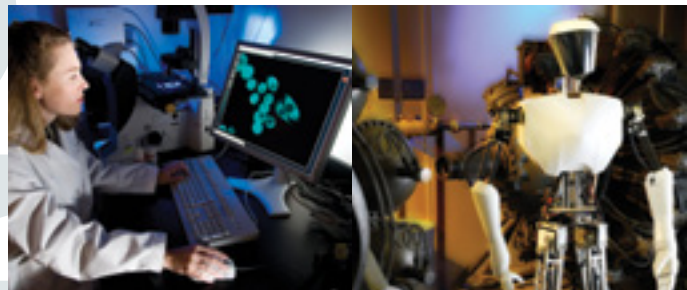


# INNOVATION



the **art** of

 **VirginiaTech**  
*Invent the Future®*



annual report

2009 - 10

Center for the Arts at Virginia Tech



Ten years ago when I gratefully agreed to take on the task of helping guide this special community into the future, I noted that the structure of higher education was in transition and that Virginia Tech faced challenges and a changing landscape that would demand innovation to navigate. That predicted transition has indeed occurred and in startlingly rapid fashion.

As the years have gone by, the innovation required to adapt to the accelerating pace of change has become more and more of an art. The interweaving of disciplines necessary to reach a research or academic goal has become more complicated and challenging. Finding adequate research and operating revenue and attracting a high-caliber of students — both graduate and undergraduate — to maintain the level of excellence we've come to expect has required a symphony of talents. Assigning expertise and resources to the areas that will most benefit the university's mission requires an artistic touch, particularly in an era when state support per Virginia student has plummeted to about half of what it

was at the beginning of the decade (adjusted for inflation).

Nonetheless, in 2009-10, Virginia Tech can look back and see enormous progress toward goals we set at the start of this administration through our collective strategic planning.

Virginia Tech has long been recognized for its mastery of the hard sciences, but I also pledged at my inauguration and in the university's strategic plan to upgrade inadequate fine and performing arts spaces to better educate the whole person. Improvement came through the university-wide Arts Initiative, and in 2009-10 we not only opened Theatre 101 as part of the renovated Henderson Hall, but also finalized plans and broke ground for the initiative's masterpiece, the Center for the Arts at Virginia Tech.

Back in 2000, we saw that Tech could not simply maintain our academic and research position. We would have to aggressively pursue innovation to forge ahead and become stronger by using our various strengths while developing new ones to capitalize on emerging opportunities. As a result,

life sciences research has grown to become the largest component of a research portfolio that has more than doubled during this decade and ranks 44th in the country. That expanded life sciences expertise, combined with Tech's ability to create alliances with businesses, also resulted in the Virginia Tech Carilion School of Medicine and Research Institute, which selected its first class in 2009-10.

The caliber and composition of the student body has continued to change. When I took office we could claim a very capable and bright student body. That remains true in 2009-10, but this freshman class averaged nearly a 4.0 high school GPA. But the bigger change is in the graduate student body, which has expanded to a size more befitting a major research university. In fall 2009, the Graduate School achieved our goal one year early to add 900 graduate students this decade, enrolling its largest-ever class of 4,114 master's students and 2,833 doctoral students. Graduate students now make up 22 percent of the overall student body.

To attract those students, Virginia Tech has altered its academic canvas by expanding the Honors Program, bolstering hands-on learning, emphasizing "green" science, integrating learning technology into virtually every course, and offering more undergraduate research. This past year, in a project that combined environmental creativity, technological expertise, and aesthetic appeal, students put together Lumenhaus, a solar house that won the Solar Decathlon Europe. Other students designed the car that triumphed in a national challenge to allow a blind person to drive, and the Robotics and Mechanisms Laboratory is turning out useful robots that would be at home in a "Star Wars" sequel.

Fulfilling our land-grant mission and *Ut Prosim* (That I May Serve) promise has also required more creative thinking. Today's global environment requires an international presence, and Tech has spread its knowledge to — and consequently learned from — a mosaic of countries, most recently such locations as Egypt and

India. Closer to home, the university has helped communities in Southside Virginia develop new economic opportunities to replace the fading industries of tobacco and textiles.

Finally, in my inaugural comments I alluded to a planned fundraising campaign. We initiated the Campaign for Virginia Tech: Invent the Future in 2003 and, as you'll see in this report, we finished 2009-10 on schedule to achieve our \$1 billion goal. In addition, annual private giving has risen. During this reporting year we raised the third-highest-ever annual total despite troubled economic times.

In April 2000, I noted, "The key to success is changing things at the right time in order to preserve those essentials that define us." As we look back on the past decade, this grand project we call Virginia Tech has done well due to the talented and innovative people who have worked together to achieve lofty goals. Our institution has remained on trajectory to reach new levels of excellence, while remaining true to our well tested land-grant university mission.

*message from the president*

*Charles W. Steger*



Theatre 101



Innovative learning in the creative arts at Virginia Tech took two huge strides in 2009-10 with the opening of one important facility and then with the final plans and groundbreaking for a second facility that will serve as the centerpiece for the university's heralded Arts Initiative.

The Arts Initiative at Virginia Tech is envisioned as a path to new ways of learning at the intersections between the arts and other disciplines. This investment will initiate and nurture dynamic collaborations on campus and beyond, enabling the university to strengthen its performance, visual, and creative arts programs while enhancing programming and scholarship university-wide. It will also act as a catalyst for economic and community development, driving tourism, entrepreneurship, and innovation.

But to accomplish this, the arts at Virginia Tech had to have expanded space. The first new facility, the environmentally friendly Theatre 101 building nestled in the L-shape of a renovated Henderson Hall, opened in 2009-10.

