institute and State University. The Goldschmidt Conference is the premier geochemistry conference in the world each year. Recent conferences have been held at Harvard University, Oxford University and the University of Toulouse. The selection of Virginia Tech as the host institution for this year's conference reflects the fact that the University and its faculty are held in high regard by the international scientific community. This year's conference will be the largest to be held in the United States with an attendance between 900-1000.

Oral presentations will be given in several parallel sessions starting Sunday morning, May 20, and continuing through Thursday morning, May 24. Forty-two topical sessions have been arranged, and posters will be on view throughout the conference, with poster presentations scheduled 3:30-4 p.m. and 9:30-10 p.m. each day

One plenary speaker will be Don DePaolo presenting the Gast Lecture, given at each conference in memory of Paul Gast, the first recipient of the Goldschmidt Medal. He will speak on "Ca Isotope Geochemistry" at 3:15-3:45 p.m. Sunday. The 2001 Goldschmidt Medal recipient, Ike Kushiro, and current GS President Mike Hochella will give scientific lectures during one plenary session 2-3:30 p.m. Monday. Kushiro's lecture is entitled "Experi- mental Forward Approach to the Genesis of Mid-Ocean Ridge Basalts," and Hochella's lecture is entitled "There Is Plenty of Room at the Bottom: The Geochemistry Version."

The Geochemical Society and the Mineralogical Society of America are co-sponsoring a short course in molecular modeling before the conference. It will be held at the Hotel Roanoke and Conference Center in Roanoke, Va. Information can be found on the short course Web site or by requesting information at rtcygan@sandia.gov.

A second pre-conference short course on calculating metamorphic phase equilibria will take place for 2 1/2 days prior to the conference, May 17-19. It will be held on the campus of Virginia Tech. For further information, contact Michael Brown at the University of Maryland at mbrown@geol.umd.edu.Further information can be found at http://www.lpi.usra.edu/meetings/gold2001/

STUDENT AWARDS
2000 - 2001

Byron Cooper Geoscience Endowed Fellowships:
Viktoras Liogys, Jonson Miller

David R. Wones Geoscience Endowed Scholarships:
Jennifer Stempien, John Vines

Geological Sciences Outstanding Service Recognition - Graduate:
Jeanette Jerz, Robert Weaver

Heath Robinson-Roy J. Holden Geoscience Endowed Scholarships:
Samuel Harvey, Jason Reed

Tillman Teaching Excellence Endowed Awards:
Kathryn Cladyne St. Clair, James L. Jerden

Alumni Geoscience Scholarship:
Phillip Staso

Geological Sciences Outstanding Service Recognition - Undergraduate:
Christina Lopano, Carmen Davis

Lowry Field Camp Scholarship:
Christopher North

Matthew Mikulich Geophysics Scholarship:
James Roberts

Outstanding Senior Award:
Christina Lopano

David and Ruth Henderson Scholarship:
Elizabeth Vanacore

Dean's Freshman Scholarship:
Daniel Morgan

Leonard and Melva Harris Scholarship:
Dylan Ward

BP-Amoco Fellowships:
Jesse Korus, Robert Wilson

Chevron Geophysics Fellowship - Graduate:
Stephanie Nowak

Chevron Geophysics Fellowship - Undergraduate:
Elizabeth Marafino

Marathon Oil Geosciences Scholarships
Craig Altare, Keegan Delaney

Texaco Geophysics Scholarships - Graduate:
Shelley Ellison, Stephanie Nowak

Texaco Geophysics Scholarships - Undergraduate:
Emily Gambill, Elizabeth Vanacore

Frank Leigh Robeson Scholarship:
James Roberts

National Science Foundation Graduate Research Fellowship:
Andrew Madden

Penelope Hanshaw Scholarship:
Christina Lopano

Graduate Research Development Project Awards:
Andrey Bekker, Jeanette Jerz, John Wilson

Graduate Student Assembly Graduate Symposium Awards:
Monica Carroll, Kevin Davis, Brooke Wilborn

Outstanding Dissertation Award:
Barry Bickmore

W.A. Tarr Award:
Carmen Davis

New Endowed Scholarships and Funds Established

We thank Friends and Alumni for the following scholarships endowed in perpetuity to aid students in the Department of Geological Sciences. All scholarships and funds are open for additional contributions.

