

SUMMER 2006



geosciences

AT VIRGINIA TECH

Magazine

**Professor
John Costain -
A Living Legend**

2006 Spring Graduation

**VT Geosciences Mourns a Great
Loss - Lynn Glover III**

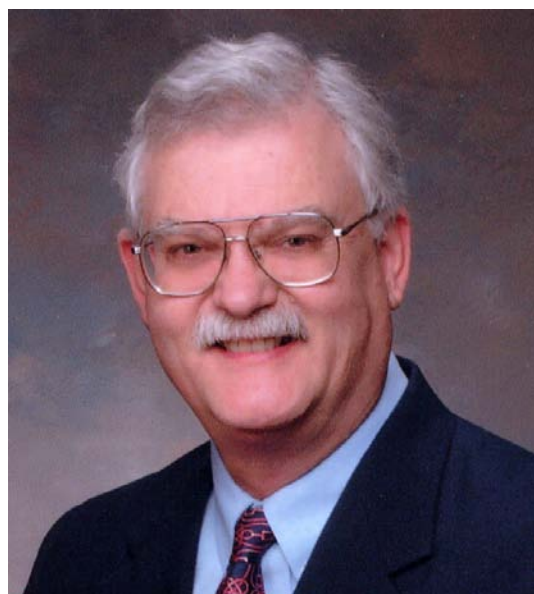


VirginiaTech

Message From The Chair

Looking Backward and Moving Forward

by Robert Tracy, Chair



As I write these comments, it is springtime in Blacksburg and we have just completed another academic year and conducted our annual commencement ceremony. Commencement is always a proud and happy time, but this year it was also very productive. Our department conferred 38 degrees to 21 B.S., 10 M.S., and 7 Ph.D students. Because of the unusual number of graduates and large harvest of awards won by them that needed to be acknowledged, our ceremony took a bit longer than normal. However, it was graced by an excellent address by this year's commencement speaker, the Honorable L. Preston Bryant, newly appointed Secretary of Natural Resources in Virginia Governor Tim Kaine's administration. Secretary Bryant has no direct educational connection to Virginia Tech, but was an English major at Randolph Macon College, and has been a long-time friend of this university in the Virginia Legislature. I believe it is fair to say that Secretary Bryant quoted or cited more poetry in this one address than I have heard in all the nineteen previous departmental commencement addresses since I arrived in Blacksburg in 1986. He delivered an inspirational message about environmental stewardship. You can read more about our speaker and see the transcript of his address elsewhere in this issue.

May marks the ninth month of my term as interim chair and the first month of my appointment to the remainder of a full four-year term as chair. This has sparked some musings on my part about what we have accomplished so far, and what awaits doing during my chairmanship. Commencement is always a time both of looking backward at the preceding academic year (and the four - or more - year careers of our graduating students), and also looking forward, as the term "commencement" implies, at the challenges of the future. This past semester was remarkably busy as we interviewed 14 faculty position candidates (this is NOT a misprint!), ten in geophysics and four in earth systems. The hiring process is still playing out as I write this, but as of now we have hired two new geophysicists, to arrive in January and August of 2007, and have three remaining geophysics candidates and one earth systems candidate awaiting offers once the dean approves, all potentially to arrive in 2007.

We anticipate that this is the beginning of faculty renewal and departmental expansion, hopefully to occur in a few years in a new Geosciences building at an as-yet undisclosed location on campus. Departmental planning indicates that as many as five of the current faculty will retire by 2012, and coupled with the department's and dean's plans for our faculty size to increase to greater than 30 in the same time frame, we will be very active both in building planning and in designing and conducting faculty searches in the next few years. Planning for the new building continues to simmer slowly with the central administration and in the legislature, but we hope to be able to make a concrete announcement to you on this front in the near future.

As you will also read elsewhere in this issue, we lost a revered member of our faculty (and alumni) community this past semester, Professor Lynn Glover III (class of 1953), who passed away in March after an extended illness. Ellen Glover has made a very generous gift to the department in Lynn's memory to endow a foundation account for support of geological field investigations and special field trips, and we have already received a significant number of contributions earmarked for this fund. I encourage all of you to consider this as a way both of honoring Lynn Glover and of fostering field geology in the department. My own path into geology was inspired by undergraduate field trips, and I suspect that is true for many of you as well.

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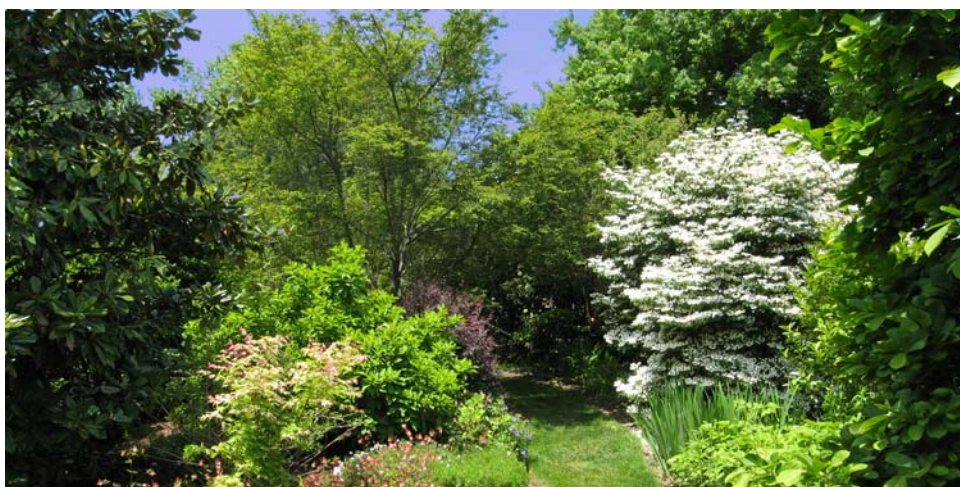
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photograph by Mark Fortney

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A Living Legend of VT Geosciences: Professor Emeritus John Costain

by Michael F. Hochella, Jr.

It is hard to believe that John Costain has already been retired from the Department of Geosciences at Virginia Tech for a decade! I still see him, most Sunday mornings, at one of Blacksburg's more popular coffee houses, enjoying family time over warm drinks and newspapers. The family is considerable, meaning that on any given Sunday I may see his dear wife, Rose, and their son Jim, or on occasions when they are in town, their daughter Caroline and her sons Chris and Jim, or their son Johnny, his wife Barbie and their son Nash.

Just two years ago, Elsevier published John's latest book, co-authored with Cahit Çoruh, entitled *Basic Theory in Reflection Seismology*. This is a major effort written in 576 pages, laying out the fundamental mathematical

background in using reflected and refracted seismic waves to image the Earth's subsurface, from a shallow water table to the base of the crust. It is one of the latest products in a career in the earth sciences that has now spanned more than a half century.

John's spectacular career all started when he took an introductory geology course halfway through his undergraduate days at Boston University in the late 1940s, where he had spent the first two years as a Spanish language major. As unlikely as that major now seems for John, his parents may have been just as surprised when he switched majors to geology. John was a city boy, born and raised in a Boston suburb by a devoted, stay-at-home mother, and a father who gave up on the min-

istry for a more steady life as a master carpenter. Upon his graduation, John wasted no time with the earth sciences, taking a position with Mobil in Venezuela for three years before heading to the University of Utah in 1954 to begin a Ph.D. He was well established in gradu-

ate school when he met Rose in August, 1956, and within three months, they were wed. (That makes this year their golden anniversary year, and I can personally attest to how brilliantly happy they still are.) When John had finished his graduate career in 1960, they

stayed right where they were. After graduation John was offered a job as an Assistant Professor in the University of Utah Department of Geophysics.