"This versatile building will be used for both classroom work and productions," said Patty Raun, chair of the Department of Theatre Arts and Cinema and director of the School of Performing Arts and Cinema. "The new performance space is ideal for a variety of sets and provides an intimate focus on the theatre piece."

Theatre 101 is 8,500 square feet and was the first facility that Virginia Tech registered with the U.S. Green Building Council and its green-building rating system, Leadership in Energy and Environmental Design. In order to minimize the project's environmental footprint, the project team reduced projected water and energy use, installed equipment to provide superior indoor air quality, and conserved materials.

Also during the year, the board of visitors approved and ground was broken for the cornerstone for the Arts Initiative, the \$89 million, 130,000-square-foot Center for the Arts at Virginia Tech.

"As a university, we must strive to educate the whole person — to prepare students for life at work as well as for life beyond work," said Virginia Tech President Charles W. Steger. "The study of the arts helps us achieve this goal, and our new Center for the Arts will be our home for the fine and performing arts. It will enrich the lives of our students, and the entire university community as well, for generations to come."

Scheduled to open in 2013 at the corner of North Main Street and Alumni Mall, the center will house a 1,260-seat performance hall for music, theatre, and dance performances; visual arts galleries for traditional, digital, and new media exhibitions; and creative technology laboratory spaces for the Institute for Creativity, Arts, and Technology.

## Illuminating the future

A student project that melded art and innovation won international acclaim in 2009-10.

Lumenhaus, Virginia Tech's entry in the Solar Decathlon Europe, was declared the most-efficient structure in the decathlon, beating out 16 other solar houses from seven countries on three continents. Lumenhaus placed in almost all of the 10 judging categories, including tying for first in architecture, taking second in communication and social awareness, and placing third in industrialization and market viability and in lighting.

"We were successful over a number of first-rate, world-class teams with excellent resources and expertise," said Robert Dunay, professor in the College of Architecture and Urban Studies and one of the faculty leaders on the project.

The team of undergraduate and graduate students and faculty members that designed and built the house

combined expertise and learning from four colleges — the College of Architecture and Urban Studies, College of Engineering, Pamplin College of Business, and College of Liberal Arts and Human Sciences.

The students and faculty members worked individually, in groups, and side-by-side to expand their knowledge and develop innovative strategies of design, research, and application. Driven by the demands of a competitive process that called for concrete deliverables that had to meet specific performance criteria, students developed teamwork and communication skills, as well as a deep appreciation for alternative modes of working offered by various disciplines.

The two-year, student-centered project required strong student leadership and collaboration. The resulting student experiences spanned the breadth of research, ideation, design, prototyping, fabrication, industry collabo-

ration, construction, transportation, communications, media relations, operations, and evaluation.

Where most energy-conscious houses are closed with strategic openings to resist heat transfer, Lumenhaus has open, flowing spaces linking occupants to each other within the house and to nature outside. Inspired by the Farnsworth House by Mies Van Der Rohe, the north and south walls are all glass, maximizing the exposure to bright, natural daylight. It uses an advanced building façade comprising two layers: a metal shutter shade and a translucent insulating panel. The shutter shade slides, providing protection from direct sunlight while simultaneously allowing for indirect, natural lighting and privacy to those inside.

Sustainable features include passive energy systems, radiant heating, and building materials from renewable and recyclable sources.

Lumenhaus, Virginia Tech's entry in the Solar Decathlon Europe



## Students honored across campus and beyond

Students in numerous fields garnered awards, recognition, and scholarships for their accomplishments in 2009-10.

*Collegiate Times* writer **Caleb Fleming**, a junior majoring in economics in the College of Science, was named the top college reporter in the country by the Associated Collegiate Press, the highest individual honor for a collegiate journalist.



Fleming's award was based on significance and newsworthiness of the stories; quality and depth of reporting and quality of quotes; and the quality of writing, editing, and Associated Press style usage.

The student wrote an in-depth article called "Decade-long disappearance" about Robert Kovack, a Virginia Tech graduate student who disappeared 10 years ago. Fleming spent much of the 2008-09 school year interviewing friends, family, faculty, and law enforcement about the disappearance, which is still unresolved. Fleming also wrote stories about Virginia Tech athletics, environmental issues, and campus crime.

In commenting on Fleming's work, the judges said, "We felt the Virginia Tech entry presented the best reporting, in both quality and depth, and included a balance of sources. It was clear the writer has a grasp of what it takes to effectively let their sources tell readers

a story, and also back that up with corresponding research.”

**Jessica Lu**, a chemistry graduate student in the College of Science, was awarded a prestigious Fulbright scholarship to pursue part of her Ph.D. research in Israel studying aerosols and their impact on the environment. Lu is looking into optical property changes in nitrogen dioxide and ozone to help determine their role in global climate change.

Two students, **Ryan Shaw** and **Brittany Gianetti**, won highly competitive Barry M. Goldwater Scholarships for the 2009–10 academic year. Shaw was a junior majoring in chemical engineering and mathematics. He also has a minor in chemistry. Gianetti was a sophomore honors student in biological sciences and biochemistry. The scholarships cover the cost of tuition, fees, books, and room and board up to a maximum of \$7,500 per year.

**Thao Do**, a mechanical engineering senior in the College of Engineering, was selected as a National Institutes of Health Oxford-Cambridge Scholar. The scholar program provides accelerated, individualized doctoral training for outstanding science students committed to biomedical research. Do’s career goal is to find noninvasive methods to detect and treat breast cancer and to work with biomedical engineering researchers around the globe. She was also a Goldwater Scholar in 2009 and 2010.