Charles J. Gose, Jr. Scholarship for Geological Sciences: This is a Legacy bequest in the will of Charles Gose, ’50, for a full scholarship. (See Obituary in this issue.)

Undergraduate Research Endowed Fund: This fund is established with Alumni contributions.

Petroleum Industry-Geosciences Endowed Graduate Scholarship: A scholarship started with gifts from unrestricted contributions from the petroleum industry.

The 3-D Subsurface Imaging Laboratory Endowed Fund: Established with directed gifts from in industry.

We are happy to report that the **Alumni Endowed Scholarship Fund** established primarily to attract outstanding undergraduate majors, has grown to $30,000 with Alumni contributions.

Thomas J. Burbey

Assistant Professor of Hydrogeosciences

Interviewed by John Costain

March 2001

Professor of Hydrogeosciences, he was the first faculty member in the new Hydrogeosciences program in the Department of Geological Sciences. Tom was born in Racine, Wisconsin (the youngest of three brothers) and moved to Milwaukee at an early age.

"For most of my childhood I lived on the shores of Lake Michigan in South Milwaukee. One of the interesting things I remember about growing up is the strange weather we had. The lake had a very interesting affect along the shore. In the evenings, cold air from the land moves across the warmer lake water creating a land breeze. Then, later in the morning after land heating had taken place the breeze reversed and moved back over the land from the water. Because the lake was so cold it really cooled the air where we lived. It wasn't unusual in early winter for it to rain in our backyard and snow in our front yard. Other times we would get 30-40 inches of snow and we'd eventually dig out to realize that a half-mile inland had almost no snow at all. This was due to the fact that the air mass moving back across the land had picked up significant moisture from the lake. The sunrises were spectacular over the lake, particularly on extremely cold mornings and the lake would steam and this big red ball would rise through the hazy mist. One time we had a particularly violent storm. We lived about 100 feet above lake level yet the next morning we had fish from the lake in our built-in swimming pool. I think the thing that finally irritated my dad enough to move from the lake to the western suburbs was the summer weather. For example, in early summer the early mornings were warm typically raising to the upper 70's by late morning; however, once sufficient heating had occurred the airflow would shift off the lake and the temperature would drop 25-35 degrees in a matter of five minutes. This pattern occurred for much of the summer and was very local to the immediate coastline. Needless to say no one wanted to swim when it was 50 degrees outside.

I graduated a semester early from South Milwaukee High School because my parents built a house in the western suburbs of Milwaukee to get away from the awful weather. When I turned 18 I began bartending (that was the drinking age then) and attending community college where I met my wife, Ingrid. I really wasn't sure what I wanted to do or become and was part of the party scene at school and work. When I turned 19, however, God got a hold of my heart and I quit bartending, got serious about school and transferred to the University of Wisconsin-Madison where I received my B.S. degree in Geology in 1981.

I ended up going west (isn't that what all young men are encouraged to do?) by enrolling in the M.S. program at the University of Nevada, Reno in the fall of 1981. The hydrogeology program was very large with over 90 full time graduate students. I worked at the Desert Research Institute as a Research Assistant and did my research at the Nevada Test Site. My thesis research was to develop a ground-water and solute transport model that simulated tritium and chloride-36 migration from a nuclear explosion cavity. Back then we began with punch cards and eventually got a mainframe; however the software models were very crude by today's standards and many modifications were usually required.