For the next seven years, John proceeded to set the stage in Utah for what would become the academic foundation for the rest of his career. There he started off with a massive vacuum tube computer, a bit bigger and more complex than the Heathkit radios he built as a child. It was an intimidating beast in sound, lights, and color. John would write a thousand lines of Algol code (a forerunner to Fortran), feed it into the computer on punched paper tape, wait an hour for the program to compile, and if successful, five glorious lights would brilliantly illuminate. John remembers waiting on those



John and Rose Costain (August 1999, Santa Fe, NM)

Photo Credit: Charles Gilbert

lights as one might await a NASA launch, with great anticipation, hoping for the best. By processing massive amounts of seismic data (by 1960s standards), and making geologic sense of it all, John became very well-known, and he didn't escape the eye of Byron Cooper, Chair of Geology in Blacksburg at the time. In 1967, Byron convinced both John and Ed Robinson, a highly successful gravity/magnetics geophysicist also at Utah, to move at the same time. Earthquake seismologist Gil Bollinger also arrived in 1967, and Virginia Tech geophysics was born and booming at the same time.

For the next few decades, further strengthened with the vital addition of Cahit Çoruh (John was primarily

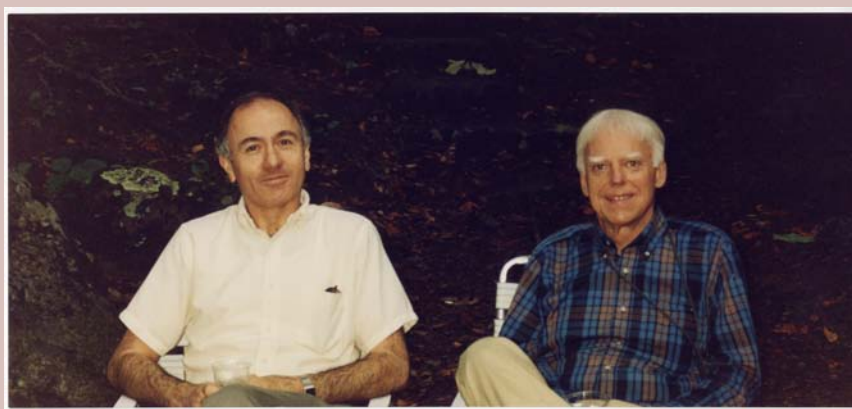
responsible for this and still beams at the thought of this stroke of genius), Virginia Tech geophysics was not only on the map, it became internationally recognized. The list of contributors read like a Who's Who of funding agencies, both government and private (NSF, DOE, NRC, USGS, Amoco, Chevron,

Sohio, Sepco, Western Geophysical, and others). John and Cahit brought in over \$10M in outside research funds with one of them as lead principal investigator. By 1980, John and Cahit established one of the most powerful seismic computing facilities in any university in the country, and Virginia Tech became the first university in the country to have a computer with commercial software (DISCO) dedicated to refraction and reflection seismology. The mammoth Vax 11-780 computer, with its accompanying six foot tall high speed tape drives, helped solve the structure of the Appalachian core complex, the Piedmont and Coastal Plain, and other major complex geologic zones from Maine to Georgia. John even managed to bring on board and maintain a vibroseis truck, with a full-time crew. Virginia Tech Geoscience was the only academic department in the country to claim such a mobile facility as their own. John's courses, and therefore his students, benefited from this emphasis on computers, and all of

his courses included computer-oriented laboratories or homework assignments. This was, indeed, the hallmark of John's teaching philosophy.

One of the bottom line results of these dramatic developments in Virginia Tech geophysics in the 70's and 80's were dramatic increases in academic ranking. For example, the 1989 Gourman Report, a highly respected rating system for university academic programs, listed VT geophysics as fourteenth in the top 50 programs across the country. Only three public universities were ranked higher nationally, UCLA at third, Berkeley at tenth, and Wisconsin (Madison) at eleventh. Due to this strength, and the addition of other strong compo-

nents in the department in mineralogy, petrology (both hard and soft rock), and paleontology, Virginia Tech geosciences reached the top-20 in the country, and top-5 among public institutions. Internally at VT, geophysics was the highest ranked degree program in



Cahit Çoruh and John Costain (Late 1980s)
White Rocks Camp Ground, near New River

the College of Arts and Sciences. John Costain had as much to do with all of this as anyone else.

Over the years, the most precious fruits of John's labors were, of course, his students, and there were many. Some of these students are now leaving their own legacies in the department, having established permanent endowed scholarships. These former students include David Worthington (M.S. '68), founder of a highly successful geophysical exploration company; David Henderson (B.S. '73), a high ranking officer with several large and important exploration firms over the years; and Stephen Scott (B.S. '79; M.S. '87), presently Principal Geophysicist for ConocoPhillips Indonesia.

John Costain, still as enthusiastic and bright as ever, was, and remains, a giant at Virginia Tech and internationally in his field. He is truly a treasure, and in his wake, he has left a reputation that our present and growing geophysics groups will build upon well into the future.

VT Geosciences Mourns a Great Loss

Lynn Glover III (1928-2006)

photograph by Mark Fortney

by Dr. Alexander E. Gates
(M.S. '81, Ph.D. '86)

It is with great sadness that I report on the passing of Lynn Glover III, my advisor, mentor and friend. Lynn Glover was born in Washington, D.C., on November 29, 1928, and spent most of his youth in Occoquan, Virginia. He earned Bachelor and Master degrees in Geology from Virginia Polytechnic Institute in 1952 and 1953, respectively. He worked as a Justice of the Peace for a short time but spent most of his early career with the US Geological Survey on various projects primarily in Puerto Rico and the Greater Antilles. He returned to graduate school at Princeton University where he earned a Ph.D. in 1967 as one of the last graduate students of Harry Hess, a true giant of plate tectonics. Lynn intended to return to the US Geological Survey, but Byron Cooper convinced him to return to Virginia Tech in 1967 where he spent the second part of his career until his retirement in 1995.

In his years at Virginia Tech, Lynn Glover established himself as one of the leaders in Appalachian tectonics. His course in Appalachian Geology was a mainstay in the graduate program. Unlike many of the other

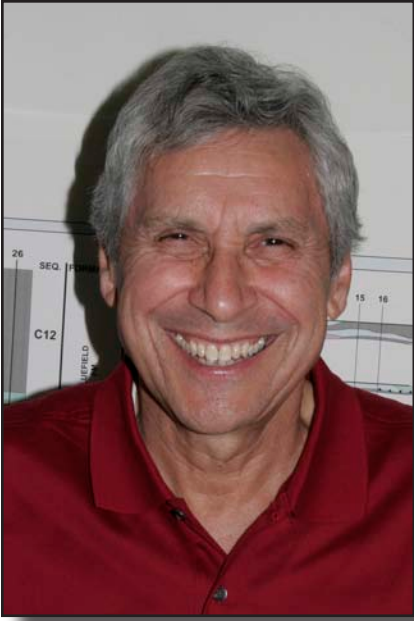
researchers in Appalachian tectonics at the time who relied on the National Science Foundation for support, Lynn took a very practical approach to his research. Taking advantage

of the energy crisis of the 1970s, Lynn was supremely successful in collaborating with other faculty in the department to obtain significant funding primarily from the Department of Energy and Nuclear Regulatory Commission. Through his Orogenic Studies Laboratory, he evaluated granites in the southern Appalachians for geothermal resources and current seismicity of faults for safety of nuclear power plants. It was his contention that these practical applications provided him with the resources to pursue his real interest in field geology and Paleozoic tectonics to a degree that would be otherwise impossible. The lab was very active at its peak, including two to three post-docs, up to five graduate assistants and support staff.