Four teams of students from the industrial design program in the School of Architecture + Design swept the five

award categories at an international design competition that included professional designs. The competition was sponsored by Ardica, a clothing company focused on portable, miniaturized power- and heat-integrated apparel. In the competition, eight finalist groups, chosen from among 100 entries, were charged with designing an outdoor product that integrated the Moshi Power Pack, which is a flat, flexible battery system that weighs less than one pound. A team made up of **Kyle McCrory**, **Patrice Hsia**, and **Greg Lefevere** designed the first-prize winner, the “Voltage” sleeping bag. Two other Hokie teams took second and third, and **Crosby Reinders** won the Student Design Award.



The first-place team

**Bonnie Fairbanks**, a graduate student in biological sciences, was awarded a Fulbright scholarship to pursue her research in Botswana studying tuberculosis in mongoose populations. The research may offer insight into the spread of the disease among humans. Fairbanks is working on a doctorate in the College of Science.

**Elizabeth Prisley**, who earned a master of arts in English from the College of Liberal Arts and Human Sciences in

May 2010, was awarded a Fulbright English Teaching Assistantship to teach English to high school students in the German state of Hessen. At Tech, Prisley volunteered with the Cranwell International Center, where she helped to organize social events and expos designed to foster relations among students and community members.

The Soil Judging Team from the College of Agriculture and Life Sciences won first place overall at the 50th American Society of Agronomy National Soil Judging Contest. It was the third national championship for Virginia Tech and the second since 2005. Team members were **William “Randy” Cosby**, **James Currie**, **Dan Johnson**, **Nina O’Malley**, **Heather Taylor**, and **Katie Wooten**.

A student team from the College of Engineering won first place in the Society for Mining, Metallurgy, and Exploration/National Stone, Sand, and Gravel Association Student Design Competition for the third consecutive year. Members of the winning team were **Blane Bowers**, **Ben Fahrman**, **Ricky Rose**, **Scott Hutchins**, **Dan Sattler**, and **Susie Underwood**.

The Virginia Tech Dairy Cattle Judging Team finished first among 19 teams at the 89th Intercollegiate Dairy Cattle Judging Contest at the World Dairy Expo in Madison, Wis., and first at the Eastern States Exposition in West Springfield, Mass. The national-champion team members included **Paula Craun**, **Derek Heizer**, **Hannah Smith**, and **Parker Welch**.

## World-class teachers make a difference

As most students or professors know, effective teaching requires constant innovation and — despite continuing research into what does and doesn’t work — is more art than science.

The creative art of teaching and the dedication Virginia Tech teachers demonstrate is evident throughout the university. And those qualities are earning more and more recognition for talented faculty members.



## Commonwealth honors the best

Virginia realizes the value of exceptional teachers and researchers and so recognizes them in various categories every year. Three Virginia Tech professors earned top state honors in 2009-10.

University Distinguished Professor

**Robert J. Bodnar’s** innovative work in geochemistry led to his being named Virginia’s Outstanding Scientist 2010 by Gov. Bob McDonnell and the Science Museum of Virginia.



Bodnar, the C.C. Garvin Professor of Geochemistry in the Department of Geosciences in the College of Science, is internationally recognized as a leader in the field of fluid inclusions, which are microscopic droplets that are trapped in minerals when they form beneath Earth’s surface. Bodnar uses fluid inclusions to study volcanic eruptions and to predict explosiveness of future eruptions.

Bodnar’s work focuses on the formation of and exploration for economically important mineral deposits of copper, gold, lead, zinc, silver, and uranium. He’s creating a scientific

framework that will allow Virginians to understand the costs and benefits of uranium mining in the state.

**Romesh C. Batra**, professor of engineering science and mechanics, received the 2010 Virginia Outstanding Faculty Award, sponsored by the State Council of Higher Education for Virginia (SCHEV) and Dominion, an energy company.



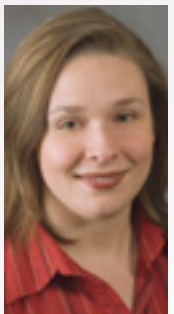
Batra, who holds Virginia Tech’s Clifton C. Garvin Professorship, is world-renowned for his research on the strength of materials. His efforts have earned numerous awards, including the prestigious Alexander von Humboldt Award in 1992 for his pioneering work in developing an understanding of the failure of materials due to extreme loads.

The addition of the SCHEV teaching award is a special honor for Batra. “I developed a passion for teaching and sharing knowledge with others during my high school and college days,” Batra recalled. In order to attend college, he lived with his single elder brother in a large city in India rather than with his parents in their small hometown.

**Maura Borrego**, assistant professor of engineering education, won a SCHEV

Virginia Outstanding Faculty Rising Star Awards in 2010. Candidates for the Rising Star Award must demonstrate superior accomplishment in four areas of scholarly endeavor: teaching, discovery, integration of knowledge, and service.

Borrego’s award comes on top of a 2008 Presidential Early Career Award for Scientists and Engineers (PECASE) for the development of methods that will better prepare faculty and graduate students for interdisciplinary research. Borrego’s award represented the first PECASE honor given to an engineer in the area of engineering education research. She also received a National Science Foundation (NSF) Early Career Development (CAREER) award in 2006.



In Borrego’s SCHEV nomination packet, the editor of the top-ranked science, technology, engineering, and mathematics (STEM) education journal, *Journal of Engineering Education*, Jack Lohmann, vice provost for faculty and academic development and professor of industrial and systems engineering at the Georgia Institute of Technology, described her as “the leading young researcher in engineering education worldwide.”