Ingrid and I were married in the middle of my degree program. Ingrid was working on a M.S. in Electrical Engineering at the University of Wisconsin (she has now been a self-employed computer programmer for thirteen years). We were tired, however, of the long-distance relationship so we were married during Christmas break on New Year's Day, 1983. I managed to complete my M.S. degree requirements in the spring of 1984 and immediately went to work for the U.S. Geological Survey in Carson City where I was assigned to a major modeling study as part of the RASA (Regional Aquifer System Analysis) program. I was to develop a model of the entire carbonate rock province of the Great Basin. The problem with a model of this size was the slowness of the computers. Back then the USGS had a PRIME mainframe computer. We were required to run our models in batch mode only during the night, which meant one model run per day. Needless to say, it was a very slow process.

In the ensuing years I worked on a project in Las Vegas to evaluate the Bureau of Reclamation's plan to build retention ponds to reduce salt inflow to Las Vegas Wash through the phreatic aquifer that was highly saline from high evapotranspiration rates and the large amount of gypsum in the soils. One winter when we were collecting water-quality samples in the wash from the many wells we had been monitoring there, we managed to get five vehicles stuck in the mud up to their axles. The water table in the wash during winter months was only about 16 inches. As it warmed up the soil became soft and our truck began to sink. We radioed to another truck to pull us out and in the process they got stuck. We then called another truck and it too got stuck. We managed to get all five of our trucks stuck in the mud. At the time it was very frustrating but over the ensuing months it became a real joke. When I finally left to take the job at Virginia

Tech one of my going-away gifts was a toy tow truck that said “Las Vegas Wash” on the side. Obviously people don’t forget.

I spent 12 years with the USGS working on various modeling projects. Eventually I began working on subsidence problems in Las Vegas. I wrote an internal (to USGS) competitive proposal to do an intensive data collection study (including installation of the first successful inclinometer casing) and also wrote a numerical code to simulate three-dimensional deformation and flow. Those of you who have taken the typical course in groundwater hydrology will remember that the REV is assumed to deform only in a vertical direction. We now know this isn’t true; however, getting the hydrologic community to understand that horizontal deformation even exists let alone that it’s important has been a huge hurdle. Traditional ways of doing things are hard to break! We now believe that horizontal deformation is important not only in subsiding basins but also in the interpretation of aquifer tests in unconsolidated deposits like the sediments of the Atlantic Coastal Plain.

My USGS project was funded for about one million dollars. This opened the door for me to return to school for my Ph.D. It really worked out well because I was paid from the USGS to get my degree. There would have been no other way to go back to school because Ingrid and I had three children by this time.

After finishing my Ph.D. from the University of Nevada in Reno in 1994, I had to make a decision to remain with the USGS but transfer to the research group either in Menlo Park, Denver, or Reston, or consider academia. I chose to try academia. I applied to two schools, Virginia Tech and the University of Massachusetts (Amherst). The rest is history. I haven’t been at Tech long enough to have any real interesting juicy stories, but it has been an adventure. The work atmosphere is much more pleasant compared to the USGS even if the number of hours I work each week has nearly doubled.

I currently have five students and one finished in the fall of 2000. My current graduate students include Bill Seaton (Ph.D.), who is working on the characterization of fracture flow in the Blue Ridge province using geophysics and hydrogeologic mapping and testing. Bill is a Principal with ATS International and will continue working with this firm after finishing his Ph.D. Jason Pope (M.S.) is characterizing subsidence and aquifer parameters in the Coastal Plain of Virginia near Franklin. Jason already has a job with the USGS and will start immediately after finishing his thesis in May of 2001. Isaac Jeng (Ph.D.) is developing a 3D finite-element (Fortran) model to simulate aquifer deformation and flow using nonlinear constitutive relations (instead of the typical Hookian or elastic approach). Sam Harvey (M.S.) is developing hypothetical numerical evolution models to explain the inland saltwater wedge in the coastal plain associated with the recently discovered Chesapeake Bay impact crater. Miles Gentry (M.S.) is beginning a study to determine if springflow hydrograph analyses can be used to characterize different flow regimes within the crystalline rocks of the Blue Ridge. We’ve determined that potentially different types of flow exist and we want to see if recharge source areas and flow type can be evaluated by measuring hydrographs.