It was an enlightening experience to be a student of Lynn Glover. During my first semester at Virginia Tech, I remember two of Lynn's graduate students arguing who would assume the role of "number one son" after the current one graduated. As it turns out, we would all eventually assume that supposed role, and yet we never knew it. Being advised by Lynn was confusing.



photograph by Mark Fortney



photograph by Mark Fortney

Professor Fred Read receives several new awards

Professor Fred Read will have to expand his trophy case. As one of the world's most recognized sedimentary geologists, three new awards have recently come his way. Dr. Read was named the recipient of the 2007 Pettijohn Medal for Excellence in Sedimentology. This well-known award recognizes scientists who have a significant record of outstanding contributions in sedimentary geology, including all aspects of sedimentology and stratigraphy. He joins a very distinguished group of sedimentary geologists who have won this award. Dr. Read will receive the medal next year in Long Beach, California, at the AAPG-SEPM national meeting. In addition, Dr. Read received the Outstanding Educator Award from the Eastern Section of the American Association of Petroleum Geologists, as well as the A.I. Levorsen Award given each year for the best paper that emphasizes creative thinking toward new ideas in exploration. The paper for which the Levorsen Award was given is entitled "Greenhouse, transitional and icehouse climates generate distinctive parasequence stacking patterns in carbonate reservoirs."

It usually meant taking classes in everything from geochemistry to geophysics and competing with students who specialized in those areas. With research, if we could make it past his secretary, the formidable Marge Dellers, Lynn tended not to give specific directions but rather allowed us to flounder. As a result, most of us wound up working closely with other members of the department in addition to Lynn. At professional meetings, Lynn would not lead his students around. Instead, we would see him at a distance embroiled in some epic battle of giants of Appalachian tectonics. He was too much of a gentleman to engage in the loud and aggressive disagreements that sometimes erupt at conventions. On the other hand, he had been known to stand up and calmly state, "You have set Appalachian Geology back 20 years with this study." Towards the end of graduate research, Lynn took more of an active role but mostly as an antagonist as if we were his rivals in the field. I heard one "number one son" say, "Lynn doesn't like my project" which was not an uncommon feeling. Yet even through this perceived lack of interest and understanding, Lynn would surprise us with an insight that showed both. If we returned to Virginia Tech after

graduation, the new graduate students in Appalachian Geology class would regard us in awe because Lynn had praised our work so highly. It was only then that we realized that Lynn held us in such high esteem and took fatherly pride in our accomplishments.

When Lynn retired in 1995, a few of us got together and organized a session at southeastern Geological Society of America. To really reflect Lynn's influence on the profession, we entitled the session "Renegade Tectonic Models and other Geologic Heresies: A Session in Honor of Lynn Glover III." The night before the session and after a few beers, a few of us thought up a song for the reception in his honor. It was sung to "Here Comes the Sun," extolling his battles in Appalachian tectonics. The chorus line was "Here comes that SOB Lynn Glover, he's always right." At first, his southern gentleman sensibilities seemed offended but later he asked for a tape of the song and kept it as a memento. In 1997, we published a final volume on Lynn's later thoughts on the tectonics of the Appalachians in a GSA Special Paper. Lynn is known to the more recent members of the department as a Professor Emeritus and the chair of the Alumni Relations Committee.

Virginia's Natural Resources: A Case for Stewardship

2006 Geosciences Commencement Address
The Honorable L. Preston Bryant, Jr.
Secretary of Natural Resources, Commonwealth of Virginia

May 13, 2006



photograph by Cenk Ozerdem

“Professor Tracy, Faculty, Staff, Graduates, Families, and Friends: It is with joy and no small amount of pride that I am here this morning to address you. I was honored to have received the invitation, the very first commencement invitation I have received in my new role as Secretary of Natural Resources.

And, besides, it is not every day that a liberal arts graduate is asked to address geosciences graduates. After all, my primary academic interests are late-18th century poetry and prose as well as modern British literature, and I dabble a bit in Beowulf, Chaucer, and Shakespeare. So far be it from me to presume to offer advice, whether practical or theoretical, to bright scientific minds on this early Saturday morning.

I am, to be sure, a believer in a liberal arts education. Our world is increasingly complex; our societies are increasingly cross-cultural; and our collective need to be increasingly collective in thought in so many areas of life is, well, increasing. It is incumbent upon us to contemplate, plan, and be able to measure the impact of technological advances on the human condition. We need to know how emerging science and technology will change the way we understand ourselves and others.

Personally, I am fortunate to have spent time in – and to, in many respects, to have been defined by – the arts, sciences, and social sciences. Most every summer, I teach a five-week literature course at the local community college – often medieval and middle English, occasionally Romantic and modern; for more than a decade, I have been a partner in an engineering (civil, geotechnical, and environmental), surveying, and planning firm; and I also have had the distinct privilege of serving in state government, for a decade in the Virginia House

of Delegates and now in the Executive Branch, where higher education policy and environmental policy have been primary concentrations. So, yes, the arts, sciences, and social sciences are all a part of me.

This is a life-mixture that not everyone can experience. I realize that. And I am grateful that I have been fulfilled in this way.

When Wordsworth sat a few miles above Tintern Abbey in the Wye River Valley, looking out over a landscape that I also have admired and hiked, he was moved to write what is perhaps the most pantheistic poem in Romantic-era literature. In all parts of nature, Wordsworth saw great good.

When Joseph Conrad wrote *Almayer's Folly*, *Victory*, *Lord Jim*, *Heart of Darkness*, and other novels and stories, he often relied on the landscape and natural world around his characters to reflect and accentuate for the reader their human condition. To Conrad, travelers' trips down rivers through jungles were searches for souls in unsettled colonial worlds.

And when the modern James Michener wrote *Chesapeake*, he did so with such description and power that he brought to life a most historic landscape of Virginia (and Maryland), allowing the reader to clearly see that the water and land and indigenous wildlife were as important to our Commonwealth's – and nation's – founding as ships and guns and tools. (If you're a Virginian and you have not read Michener's *Chesapeake*, then let that be your first post-graduate homework assignment.)

Ours is a Commonwealth whose natural resources are, in my opinion, more historic than those of any other state. Looking eastward, we see our 12,000-year-old Chesapeake Bay, one of the world's most wondrous estuaries. Its tidal flows

connect ocean species to today's landlubbers; certainly, those flows helped that first fish with toes come ashore. And, of course, we all know about its 35 million-year-old cataclysmic crater. On our westward spine, there are our Blue Ridge Mountains, renowned in film and song, but historic for their pre-Revolutionary War wagon road, which Englishmen, Scots, German Protestants, Mennonites, and Moravians traveled to settle much of the eastern United States. And connecting that wondrous estuary to those renowned mountains are the most historic rivers in our nation – the Potomac, Rappahannock, and James – which led the very earliest settlers into a new frontier.

And then, of course, there are such relatively unknown but highly treasured resources as the small quarry in Pittsylvania County, which is the only place on the planet where entire Triassic insect fossils are being collected. We can be proud that researchers from this very department are involved in that work.

Yes, Virginia has the most historic natural resources in the nation. Put another way, we have a lot to lose if we are not careful. It is our responsibility to preserve and promote them – and that is one of the impressions I hope to make upon you this morning.

If we are indeed to preserve and promote them, however, we must do so by first acknowledging the stresses our resources are under.

Let's look at three areas to make this point – population growth, transportation demands, and energy consumption.