## CAREER opportunities multiply

Virginia Tech educators garnered a number of NSF CAREER Awards in 2009-10. CAREER awards go to outstanding young faculty members who present career development plans that effectively integrate the excitement of research with inspired teaching. Recipients are expected to become academic leaders, and Tech faculty members have been recognized in this way more and more in recent years.

**Aditya Johri**, an assistant professor in the engineering education department, won his CAREER award to study work practices of global engineering professionals. Johri hopes that his research will advance understanding of how engineers work in teams spread across the world using information technology, and lead to insights that can help educators better prepare future engineers. Such international collaboration in the classroom can transform how engineering students are educated.



**Bingyu Zhao**, assistant professor of horticulture in the College of Agriculture and Life Sciences, is investigating a disease-resistant gene in corn that prevents bacteria from invading distantly related plant species. Zhao hopes to discover how to transfer disease-resistant genes from model plant species into economically important crops.



**Danfeng Yao**, an assistant professor in the computer science department in the College of Engineering, will use her CAREER grant to develop software

that will differentiate human-user computer interaction from that of malware. Millions of computers worldwide are infected annually by malicious software. Existing malware-detection approaches are limited in their ability to identify and discern malicious bots from legitimate and benign ones. Yao also will increase general awareness of cyber-security issues in schools.



**Yang Cao**, a member of the computational biology and bioinformatics group in Tech's computer science department, was awarded a CAREER grant for interdisciplinary computational biology work that integrates biological discovery with mathematical modeling and simulation. The methods developed in Cao's project will help with understanding the molecular mechanisms regulating the cell cycle, a major challenge of contemporary cell biology.



**Carla Finkelstein**, assistant professor of biological sciences and director of the Integrated Cellular Responses

Laboratory, received a CAREER grant to support her study of circadian control of cell division and homeostasis. The goal is to address how circadian factors sense metabolic changes and act in cell-fate decisions. Finkelstein's research also involves training high school students and college undergraduates through research internships.



**Edward Valeev**, assistant professor of chemistry, received a CAREER grant to further his research toward accurate quantum-mechanical predictions of molecules and materials properties. His research group's main focus is on the development of mathematical and numerical models and their implementation in computer programs.

Another major national award went to **Leigh McCue-Weil**, an assistant professor in the College of Engineering's Department of Aerospace and Ocean Engineering, who received a Presidential Early Career Award for Scientists and Engineers, the highest U.S. honor bestowed on outstanding scientists and engineers beginning their independent careers. McCue-Weil



is developing tools to help ship designers better understand ship motions and, thus, better prevent capsizing and other dangers resulting from vessel instabilities.

**Cornel Sultan**, assistant professor of aerospace and ocean engineering in the College of Engineering, received his CAREER award to continue looking at biological discoveries to develop new controllable structures that, in engineering terms, have "tensional integrity." This research could lead to improvements in the understanding of the connection between heart disease and a cell's structure, aid tissue and organ reconstruction research, and explain how nature controls motion in a fast and energy-efficient manner.

**Marissa Nichole Rylander**, an assistant professor in the Department of Mechanical Engineering and the Virginia Tech-Wake Forest University School of Biomedical Engineering and Sciences, will use her CAREER grant to develop a novel sensing system she co-invented



called the "holey scaffold." Typically made from biodegradable synthetics or biological materials, such as collagen, the scaffold promotes tissue growth.

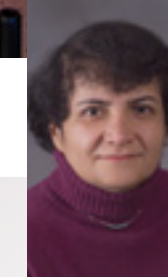
Physicist **Patrick Huber** was one of just 69 people nationally to receive a prestigious Early Career Research Award from the U.S. Department of Energy for his research on neutrinos, which play a critical role in understanding the expansion of the universe, the emergence of ordinary matter, and nuclear reactions. The physics department's neutrino group is one of the largest and most visible neutrino research groups in the world.

Physicist **Giti Khodaparast** received a CAREER grant to support her



Giti Khodaparast studies quantum states and interactions in semiconductor materials.

research and educational activities to better understand quantum states and interactions in semiconductor materials, important for developing concepts for the next generation of technological devices.



**Padma Rajagopalan**, an assistant professor in the Department of Chemical Engineering and a core faculty member with the Virginia Tech-Wake Forest University School of Biomedical Engineering and Sciences, won her CAREER award for studies that could provide new insights into tumor metastasis, wound healing, and developmental biology.

## Several faculty members join first class of Fellows

Five of the more than 150 individuals named to the inaugural class of American Chemical Society (ACS) Fellows were from Virginia Tech. ACS is the world's largest scientific society and is dedicated to the advancement of the chemical enterprise and career development across all fields of chemistry.



Marissa Nichole Rylander will use her CAREER grant to study tissue growth.

Honored for excellence in chemistry and service to society were **Neal Castagnoli Jr., Timothy E. Long, James McGrath,** and **S. Richard Turner**, professors in the College of Science's chemistry department, and **Kevin Edgar**, professor of biomaterial and bioprocessing in the College of Natural Resources and Environment's wood science and forest products department.

Castagnoli's research is devoted to the study of molecular mechanisms of drug metabolism and pharmacological action. Edgar's research focuses on the synthesis, analysis, and structure-property-performance evaluation of polysaccharide derivatives. Long's research focus is the synthesis and characterization of novel macromolecules for applications ranging from biology to materials and electromechanical devices.

McGrath is a University Distinguished Professor and the Ethyl Chaired Professor of Chemistry and a member of the National Academy of Engineering. He has mentored hundreds of students and provided ACS short courses to thousands of professionals.

Turner, director of the Macromolecules and Interfaces Institute, is an organic polymer chemist specializing in synthesis and characterization of various polymers. He holds more than 100 U.S. patents.