I teach two undergraduate courses: Oceanography and Groundwater Hydrology. My current graduate courses include Quantitative Hydrogeology and Groundwater Flow and Transport Modeling (the latter is co-taught with Dr. Mark Widdowson from Civil and Environmental Engineering). Mark and I also have a joint research proposal pending with the U.S. Army to investigate flow, transport, and remediation processes at an army base in South Carolina. My colleague in the Department in Hydrogeosciences, Dr. Madeline Schreiber, and I plan to add a laboratory to the Groundwater Hydrology course during the next academic year, and a field course in hydrogeology in the near future.

My family has really grown to love Blacksburg. Ingrid and I have three children: Rena (16), Ariel (12), and Ryan (10). Everyone seems to know everyone else here and there is a real community spirit. We’re very happy about the move and thank God for the way things have turned out thus far.”

ALUMNI NEWS

‘49

George Byrom Vockroth (B.S. ’49) retired May 1, 2000 as owner of Vantage Oil Company. George represents the Mississippi Geological Society as a member of the Mississippi Water Resources Advisory Council.

‘51

William Siapno (B.S. ’51) is a self-employed geological engineer. He is still skiing and flying the high Rockies and also does a little fly fishing.

‘69

James D. Ming (M.S. ’69) is currently doing geophysical exploration for petroleum in Kuwait, working for Joint Operations, the joint venture operating company of Saudi Arabia and Kuwait, responsible for exploring and developing the Partitioned Neutral Zone that straddles the Kuwait/Saudi Arabian border. He is seconded from Saudi Arabian Texaco, who are representing Saudi Arabia. Jim and his wife Marilyn are currently living in SAT company housing, which consists of houses and townhouses on the beach of the Gulf of Arabia. We are about 50 miles south of the capital, Kuwait City, and about 30 miles east of the Joint Operations offices. The countryside is flat, arid desert. Present daytime highs are in the 70s, but it will get up to about 125 degrees in the summer. Over December and January, highs were in the 40s to 60s, with lows almost down to freezing. The beach is very nice, the Gulf waters are clear blue, with lots of shallow reefs and the roads and highways are great, except for the ubiquitous camel, sheep and goat herd hazards. <marilyn_ming@hotmail.com>

‘70

Dave Russell (B.S. ’70) enjoyed the Fall Newsletter, particularly the pieces on his favorite college professor, Dr. Lowry. Not that he was his best student, in fact probably near the bottom, but his earnest desire to transfer knowledge of his science, his integrity, and his fatherly demeanor has guided me for 30 years. Please forward my warm regards to Dr. Lowry. Dave is President of Transaction Systems Architects and CEO of ACI Worldwide.
<DaveRussell@attglobal.net>

‘71

Charles Garrett Haag (B.S. ’71) is a geologist at Tidewater Quarries, Inc. in Richmond, Virginia. Charles became a Virginia Certified Professional Geologist in 1996 and became a member of the Geologic Society of America in 2000.

‘78

Richard “Rick” L. Ford (B.S. ’78) is an Assistant Professor of Geosciences at Weber State University in Ogden, Utah. Rick sends greetings to all GeoHokies of the class of 1978.
<rford@weber.edu>

‘79

Steve Grimsley (B.S. ’79) left ARCO in May 2000 with the merger into BP. The family didn’t want to move to Cairo, Egypt, which was the assignment they offered. Steve consulted on a small project and then joined a small consulting company, Petrotel. The main effort, at this point, is in evaluating blocks in India for an Asian petrochemical firm. Joe was in Bombay working on the project when the Republic Day earthquake occurred. At 45 seconds, it was the longest tremor he has ever experienced. An unusual project with a fair bit of gravel, but at least the family can stay in the U.S.

‘80

Joe M. Reilly (M.S. ’80) As a consequence of the merger of Exxon and Mobil, Joe, wife Nan and two children have relocated to Tomball, Texas, outside Houston. Joe is currently managing the ExxonMobil

Geophysical Applications group. This group of approximately 70 staff worldwide provides quantitative geophysics support for the exploration, development and production companies of ExxonMobil, including onsite staff in foreign subsidiaries.