Our natural resources will forever be under stress as Virginia continues to grow. Such is not new, really, and it only states the obvious. Virginia has for many decades worked to protect our heritage resources against the demands of a grow-

ing population and an increasingly sophisticated economy. We are kindly "victimized," in a way, for living in an economically well-positioned mid-Atlantic state, whose proximity to the nation's capital, moderate climate, diverse landscape, and generally high quality of life are more than so many can refuse. That said, such growth, in many ways, beats the alternative. Living in a growing, healthy state, while bringing on certain challenges, is a good thing.

Reviewing the past half-century, though, we can see that our state's population has doubled. In 1960, Virginia was home to four million people. Today, we have seven-and-a-half million. And by the end of this decade, we will be home to eight million people. That's twice as many people in 50 years, with the rate of increase in just the past decade especially hyped.

The result, in part, is that our spatial gaps are being filled. Our once rural areas – especially those between Northern Virginia and Richmond, along our historic Northern Neck and Middle Peninsula, in our upper Shenandoah Valley, and in our southeastern peanut-and-pine flats along the North Carolina border – are becoming increasingly sub-

urbanized.

Over the past decade alone, Virginia has lost to development an average of 60,000 acres each year, and much of what is lost is from working farmland. Broken down, we lose to development nearly 200 acres every day – that's nearly a hundred acres lost before lunch time each day, and another hundred acres lost before dinner.

In transportation, we see an unsurprisingly similar trend. Over the past 20 years, the vehicle miles traveled in Virginia have increased by more than 70%, while over the same period

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L. Preston Bryant, Jr.

Biography: L. Preston Bryant, Jr. Secretary of Natural Resources

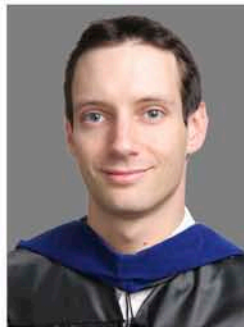
Preston Bryant, Jr., serves as Secretary of Natural Resources in the cabinet of Virginia Governor Timothy M. Kaine. Prior to joining Governor Kaine's cabinet, Secretary Bryant served in the Virginia House of Delegates for 10 years, where he sponsored landmark legislation to help preserve more than one million acres of nontidal wetlands, streamline the state's stormwater management programs, and create a nutrient credit trading program to advance upgrades to more than a hundred wastewater treatment facilities that discharge into Virginia waters.

Secretary Bryant also was a partner in a Virginia-based engineering, surveying, and planning firm that specialized in the design of large-scale residential, commercial and industrial developments as well as transportation facilities.

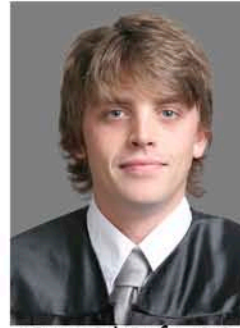
Secretary Bryant was born in Lynchburg, Virginia. He received his B.A. in English from Randolph-Macon College, a master's degree in the humanities from the University of Richmond, and an M.A. in modern British literature from the University of London. He and his wife, Liz, live in Richmond.



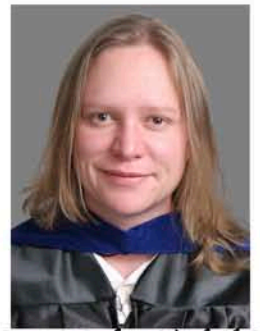
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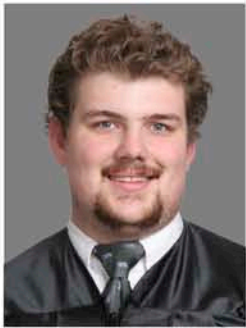
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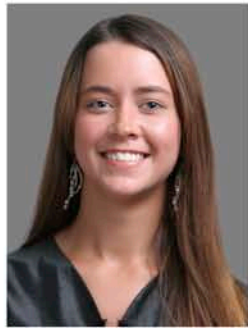
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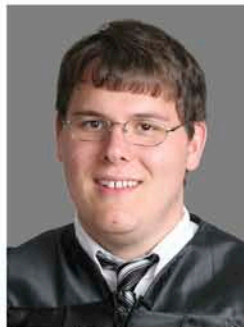
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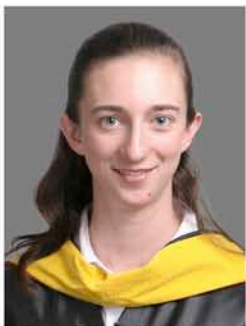


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Geoscience Class 20



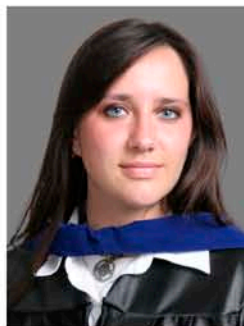
Trey Stinson Dickerson, B.S. – Not Pictured



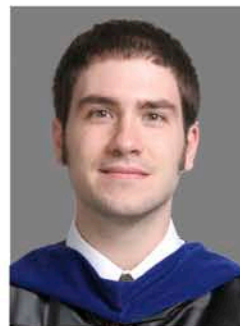
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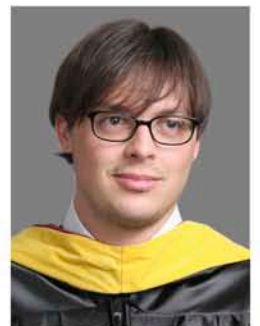
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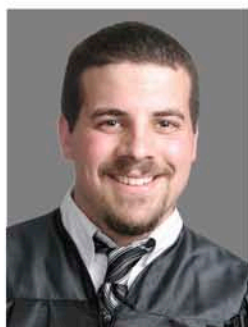
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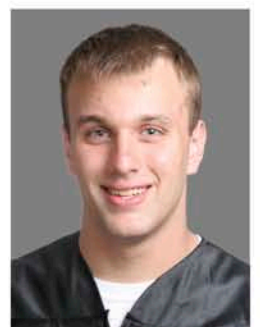
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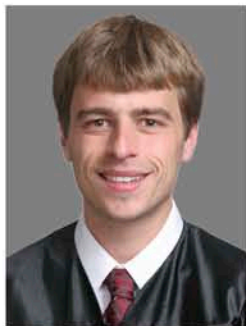
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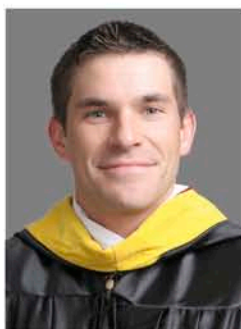
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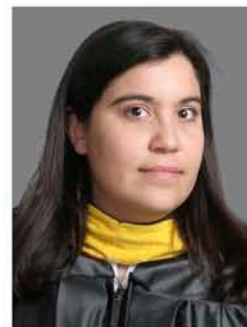
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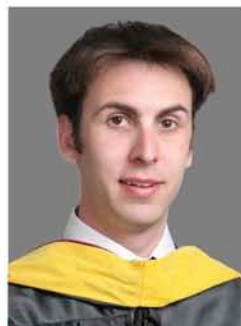
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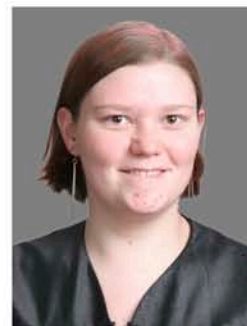
Claudia Cannatelli, M.S.



Elizabeth A. Glusica, B.S.



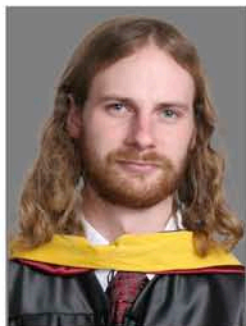
Elige B. Grant, V, M.S.



Martha M. Griffith, B.S.