### Other awards and honors abound

**Michael Badawy**, professor of management in the Pamplin College of Business, received the International

Association for Management of Technology's 2009 Lifetime Achievement Award. Badawy was recognized for his "internationally acclaimed work, pioneering leadership, distinguished research, dedicated service, and institutional building in advancing the technology management discipline."

**Anne Khademian**, a professor with the Center for Public Administration and Policy in the School of Public and International Affairs, was elected a National Academy of Public Administration Fellow.

**Ross Angel**, research professor of geosciences and adjunct professor of biological sciences, was selected to receive the 2011 Dana Medal from the Mineralogical Society of America for "sustained, outstanding contributions through original research in the mineralogical sciences."

**T. Daniel Crawford**, professor of theoretical chemistry, was awarded the 2010 Dirac Medal for the world's outstanding computational chemist under the age of 40 for his advances in theoretical chemistry. Much of Crawford's research is focused on developing ways to enhance the effectiveness of drug development.

Four professors from the School of Architecture + Design were among 25 faculty members in North America named Most Admired Educators of 2010 in the 11th annual America's Best Architecture and Design Schools study by *DesignIntelligence*. They were **Brian Katen, Ronald Kemnitzer, Patrick Miller,** and **Lisa Tucker**.

**Cliff T. Ragsdale**, Bank of America Professor of Information Technology in the Pamplin College of Business, was named a Fellow of the Decision Sciences Institute. He is one of only 108 scholars worldwide to receive this distinction.

**Judy S. Riffle**, professor of chemistry and director of the macromolecular science and engineering program, was one of only three chemists worldwide to be elected a Fellow in the Polymeric Materials Science and Engineering Division of the American Chemical Society in 2010.

The American Poultry Historical Society awarded the poultry industry's highest honor to **Paul Siegel**, University Distinguished Professor Emeritus of Animal and Poultry Sciences in the College of Agriculture and Life Sciences, by inducting him into the American Poultry Industry Hall of Fame. Siegel has devoted more than 60 years to researching and teaching poultry science.

**Shuhai Xiao**, professor of geobiology in the College of Science, was named a Guggenheim Fellow. The award will support his research in Arctic Siberia that will augment his years of study in South China to understand the co-evolution of the environment and early animals 600 million years ago.

**Carl Griffey**, professor of crop and soil environmental sciences in the College of Agriculture and Life Sciences, was elected Fellow of the American Society of Agronomy.

## Discovering new frontiers

Groundbreaking research is often the engine that drives innovative, creative teaching and brings bright, inspired students to Virginia Tech.

So it was good news, in a year that seemed to bring nothing but gloomy economic tidings, that Virginia Tech research expenditures (as of June 30, 2009) reported to the National Science Foundation (NSF) approached \$400 million for the first time ever. The \$396.7 million figure represented an increase of \$23.4 million, or 6.27 percent, over fiscal year 2008. For 2009, Tech's expenditures ranked 44th in the nation, up from 46th in 2008.

"Competitive research awards continued to grow thanks to the efforts of our faculty," said Robert Walters, vice president for research. "Sponsored research activity is more than money; it represents the Virginia Tech faculty's outstanding scholarship and expertise and their efforts to address important societal problems."

More than half of the growth was from federal funding, which grew from \$135.6 million to \$148.4 million. But the federal funding increase was partly offset by a \$4.8 million reduction in Commonwealth Research Initiative revenue. Industry funding dropped slightly from \$20.47 million to \$20.44 million. Institutional and other funding, such as cost sharing and revenue from foundations, grew from \$116.9 million to \$127.6 million.

"We feel good about the direction in which we're moving," said Roderick Hall, associate vice president for research.

In addition, Virginia Tech Intellectual Properties added 37 U.S. patents and seven foreign ones. Virginia Tech-developed intellectual property generated licensing income of more than \$3.3 million during the year.

### Battling global infectious disease

The 2009-10 fiscal year saw some major research awards (a number of which are detailed in other parts of this report), including the largest, one-time federal award in the history of Virginia Tech.

Congressman Rick Boucher, of Virginia, joined Tech officials to announce a \$27.6 million award from the National Institutes of Health's (NIH) National Institute of Allergy and Infectious Diseases to the Virginia Bioinformatics Institute (VBI). The funding will be used by VBI's Cyberinfrastructure Group (CIG) to support infectious disease research across the globe, primarily to integrate vital information on pathogens, provide key resources and tools to scientists, and help researchers to analyze data arising from infectious disease research.

"Virginia Tech is a leader in bioinformatics related to infectious diseases, and the work the Virginia Bioinformatics Institute performs is extremely valuable not only for Virginia Tech but for the nation," said Boucher.