'81

Michael A. Linden (M.S. '81) is a Regional Geologist with the U.S. Forest Service in Albuquerque, New Mexico. He lives in the mountains outside Albuquerque with wife Erika and their two children. He is the Regional Geologist for the Southwestern Region of the U.S. Forest Service (20 million acres of gorgeous scenery!). Work involves mineral resource extraction from federal lands, mining claim exams, environmental studies, and a variety of geology related duties. He is also starting a new rock/blues band. <mlinden@fs.fed.us>

'83

Mike Huggins (M.S. '83) Thanks to Mike for alerting us to the New York Times article concerning Seattle's seismic risk, with Tom Pratt (M.S. '82; Ph.D., '86) prominently quoted and pictures. See the Fall 2000 issue of our Newsletter for an update of Mike Huggins' activities. Mike is lead WPI scientist for assessment of Equilon Enterprises/Shell Oil Co.

'85

Dan Lizarralde (B.S. '85) is an Assistant Professor of Geophysics at Georgia Tech in Atlanta, Georgia. <danl@hatteras.eas.gatech.edu>

Melissa J. B. Rogers (B.S. '85, M.S. '88) March 30, 2001 was Melissa's last day with The National Center for Microgravity Research on Fluids and Combustion. She has decided to try her luck in the mercenary world, and will be taking on freelance writing and workshop type work as she tries to build up her own education consulting business. She doesn't have a company name yet. She will be working out of the house. "Keep in touch. If you need any writingdone, let me know." <melissa@vatechalumni.com>

'88

Rob Culbertson (B.S. '88) Rob writes: "Hello to all." After spending five years working as a geologist for several engineering/environmental consulting firms in Richmond and Northern Virginia Rob has been teaching High School science in Chesterfield County for the past seven years. He married the former Kathy Santilli, a VPI Business Alumna ('87) and is Dad to two great kids. During the summer of 2000 he completed his M.Ed. at Virginia Commonwealth University. His prize for receiving the R.E.B. Award for Teaching Excellence included a grant to travel to Italy in the summer of 2002 to study the art, math, and science of Renaissance cathedrals. Of particular interest is their use as solar observatories by the Church, which, in the 15th century, was making a concerted effort to determine the annual dates of the vernal equinox so that they could set dates for Easter without relying on other, outside religious establishments. He also got a very nice pen. He always enjoys getting the newsletter, and is looking forward to making it to one of the Homecoming banquets in the not-to-distant future. < rhciv@cavtel.net>

Curt Lindsay (Ph.D. '88) sends his warmest regards to everyone in the Department of Geological Sciences. <lindsay_curt@hotmail.com>

'89

David Jordan (B.S. '89) is Program Manager for the Litigation Support Group at DBS&A in Albuquerque, New Mexico. The group specializes in cost allocation, cost recovery, and environmental forensics. He also spearheads a group that provides geographic information system (GIS) services to litigation, mining, engineering, and water resources projects. <djordan@dbstephens.com>

'90

Dave Wayne (Ph.D. '90) works for Los Alamos National Laboratory in Los Alamos, NM. He joined a new group in the Nuclear Materials and Technology (NMT) Division in May 2000. Aside from continuing my research in glow discharge mass spectrometry (GDMS) and on the thermal ionization cavity

(TIC) source for mass spectrometry, my new responsibilities are geared toward establishing a new analytical lab in LANL's TA-55 Plutonium Facility. The centerpiece of this effort is a brand-new, glovebox-based laser ablation inductively coupled plasma mass spectrometer (the Finnigan 'Element2' LAICPMS). "It's all still in crates as I write this (Dec. 2000)."

Dave's wife, Cindy, is a registered nurse who runs clinical trials for new & newly approved AIDS medications at a clinic in Santa Fe. Their daughter, Sophie, turned 4 last Halloween. One of Sophie's favorite pastimes is looking for interesting rocks in our gravel driveway… uh-oh!