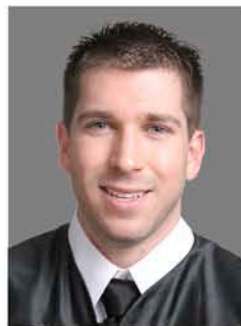
Michael E. Mattox, B.S.



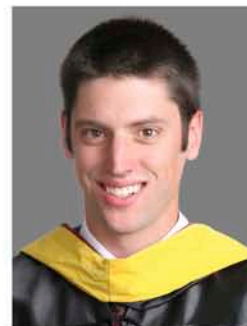
Ryan J. McAleer, M.S.



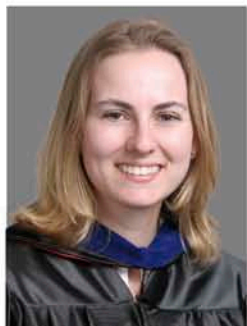
Jennifer L. Moll, B.S.



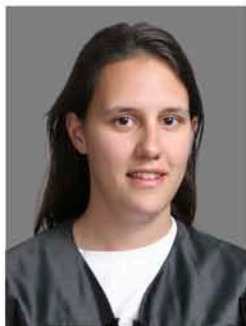
Morgan B. Pearsall, B.S.



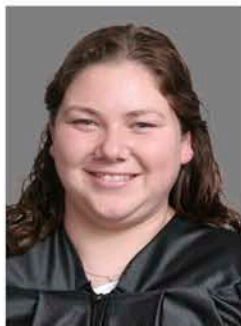
David F. Rugh, M.S.



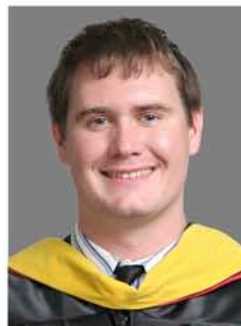
Jennifer A. Stempien, Ph.D.



Erin L. Strawn, B.S.



Katherine A. Walraven, B.S.



Daniel J. Yancey, M.S.

Science of 06



Matthew Douglas Smith, B.S. – Not Pictured

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the number of new lane miles constructed has only been 8%. This equates to the congestion levels that we know so painfully well, the increased time we spend in our cars, and growing amounts of energy we routinely expend (or waste).

And energy is something we know to be more and more precious. (I actually got excited yesterday when I saw that gas was down to \$2.75 per gallon.) Our in-state energy trends are no different than our national ones – they track an obviously similar upward path.

Virginians consume nearly two-and-a-half quadrillion BTUs annually. We import more than 50% of our total energy needs, with petroleum accounting for two-thirds of it. Coal is our only energy export – and that's being depleted.

A couple of hours southwest of here, we have about 250 million tons of coal reserves remaining. Steady growth in Virginia's coal production began in about 1890 and lasted for a century. However, our state production peaked in 1990. Since then, there has been a steady decline in coal extraction. Indeed, projections suggest that over the next decade, Virginia coal extraction from the quarter-billion tons we have will fall to about 20 million tons per year and then to half that over the ensuing years. A steady decline in the balance will come over the next century. It is safe to say that in the mid- to late-21st century, Virginia coal will peter out to negligible annual yields. And according to economics, those negligible yields will likely give way to the no-longer-worth-it costs of production.

Oil is in equally challenging supply. Virginia is not a great oil-refining state. We never have been, though we do have one major oil refinery in Hampton Roads.

There is an estimated two trillion barrels of oil beneath the earth. One trillion has been extracted, and we are now down to the second trillion. Globally, we are extracting about a thousand barrels every second. We are now burning 31 barrels for every 4.5 barrels discovered. Production is on the decline in 54 of the 65 oil-producing countries.

These are trends – facts – that should ring certain alarm bells.

We know the need for alternative sources of energy. Such is the challenge facing the new graduates from this Department of Geosciences.

But let's bring the case for stewardship back closer to home. Let's return to James Michener's Chesapeake Bay.

It's one thing to cite a mineral that's disappearing; it's another to cite a historic Virginia species and food source. The plight of our native Chesapeake Bay oyster, the *C. virginica*, is a delicious stewardship point to make. Indeed, its sad decline is precisely what happens when the demands of growth outstrip our natural resources – or at least our smart management of those resources.

When Captain John Smith arrived in the Chesapeake Bay with its tidal rivers nearly 400 years ago, he found mounds – mountains – of oyster shells so numerous and near one another that they were navigational hazards. Oyster shells were elongated and measured a foot in length.

In the early 1900s, however, we Virginians began significantly over-harvesting our Bay's oysters. We took the oysters but did not replenish their shell habitat. Instead, we used their shells for road-building. And we continued this over-harvesting through the 1950s, when our post-war population began booming and development in the Chesapeake Bay watershed dramatically increased, causing greater urban and suburban runoff pollution (phosphorus and nitrogen), a dramatic increase in the loss of open-space lands, and a predictable result in water-quality degradation. Our native oysters, then, with their environment so damaged and changed, became vulnerable. Disease set in more than a half-century go, and the population has never amassed the numbers or strength to recover. Our oyster harvest today, relatively speaking, is measured in

teaspoons rather than buckets. The last 10 years' harvest has been disastrous.

We most certainly will never see the kind of rebound we would like in our native *C. virginica* oyster. For more than five years we have been conducting research on the introduction of an Asian oyster, *C. ariakensis*, into our Bay. And a several-year environmental impact statement is also now being conducted.

Yes, these are the challenges that face new graduates from this Department of Geosciences.

Virginia without oysters is like a flower without petals. It is historically upsetting and significant.

Leaving Virginia Tech and this Department is the first step of your professional careers – careers that will take time to develop and then unfold.



Professor Emeritus Edwin Robinson leading Graduation procession

photograph by Cenk Ozerdem

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Bill Thomas (Ph.D. '60) completes his term as President of the Geological Society of America

by Robert Tracy, Chair

William A. Thomas, The James S. Hudnall Professor of Geology at the University of Kentucky, is currently finishing up his term as President of the Geological Society of America. Bill received his Ph.D. from the Department of Geology at Virginia Tech in 1960, following receipt of his B.S. (1956) and M.S. (1957) degrees from the University of Kentucky. Terms of GSA presidents have traditionally run from one Annual Meeting to the next (usually from November to November), but a shift to a fiscal-year term basis by GSA has given Bill an extra eight months or so in office, since his term ran from November of 2004 to June of 2006.

GSA is a major scientific society, currently serving 17,000+ members, most in the United States but with a significant scattering across the world. The President of GSA has a number of roles, including presiding over meetings of the Council and important committees, as well as representing the Society at section meetings held across the country from March to May. I have known Bill for many years through his research in Appalachian structure and tectonics, and in global tectonics generally. Since I knew he would be attending the Southeastern Section GSA meeting in Knoxville last March, and chairing a major Appalachian Tectonics Symposium with Bob Hatcher, I took the opportunity to sit down with him for a few minutes and chat about the trajectory of his career that took him from Blacksburg in 1959 to presidency of GSA in 2004-2006, and current tenure as a distinguished chair at the University of Kentucky.

Bill told me that as far as he knows, he was the third Ph.D. to graduate from the Geology Department at VPI, as it was then known, but he could not recall the names of the first two. A bit of research since then indicates that the first was in 1957 (Charles Hobbs, Jr.) and three are listed in our records for 1960 (Bill Thomas, Ping-Fan Chen and Douglas Hillhouse). So Bill can be regarded as either second (in 1959) or tied for second (in 1960). As a graduate student, he worked with Byron Cooper, and although he had done

stratigraphy in western Colorado for his M.S. thesis at the University of Kentucky, he focused on Upper Mississippian stratigraphy of southwestern Virginia, Kentucky and West Virginia for his Ph.D. He must have worked very efficiently, finishing up his dissertation in a little over two years.