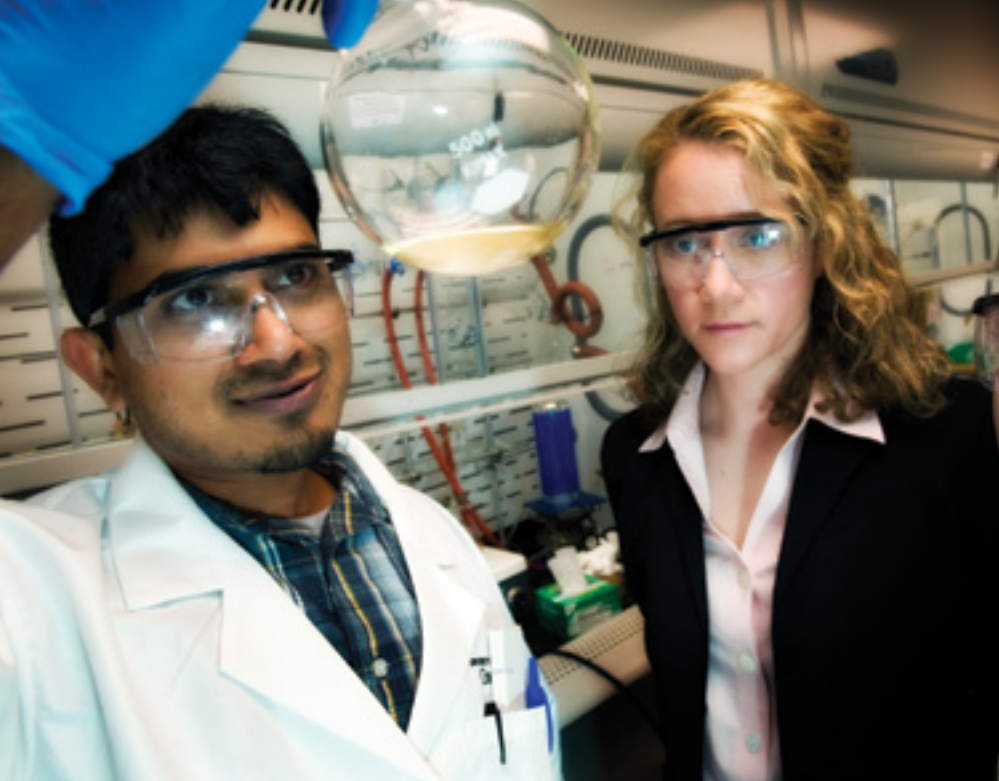


"The new award from the NIH will allow us to continue our work to support infectious disease research and the development of vaccine, diagnostic, or therapeutic targets for countermeasures," said Bruno Sobral, professor and director of CIG and principal investigator of the project. "As we move ahead, we will be working hand-in-hand with a wide range of partners, including medical schools and public health institutions interested in translating the very latest scientific discoveries and innovation into practical health benefits for society at large."

### Research looks for new heart and cancer medications

The NIH also gave Theresa Reineke, associate professor of chemistry, a \$2.3 million New Innovator Award grant to conduct research that will aid in the development of new heart disease and cancer medicines that have fewer side effects.

Reineke's research group is creating carbohydrate-based polymers for the delivery of genetic drugs to combat



Doctoral student Vijay Taori with Theresa Marie Reineke, associate professor, chemistry, in her Corporate Research Center lab

both cancer and heart disease. The newly developed molecules can travel into cells, and also can be tracked so that scientists can follow the molecules' movement in living systems. Her research was featured in the *Proceedings of the National Academy of Sciences*.

"This grant will allow us to gain a better understanding of the cellular mechanisms involved in the delivery of polymeric drug carriers for both illnesses," Reineke said. "These studies will ultimately lead to the development of medicines that are more specific to their disease targets and therefore are less toxic to other parts of the human system."

Reineke's New Innovator Award was one of just 55 across the nation.

### Saving lives on the highway

The National Highway Traffic Safety Administration awarded \$3 million over five years to Virginia Tech's Cen-

ter for Injury Biomechanics to partner with the Virginia Tech Transportation Institute (VTTI) and the Virginia Tech-Wake Forest University School of Biomedical Engineering and Sciences to generate gender- and age-specific models for prediction of injury in motor-vehicle crashes.

"Given the continuing, unacceptably high crash rate in the U.S., it is critical that we continue to be diligent in our efforts to find ways to predict and mitigate injury from motor-vehicle crashes, thereby effecting policy change to ultimately save lives," said VTTI Director Tom Dingus.

Increased life expectancy and declining birth rates are projected to raise the portion of the U.S. population over age 65, creating an urgent need for further research into the biomechanics of the aging body. The decreased skeletal and physiological resilience of the elderly make trauma and its aftereffects one of the top 10 causes of death among those 65 and over, with motor vehicle crashes as one of the most common sources of such trauma.

Due to their versatility, computational models of the human body have emerged as a promising avenue for research aimed at improving the effectiveness of vehicle safety systems and mitigating crash-related injuries across all age groups. One component of this research program investigates brain injury mechanisms and post-injury biochemical cascades.

"The knowledge gained from this study will lead to a better understanding of injury tolerance and more effective approaches to injury prediction, mitigation, diagnosis, and treatment," said Warren Hardy, director of the Center for Injury Biomechanics.

### Fighting hunger

The U.S. Agency for International Development (USAID) awarded Tech a \$2.5 million contract for a program that will promote agriculture-led growth, increase rural incomes, and reduce hunger in Mali. The Office of International Research, Education, and Development (OIREd) will manage the effort.

One focus of the program will be improving tomato production, an integral part of the rice-based agriculture in Mali. The rice-tomato crop rotation is often found in the region, with rice providing family sustenance and tomatoes providing cash.

Tomatoes are the single most valuable horticultural crop in the world. By introducing a package of agricultural strategies, the program expects to improve production. The project will also promote quality assurance among small farmers and build sustainable national capacity for pesticide residue analysis as a means for meeting international agricultural trade standards and reducing sanitary barriers to trade.

OIREd also won renewal of two \$15 million grants from USAID to enhance global food and livelihood security while limiting negative effects on natural resources through prudent environmental stewardship and conservation agriculture in developing countries. Virginia Tech is the only university managing two USAID Collaborative Research Support Programs.

### Monitoring space

Members of Virginia Tech's Space@VT research group received a \$2 million grant from the NSF to build a chain of space weather instrument stations in Antarctica.