Aside from work & family-type stuff, he is still playing the drums in a few local groups, including the Stefan Dill Trio (see/hear us at www.norumba.com), and Protuberance (a 'rough' jazz trio of tuba, guitar and drums). These groups (or parts of them) have a couple CDs out on the Zerx label, based in Albuquerque. He has also been writing jazz CD reviews for www.jazzweekly.com

"Greetings to everyone who occupied the fifth floor of Derring circa 1985 through 1990 and those from "Lab Central" (which AK has unfortunately re-named 'PITLab.' PITLab? Geez! It never seemed that bad to me!). Have they replaced the paneling in the geology graduate student offices on the fifth floor?"

'91

Michael Jones (B.S. '91) is working for the United States Department of Agriculture in Rutherfordton, North Carolina. Mike sends this message "Hi, all that know me. Ship me an e-mail or snail mail. Would love to hear from you!" <mikethesoilguy@grits.net>

'92

Laura Lampshire (M.S. '92) is presently on a leave of absence from being a hydrogeologist at CH2M Hill. Laura and Greg have two sons, Jared (born October '97) and Nathan (born July 2000). She is enjoying her job as a full time Mom and would love to hear from other classmates when they have a spare moment! <laura_lampshire@hotmail.com>

Phil Pappano, Jr. (M.S. '92) Peg and Phil Pappano write, "It's a boy!" We welcome to our world Joseph Andrew Pappano, 9 lbs. 4 oz., 19.5" long, born January 15, 2001. Congratulations to <phil_pappano@yahoo.com>.

'93

Dave Valentino (Ph.D. '93) is now an Associate Professor in the Department of Earth Sciences at the State University of New York at Oswego. In addition to teaching hard-rock geology courses, Dave recently developed a geology field camp held in the Adirondack Mountains, New York. Karen Valentino (M.S. Material Science '93) continues to home school their three children and teach part time at SUNY-Oswego.

'94

C. Michael Lang (B.S. '94) is a project geologist with Vista Environmental, Inc. in Ashland, Virginia. <cmlang@vista-environmental.com>

Scott Rutherford (M.S. '94) is currently a post-doctoral researcher at the University of Rhode Island, where he works on limits to microbial life in deeply-buried marine sediments, and at the University of Virginia (boooooo!) where he works on reconstructing late Holocene climate. <Srutherford@gso.uri.edu>

'95

Joe East (B.S. '95) is currently a graduate student at George Washington University working on his masters in structural geology. He's studying a section of carbonate mylonites from the Franklin mine in New Jersey.

Colin Reasoner (B.S. '95) has completed his dissertation titled, "Seismic Imaging at the Top and Bottom of a Mantle Pluem" at the University of California, Santa Cruz, and will start work at Science

Applications International Corporation. His job as a scientific programmer will support SAIC's global seismic monitoring program for nuclear test ban treaty verification. <colinr@es.ucsc.edu>

'96

Mona Becker (M.S. '96) finished her Ph.D. at SUNY Stony Brook in January 2001. She now has a two-year post-doctoral appointment at the Department of Earth Sciences at Oxford University.

Kimberly (Saettler) Hoke (B.S. '96) received her M.S. from the University of Missouri-Columbia in 1998, got married in May of 1998, and worked for Chevron in Houston until 1999. She has returned to UMC to pursue her Ph.D. and is now in her second year working on the biogeochemistry of acid mine lakes. <kdhd2a@mizzou.edu>

Michael Hsieh (B.S. '96) is a Ph.D. candidate in geology with an emphasis in environmental geochemistry at the University of Oklahoma.

David Hulslander (B.S. '96) is currently employed at Research Systems, Inc., working in remote sensing, earth surface processes, and geologic hazards. <hulslanders@cs.com>

'97

Anthony W. Hess (B.S. '97) works for Rockbridge County Health Department in Lexington, VA. N/A@gkar.cc.vt.edu

'98

Robert Nejako (B.S. '98)
Rob is working at Fairfield Industries, Inc. in Houston, Texas.