Bill's early and mid-career paths were eventful. After leaving Blacksburg in 1959, he worked for several years in exploration for the California Company (now Chevron), principally in the Gulf coastal region. In 1963, he started a seven-year stint at Birmingham-Southern College, rising to the position of department head. In 1970, he left for the north, and spent two years at Queens College of CUNY, including a year as chair. From there, back south: from 1972 to 1979 he was professor and chair at Georgia State University in Atlanta, moving in 1979 to be a professor at the University of Alabama. He remained at Alabama for eleven years, finally ending up back in Lexington at the University of Kentucky as professor, and he was chair there from



1991-1997.

One topic we touched upon in our brief conversation was the pitfalls of returning to one's former haunts, only to find them irretrievably changed by time. Bill has been in Blacksburg many times, but said that he finds it quite different each time he visits. His biggest culture shock of this sort, however, was returning to the University of Kentucky as professor and chair in 1991, having left as a newly minted M.S. graduate 34 years before. He said that it seemed a totally different place, both in size and character.

As a department, we take great pride in the accomplishments of all of our graduates, but none more so than Bill Thomas, who has crowned a distinguished academic career with election to the highest office in one of our most important professional societies. Great going, Bill, and when you return to Blacksburg next year, we'll prepare a special historical map of town for you showing the student watering holes of 47 years ago. We'll see if any of them can be found today by an experienced field geologist!

Alumni remember VT's Saltville field camp



Cooks Lois Craig (left) and Barbara Webb (right) prepare lasagna while Nancy Craig watches in this 1974 photo. (Photo courtesy of Dr. Fred Webb, Jr., M.S. '59, Ph.D. '65.)

Dear Editor,

Reading the article about VT's Geology Summer Field Camp brought back fond memories from the summer of '70.

Being on the GI Bill and somewhat strapped for funds, I managed to somehow beg one of the "appointments" to work at the field camp while attending. I got there a couple days before the rest of the students and met Dr. Fred Webb, his lovely wife Barbara, who was our primary boss, and their two delightful daughters. They stayed in the house trailer behind the building. My cohorts in crime as worker bees were John Atthowe and R.J.P. (Ron) Tucker. Our job was to get there early to help set up, arise early every day to help with breakfast and the layout of cold cuts for sack lunches, clean up of breakfast dishes, and when we returned from the field each day to assist with the preparation of supper while the rest of the students sacked out in their bunks, threw Frisbee, or generally relaxed. Then we cleaned up after supper, kept the showers and latrines clean, and after the camp closed stayed around a day or so to clean up.

Somehow I got the job of driving the other van when we went to the field each day. I guess Dr. Webb had not decided on the "choose more mature graduate students" policy. Maybe since I was a vet and a little older than most of the rest, he let me slide.

I remember fishing in the north fork of the Holston with Atthowe, shooting groundhogs in the field behind the camp with the varmint rifle I kept in my VW, going

down to the town square to sip a brew and be called rock pickers. I also remember heading over to Hungry Mother State Park on Sundays with Dave Tibbs and the late Jim Mink and going to the drive-in over on I-81 (the Starlight?) to watch blue movies while sipping a bottle of Ripple Wine. We'd ride over in the car (not my VW), and then before we got there, two of us would get in the trunk to go through the pay gate.

I remember Penny Whitten was the only female amongst us. She may well have been the first female at the camp, and she got the small room off of the main dining room as her dorm room.

I later heard rumors, perhaps from a spider, that one of our students stayed on after the camp closed for the summer to do some major painting. While there alone, he somehow managed to connect with a cute townie that I remember well and allegedly was in her company in the sack early one work day when Dr. Cooper decided to drive down from Blacksburg and check on the painting progress. I suspect it was this fellow who may have bartered off the mattresses. His name will remain silent.

All in all, it was a great six weeks. One cannot imagine what an "A" in this nine quarter hour course did for my GPA. As Dr. Lowry, my course advisor, said to my boss at the Tennessee Valley Authority while Dr. Lowry was down in Knoxville or a Southeastern GSA meeting, "Bill wasn't one of our better students, but he could think in three dimensions." That endeared Dr. Lowry to me forever and I used the quote frequently as I went through my career with TVA and the Department of Energy. I retired in January 2002 with 36 years federal service including my military service. My wife and I remain here in Knoxville.

Bill Seay
B.S. in Geology, Class of '71

Dear Editor,

I enjoyed reading the cover story of the Geosciences Magazine about the field camp at Saltville and wanted to share some of my personal memories. I spent two five week sessions at the camp, one in 1984 as an assistant cook to Mrs. Barbara Webb and one in 1985 as a student at the camp. I have fond memories of both summers there, and they are from entirely different perspectives.

In 1984, Mrs. Webb taught me how to cook things that didn't just come out of a box or a can. We would get up at the crack of dawn (6:00 a.m., what an ungodly hour to be awake!) to fix a phenomenal number of eggs, pancakes, sausage patties, you name it. Later in the morning, came the trip to Piggly Wiggly to buy six gallons of milk, five heads of lettuce, 14 pounds of ground beef, and so much more. It takes a lot of food to feed 25 people three meals a day! When I went back to Blacksburg after the summer was over, my friends wanted me to cook for them until I learned how to scale back down on quantities.

There wasn't much to do in Saltville on the weekends, so most of the staff and students headed out. One weekend when a few of us got stuck at the camp, we took several chairs up to the apex of the roof (just like on the current television commercial) and waved to the locals cruising by the camp. What a nice way to spend an evening! Mrs. Webb was not pleased with us when she found out! ("You could have fallen off and gotten hurt!") She was right.)

Most students probably remember the huge sink-hole in the side of the mountain near town. One evening a group of us lowered ourselves down into the hole by a garden hose tied to a tree and went rock climbing and crystal hunting. There were beautiful calcite crystals down there, and the water down in the bottom of that hole was the most incredible shade of green. The high side of the sink hole was awe inspiring, but the best part was seeing how far up we would climb between the boulders at the bottom of the pit.

The next summer I was there with some old friends and made some new ones very quickly. It was hard work, but a wonderful experience. The mountains of Southwest Virginia are so gorgeous. Emerging from a canopy of trees into a grassy meadow spurred my

buddy and I to run across the field and launch into a rendition of "The Sound of Music," with arms spread and gear flapping. There were some thrills, too. The experience of being chased across a field by a very angry Black Angus bull was indelibly imprinted on my brain. I have never climbed a barbed wire fence so fast in my life and thought twice about going through cow pastures long after that experience.

After supper, we compiled our data and worked on our maps. Then it was time to blow off steam as we were so inclined to do. We cruised the great metropolis of Saltville, watched the softball games, and just generally had a good time doing things college students do. There are so many other things that I could discuss. Saltville and the whole area that we explored still have a very special place in my heart. Memories flood my brain whenever I travel through that part of the state.

Since graduation I came back to my home town, taught high school Earth Science for eight years, took three years to be a stay-at-home mom, and have been in adult education for the last nine years. I primarily teach science and math to my students and frequently pepper my lessons with the things I learned and anecdotes from my time as a student in the Department of Geological Sciences and at Virginia Tech.