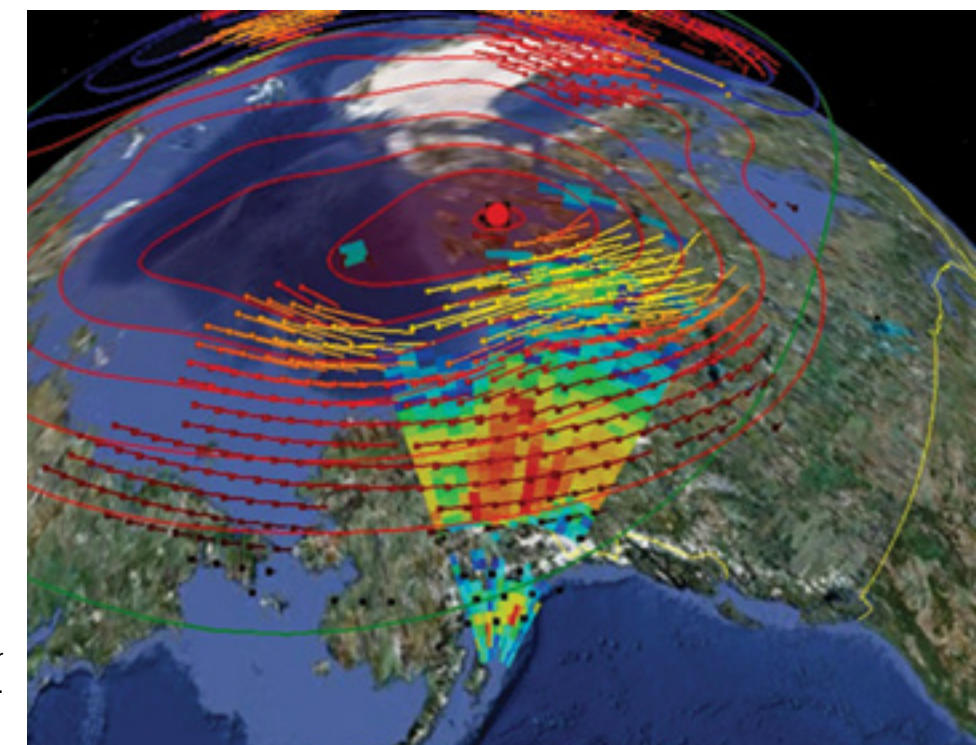
Space weather affects a variety of everyday consumer technologies, including GPS devices, satellites for television reception, and cellular phones. Also, understanding space weather is critical to space programs.

For example, "Satellites experience the disruptive effects of energetic charged particles and electrical charging across the satellite structure during various weather conditions. Astronauts are vulnerable to energetic radiation that may occur at space station altitudes. Navigation signals from global positioning satellites are affected by irregularities in the ionosphere that develop under some conditions, and massive disruption in electric power distribution systems can be triggered by geomagnetic storms," explained Robert Clauer, professor of electrical and computer engineering.

The northern hemisphere is already covered by a number of stations in

the Arctic, but due primarily to the "extreme Antarctic climate and lack of manned facilities with the necessary infrastructure to support facilities, the southern polar region is not," Clauer said.

Clauer's office is located at the National Institute of Aerospace (NIA), a consortium of universities established in 2002 to develop excellence in research and education in a spectrum of aerospace-related areas of study, including space science. The NIA teams with NASA Langley Research Center in Hampton, Va., to conduct some of the nation's most advanced aerospace and atmospheric research.



A weather map generated by a radar system shows space weather patterns.

## Paving the technological path to the future

Virginia Tech has long prided itself on leading the way in technological innovation. That leadership is even moving into fields where the university barely had a presence a decade ago.

Nowhere is this more evident than in Associate Professor Dennis Hong's Robotics and Mechanisms Laboratory (RoMeLa). Worldwide, the robotics field is dominated by South Korea and Japan, but Hong and his students are working hard to catch up. In a *Popular Science* cover story on robotics, editors dubbed RoMeLa's Cognitive Humanoid Autonomous Robot with Learning Intelligence (CHARLI), the first autonomous, full-sized, walking, humanoid robot with four moving limbs and a head built in the United States, "the loneliest humanoid in America."

"CHARLI is just the start, to quickly get our foot into this exclusive international club of humanoid robots," Hong said.

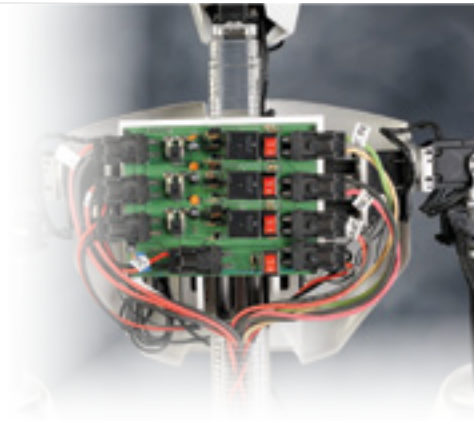
"Though we still have a long way to go to catch up with them, RoMeLa always approaches the problem in fresh new innovative ways, and we believe we can create new technologies and solutions that can leapfrog the 'traditional' approaches."

RoMeLa is filled with robots that would fit into a "Star Wars" sequel. For example, a Robotic Air Powered Hand with Elastic Ligaments (RAPHaEL) uses compressed air to move and could one day help improve prosthetics. The updated version won first place in the American Society of Mechanical Engineers Student Mechanism and Robot Design Competition at the International Design Engineering

Technical Conference. The Cable-suspended Limbed Intelligent Matching Behavior Robot (CLIMBeR) scales steep cliffs and is rugged enough to handle the terrain on Mars.

Intelligent Mobility Platform with Active Spoke System (IMPASS) is a robot with a circle of spokes that individually move in and out so it can walk and roll. Hyper-redundant Discrete Robotic Articulated Serpentine (HyDRAS) snakes its way up dangerous scaffolding. Another upcoming project is a firefighting robot.