'99

Kelly Rose (M.S. '99) is working at Marathon Oil Company in Oklahoma City, Oklahoma.

'00

Brian Coffey (Ph.D. 2000)
Ginger (Vaughn) Coffey (M.S. '97)
Brian and Ginger moved to Houston, Texas and bought a house. Brian is working at Exxon-Mobil and Ginger is with Landmark. <gcoffey@lgc.com > or <gvaughn @ texas.net> <bcoffey@texas.net>

David Tieu (B.S. 2000) is currently working for a geophysical company in Charlottesville, Virginia. He is using instruments like Em-61, Em-31, magnetometers and other various instruments to study and subsurface. <davidtieu@hotmail.com>

DeBonne Wishart (M.S. 2000) has accepted a position as Assistant Project Hydrogeologist at the Headquarters of TRC Environmental Corporation, in Windsor, Connecticut. She is working on a ground-water modeling/contaminant transport project for the Atlantic City Airport, FAA Area 41, Pleasantville, New Jersey. DeBonne says she spent eight days training in Connecticut and is working from the Lyndhurst office until she locates a place to live in Connecticut. Good luck, DeBonne and keep in touch!

Obituary

Charles Joseph Gose., Jr. ’50
Alumnus and Benefactor

Charles Gose, 75, of Brandon Oaks Retirement Center, Roanoke, passed away Sunday, January 14, 2001. He was born July 6, 1925 in Burkes Garden, Virginia and was the son of the late Charles J. Gose, Sr. and Olive Owens Gose. Charles studied mechanical engineering at Purdue University (B.S. ’45) and geology at Virginia Tech (B.S. ’50). He served in the Navy (1952 – 1955), worked for the U.S. Geological Survey (1955 – 1957) and Westvaco (1959 – 1987) retiring from the latter in 1987. In 1988 Charles was appointed to the Dean’s Round Table, College of Arts and Sciences, Virginia Tech. He was a member of St. John Lutheran Church. A career profile of Charles was published in the 1999 Newsletter, Department of Geological Sciences

Surviving are his nephews, Ellsworth G. Snyder and wife Lynda, Roanoke, Charles W. Snyder and wife Cindy, Lawrenceville, Georgia; nieces Lee S. Hodge and husband, Jim, Katrina S. Hawes and husband, Steve, Winchester, Virginia.

In his Legacy he endowed a full scholarship, the **Charles J. Gose, Jr. Scholarship for Geological Science**, for which the Department of Geological Sciences, Virginia Tech is deeply grateful.

DONORS

If you would like to consider making a gift to the Department of Geological Sciences, simply send your check, made payable to the Virginia Tech Foundation, to: Chairman, Department of Geological Sciences, Virginia Tech, Blacksburg, Virginia 24061, Ph: 540-231-6894. Please let the Department Chairman know so that he can provide timely information about our needs. You can also get information from Ms. Connie Talbott, Development Director, College of Arts and Sciences, at ctalbott@vt.edu or Ph: 540-231-8734. You should include a brief note stating how you would like the money used. Currently there is a financial need especially for:

*Undergraduate scholarships and fellowships including funding for field studies and research
*Graduate scholarships and fellowships
*Endowed chairs for faculty
*Laboratories, research and teaching including our Geosciences Museum

A MESSAGE FROM THE UNIVERSITY DEVELOPMENT OFFICE

There are many different ways to give to your favorite programs at Virginia Tech, including the Department of Geological Sciences. Donations from our alumni and other friends are critical to our plans for endowing scholarships, professorships and programs within the Department. Most people know about making cash donations, but there are other methods to give that may better suit your financial situation. You may be surprised to learn what kinds of gifts Virginia Tech accepts, and how you can avoid some taxes you thought you would have to pay. For more information about giving stock, receiving income in exchange for your gift or making a donation through your estate plans, please contact Connie Talbott, the Director of Development for the College of Arts & Sciences, or one of our gift planning professionals at (800) 533-1144.