Sincerely,
Laurie McDaniel Greer
B.S. in Geology, Class of '86

1295 Beulah Road
Rocky Mount, VA 24151

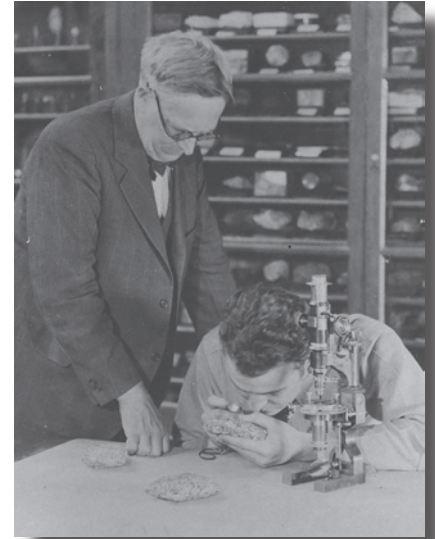
Editors Note: In the Winter 2006 of this magazine, Professors Fred Webb and Jim Craig remembered Saltville. Printed here are two letters from former field camp students.

Centennial Memories

From the Beginning: A VPI Geology Major a Century Ago

Editor's note: Centennial Memories is a series of articles in this magazine celebrating the 100th anniversary of the founding of the geology "department" at VPI. In this note, we continue our story begun in the last edition of what it would have been like to be a geology student in 1906.

We continue the journey of our Geology major in the Scientific Department at Virginia Polytechnic Institute in 1906. Dr. Watson has moved on to be the Head of the School of Geology at the University of Virginia as well as State Geologist, and Dr. Roy Holden is your only Geology professor (for the next 20 years!). He is an inspiring and enthusiastic professor who cannot find the time to record his investigations because he has too many teaching duties which may sound familiar to some of you. You are one of a very few students in the Scientific Department studying to be a geologist. After you mastered the Chemistry, Physics and Math requirements and General Geology A and B, you are ready to tackle General Mineralogy with Dana's Text-Book of Mineralogy and Physiographic Geology which meets twice a week. The other courses available to you are Rock-Weathering, Economic Geology, Paleontology, Determinative Mineralogy and Petrography. Your Summer Field Work would have been with the Geological Survey of Virginia. If you excelled in these endeavors, a Master of Science in Geology or Mineralogy was available. Stay tuned as we visit the archives of our Geology Department during the coming year leading to our 100 year celebration.



Dr. Roy Holden advising a student

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Your personal lives and professional careers will need a proper balance to prevent undue wearing on any given side. Personally, you should continue sharpening your scientific minds by feeding, in no small part, off of other non-science foods – art, literature, and history.

If you need a patron saint, look to Bertrand Russell, the British philosopher, logician, essayist, and social critic. He was a prolific writer in both the sciences and humanities. While not everyone would call Russell "balanced" in every sense of that word – he was more eccentric than anything – he did cut a colorful swath in life.

It is incumbent upon you, though, to work for a personal balance much the way we Virginia policy makers are forever working to balance our natural-resource protection against the growth trends we know so well and with our long-standing, historic commitment to economic development.

And when you are professionally working for 'progress,' consider the many ways progress can be defined and what

the impact of that progress might be in a social and cultural sense. Think of our *C. virginica* oyster. Will your work – or the next generation of product that your work today may lead to – change the way we understand ourselves and others? If so, how?

I will say again that I do not presume to impart great wisdom. I can only testify to the joys I have had from engaging in the part-time teaching of Beowulf and Chaucer and Wordsworth and Conrad while being a full-time partner in a civil engineering firm while still working in the public policy of our Commonwealth – social, economic, educational, and environmental.

I hope the personal and professional balance you achieve brings the same level of joy as you step away from these beautiful mountains.

Thank you for allowing me to be a part of this special weekend."

'60s

Martin Louis Bregman (M.S. '67) writes, "I spent the summer of 2005 working on The Mitchell Mountain Quadrangle near my dissertation area. I will spend a week in 2006 finishing up. I got promoted to 7th Degree Black Belt in 2004, won the National championship in my age and weight at the Judo Championships and was elected to the Jim Thorpe Sports Hall of Fame in 2005 as the martial artist of the year in Oklahoma. My special regards to Dr. Lowry. I haven't kept in touch as much as I should have. VPI still has one of the best Geology Departments in the country."

'70s

Phil Brown (B.S. '72) writes, "I have been a consulting hydrogeologist based in Evergreen, Colorado for the last 23 years. Since leaving Virginia Tech, I have worked on a variety of projects on each of the seven continents. I am currently working in the tsunami ravaged Aceh Province of North Sumatra, Indonesia, helping to develop long-term water supplies for destroyed

villages and in North Cyprus providing technical assistance in developing a well field management program. I am also working on a variety of mining projects in Mexico, Venezuela, and even the USA. My old friends can reach me at hydrobro@aol.com."

Dave Kinne (B.S. '79) writes, "I had no idea I would wind up living in Texas for most of my adult life. Houston is the place if you work in the oil business. Funny, just a stones throw away in the same neighborhood, in the same model house, lives Bill Pramik, fellow Virginia Tech Geoscience alum. We have worked for the same company for a spell. Small world!" Contact Dave at 1905 Garden Terrace, Katy, Texas 77494. dkinne@houston.rr.com

'80s

Terry Kennedy (B.S. '88) writes, "Hello to all of the 'Reggie's Rangers' from Saltville, 1987." Terry is Vice President of Geological Resources, Inc. in Charlotte, North Carolina. Contact Terry at 500 Devonport Road, Matthews, North Carolina 28104

'90s

Charlie Waltman (B.S. '95) writes, "It has been a long time since I wrote to say 'Hi'! I am still in Houston (going on nine years now), which is a lot longer than I anticipated, but that's how things go! I am enjoying my job as a geophysicist working with microseismic fracture mapping of well stimulations. Passive seismic is really getting a lot of attention these days. It's been fun to be a part of an evolving technology over the past few years.

In the fall of 1994, my future wife, Kate, and I visited Blacksburg and had a great time walking on campus (Derring is one of the things that hasn't changed!), and I proposed at the top of an old favorite hiking spot near Mountain Lake. Kate and I were married in April 2005 at a vineyard in Texas. I managed to sneak some good home brew into the reception though. We are usually back in Richmond, Virginia over the holidays, and would love to get together with old geo-friends!" ckwaltman@excited.com

Wendi Sudhakar (B.S. '96) writes, "Hey there! I just wanted to update my contact info as I have changed jobs. I

joined Devon Energy on February 20th, and I'm in the International Division working in the southern Campos Basin." Contact Wendi at 8214 Campaign Circle, Richmond, TX 77469; e-mail wendi.sudhakar@devon.com

'00s

Stephanie Watts (B.S. 2001) is now living in Reno, NV.

Jenny LaGesse (M.S. 2004) is now working for Chevron in Houston, Texas.

**We want to
hear from
YOU!**

Send us news to share with your Geosciences friends and colleagues. Include your name, home and office addresses, phone numbers and email addresses. Also, if you have photos you would like to share, and space allows, we will include them in the next publication.

Graduate student Benjamin Schwartz becomes highly recognized

Benjamin Schwartz, a Ph.D. student with Madeline Schreiber's hydrogeosciences group, has had a very eventful year. He submitted a research proposal to the Geological Society of America, and it has been recognized as having exceptional merit in conception and presentation (one of 19 out of 720 proposals with such distinction). The same proposal was also recognized by the GSA Hydrogeology Division as being one of three outstanding proposals. Benjamin also received the annual Ralph W. Stone Award and Fellowship from the National Speleological Society for outstanding graduate research. Finally, he was awarded the Karst Research Fellowship by the The Cave Research Foundation, given each year to a graduate student who proposes truly exceptional research. Ben lives in Blacksburg with his wife Cori and son, Zachary.



Post-doc Fabrizio Nestola brings a world of experience to the Crystallography Laboratory



Minerals exist at depth in the Earth under high pressures; pressure increases by about 1 kbar (1000 atmospheres) for every 3km depth. In order to understand the behavior of minerals in the earth, it is, therefore, necessary to study minerals in the lab under high pressures. With his background in crystallography from a Ph.D. at the University of Torino, Italy, and high-pressure expertise developed as a post-doc at the Bayerisches Geoinstitut, Germany, Fabrizio Nestola joined the high-pressure program of the Virginia Tech Crystallography Laboratory as a post-doc in November 2005, to work with Professors Nancy Ross and Ross Angel. Unfortunately for us, Fabrizio's sojourn in Blacksburg was terminated prematurely after only four months by his appointment to the faculty of the University

of Padua in northern Italy, where he is setting up a new facility to continue his studies of the high-pressure behavior of minerals. On the positive side, his new appointment will allow Fabrizio to host research visits by our students to Padua and provide them with a different view of the world of high-pressure crystallography.



Ph.D. student Nick Wigginton selected to meet Nobel Laureates

Nicholas S. Wigginton of Holt, Michigan, a Ph.D. student in Mike Hochella's group, has been selected by the U.S. Department of Energy (DOE) as one of 60 graduate students from across the country, representing all sciences, to attend a meeting of Nobel Laureates in Lindau, Germany, this summer. Wigginton's research is based in part on the discoveries of Rudolph Marcus, who received the Nobel in chemistry in 1992 for his contributions to the theory of electron transfer reactions in chemical systems. Wigginton is using a scanning tunneling microscope (STM) to study proteins from a bacterium called Shewanella. DOE is particularly interested in Shewanella, because it immobilizes certain chemical species in ground water, including radioactive and heavy metals. The research is part of a multimillion-dollar DOE project which includes nearly 40 scientists. "The goals are to understand the fundamental reactions that dictate how these bacteria interact with minerals -- to understand part of our natural environment, and to see if the DOE can use these bacteria to clean up sites that have been contaminated with, for instance, uranium," said Wigginton.



photograph by Cenk Ozerdem

A Message from Matt Banks and an Invitation to be Part of Something Special!

As we prepare for a future in which the College of Science at Virginia Tech is a national leader in scholarship and the teaching of science, we are educating students and building knowledge for a world that is increasingly global, entrepreneurial and ever more reliant on technology and science. These times demand scientists who can push the boundaries, go beyond what is expected and engage in “out of the box” thinking to stay ahead of the constant change of today’s world. The College of Science takes on the task of creating these leaders and encouraging their intellectual growth with a deep understanding of their importance in this rapidly changing world.

Virginia Tech’s Department of Geosciences is known worldwide. Our faculty members are discovering cutting-edge technologies and creating innovative solutions. They are successfully collaborating, reaching across the disciplines and building partnerships with industry to produce results — results that impact society, improve lives and ultimately make the world a better place.

To accomplish our goals — to achieve Virginia Tech President Charles Steger’s hope of becoming one of this nation’s top research institutes and through that, a top institute for graduate and undergraduate education — we need your support. Virginia Tech receives less than a third of its funding from the state of Virginia. To face the new challenges of today’s global marketplace with increased competition for funds and students, we need you — business leaders, government officials, individual citizens, and alumni — to make a gift for our present and our future.

If you would like to consider a gift to the Department of Geosciences, currently there is financial need especially for undergraduate scholarships and fellowships. Additionally, there are

opportunities for including funding for field studies and research, graduate scholarships and fellowships, endowed chairs for faculty, laboratories for research and teaching including our Geosciences Museum. Giving to the Department of Geosciences is easy. You may include a brief note stating how you would like your gift to be used. Please note that Robert Tracy, chair of Geosciences, would be happy to work with you to determine the best use

of your gift. You may choose to contribute in any of the following ways:

- Write a check made payable to the Virginia Tech Foundation, Inc. and earmarked to Geosciences.
- Visit www.givingto.vt.edu and make a gift online using a secure website.
- Call +1.540.231.2551 between 8 a.m. and 5 p.m. Eastern Daylight Savings Time.
- We also accept gifts of appreciated stock or gifts made through electronic funds transfer. Please call us to make arrangements.

And don’t forget that you may be able to double or triple your gift to VT through your employer’s matching gift program! Whatever you do, please give. Your gift truly does make an impact.

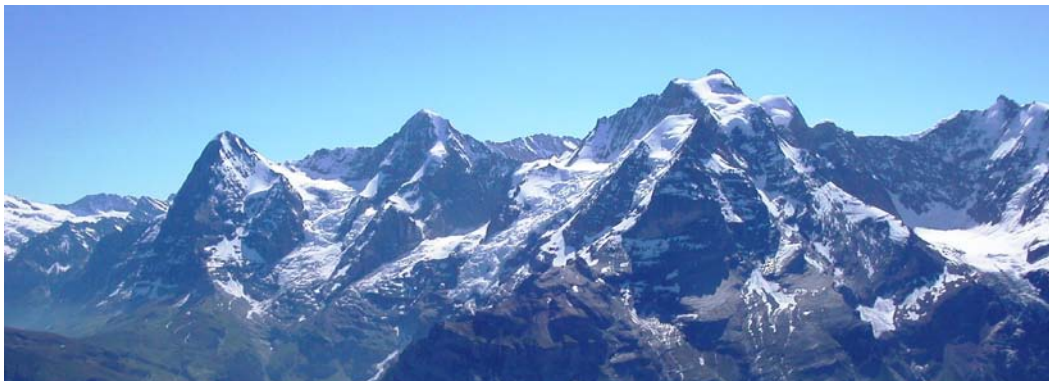
The Department of Geosciences will use these funds for graduate student fellowships, undergraduate scholarships, and various program initiatives. We are also seeking special funds to construct a new Geosciences building and establish chaired faculty positions. For information about estate planning, special gifts, or anything else, please contact Matt Banks, Director of Development for the College of Science, at +1.540.231.2551. Thank you for your support.

Support Geosciences

A Mountain Comes to Virginia Tech

By Matt Mikulich

Are you aware that recently a mountain has come to Virginia Tech? EIGER, which is an acronym for Exploring Interfaces Through Graduate Education and Research, is a major new NSF funded, multidisciplinary, Ph.D., science and engineering program. It really is a bit of an experiment in graduate education whose object is to change the way students are trained and educated. Many problems in the real world are ever more complex and require a multidisciplinary approach to their solutions. However, the culture and practice of solving



MARK YOUR CALENDAR!

The 2006 Twelveth Annual Geosciences Alumni-Faculty Dinner will be held Friday, November 10, 2006, at the Blacksburg Country Club. We will be celebrating the career of Dr. John Costain and as a special bonus, tickets will be available through the alumni office for the football game on Saturday! For your convenience, hotel rooms will be available through the alumni office. Also, a block of rooms has been reserved at the Hampton Inn in the NRV mall area (just ask for VT Geosciences).

You will soon be receiving a detailed invitation, so make plans to join us in November. If you have any questions for now, please don't hesitate to contact Mary McMurray (e-mail mcmurray@vt.edu or phone 540-231-6521).

them is not optimized in our current single discipline education philosophy. And so, there is room for a new direction in graduate education.

EIGER started in the fall 2005 semester, and currently has 15 students involved, of which two are from Geosciences. Each will be supported for two years of their Ph.D. program, and funding will support about 30 students in total. Other elements of the program incorporate three core EIGER courses, an international research experience, and a multidisciplinary thesis research. Degrees will be awarded by individual departments. The EIGER program is designed for a five year life, but the hope is that the EIGER seed will be planted, encouraged, and grow, and eventually become a part of graduate education at VT.

Mike Hochella of the Geosciences department is the Director of EIGER, and he is supported by core faculty from the physics, biology, engineering, and psychology departments. In addition, EIGER has an Advisory Board of six individuals who are committed to its success.



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