In another project, called the Blind Driver Challenge, a Virginia Tech student team developed the first prototype car that can be driven by the blind. The vehicle's name is DAVID, an acronym for Demonstrative Automobile for the Visually Impaired Driver.



RoMeLa students assemble CHARLI.

The students retrofitted a four-wheel dirt buggy using laser range finders, an instant voice command interface, and a host of other innovative technologies to guide blind drivers as they steer, brake, and accelerate. Although DAVID is still in the early testing stages, the National Federation of the Blind (NFB) considers the vehicle a major breakthrough for independent living of the visually impaired.

"It was great!" said Wes Majerus, the first blind person to drive the buggy on a closed course. He is an access technology specialist with the NFB's Jernigan Institute in Baltimore, which in 2004 challenged university research teams to develop a vehicle that would one day allow the blind to drive. Virginia Tech was the only university in the nation to accept the nonprofit's call.

All of this innovation led to Hong being named named to *Popular Science's* eighth annual Brilliant 10. The listing honors top U.S. scientists younger than 40 years old. Honorees are chosen from among hundreds of nominees each year. Past honors for Hong include the National Science Foundation's Early Career Development award. He also has won several international awards related to his work in robotic competitions, including the DARPA Urban Challenge.

### Technology and driving don't always mix

Technology has been a boon to humans in many ways, but it can also be dangerous when used in the wrong way.

The Virginia Tech Transportation Institute (VTTI) has worked in recent years to provide a clearer picture of one of those hazards — driver distraction caused by cell phone use. The research has resulted in worldwide recognition of the problem.

VTTI has conducted several large-scale, naturalistic driving studies using sophisticated cameras and instrumentation in participants' personal vehicles. Combined, these studies continuously observed drivers for more than 6 million miles of driving.

"Given recent catastrophic crash events and disturbing trends, there is an alarming amount of misinformation and confusion regarding cell phone and texting use while behind the wheel of a vehicle," said Tom Dingus, director of the institute. "The findings from our research at VTTI can help begin to clear up these misconceptions as it is based on real-world driving data. We conduct transportation safety research in an effort to equip the public with information that can save lives."

In VTTI's studies, manual manipulation of phones led to a substantial increase in the risk of being involved in a crash or near-crash. However, talking or listening increased risk much less for light vehicles and not at all for trucks. Text-messaging on a cell phone was associated with the highest risk of all. In fact, drivers of heavy vehicles or trucks were 23.2 times more likely to be in a crash or near-crash as a result of texting while driving. Texting while driving at 55 mph can equate to a driver traveling the length of a football field without looking at the roadway.

On the other hand, VTTI's naturalistic driving studies refuted various driving simulator studies that suggested talking and listening are as dangerous as visually distracting cell phone tasks. The VTTI results showed conclusively that a real key to significantly improving safety is keeping one's eyes on the road.

### Foundation to extend fiber-optic backbone

The Virginia Tech Foundation received a grant from the U.S. Department of Commerce Broadband Technologies Opportunities Program (BTOP) to extend Virginia's open-access fiber optic backbone into the central Appalachian region of the state.

"This project will enhance opportunities for research, economic development, and public service, which are core to the university mission," said Raymond D. Smoot Jr., chief executive officer of the Virginia Tech Foundation. "The total project budget is \$6.925 million, with \$5.54 million provided from federal grant assistance."

Over the past decade, Virginia has invested funds from the tobacco indemnification settlement and federal funding sources to build high-performance fiber-optic networks throughout the rural, tobacco-growing regions in the Southside and Southwest areas of the commonwealth. This grant will enable extension of the network outside the tobacco region. The new path will add 110 miles of fiber to the system beginning at an existing node in Bedford and



stretching through Bedford, Roanoke, Botetourt, Craig, Giles, and Montgomery counties to reach Blacksburg and Virginia Tech.

Virginia Tech will use the fiber to enhance research, development, public safety, health care, and education programs throughout the region. The university also plans to use the fiber to improve access to national and international high-performance networks required for high-end science and engineering research.

“Virginia Tech has a long history of enhancing information technology availability for Virginia through large-scale prototypes,” said Jeff Crowder, program

director with Virginia Tech’s Information Technology division. “The university was instrumental in conceiving and promoting the state’s investment in open-access fiber starting in the late 1990s.”

### Professor to track pandemics in humans and computers

Anil Vullikanti, an assistant professor in the department of computer science and a member of the Virginia Bioinformatics Institute, won a \$750,000 federal grant to formulate a mathematical framework that can track the spread of pandemics among populations and

malware across wireless computer networks. The same framework could also determine how a blackout on one major power grid can cause a cascade of additional neighboring networks to fail. The grant is funded by the U.S. Department of Energy’s Early Career Principal Investigator program.

Vullikanti’s methods are expected to detect vulnerabilities and improve robustness in the areas of health care, computer networking, and power grid controls. He also will develop realistic models and scalable, efficient simulation tools for understanding diffusion processes within complex network systems vital to the Department of Energy.

Students work with *Arabidopsis thaliana*, a relative of the mustard plant, which was the first plant to have its genome sequenced. Plant scientists are systematically — one at a time — removing genes from the plant, and then growing the result to determine the role of the missing gene. But *Arabidopsis thaliana* has 25,000 genes, which means an enormous number of environmental variables have to be tested.

“We have lots of high school students, and they can stress the plants in ways we can’t even imagine. So the scientists are knocking out genes of interest and giving the seeds to the students, who are designing environments to study plants’ reactions,” said Dolan. “Students have made discoveries that are acknowledged in grant proposals and publications.”

For instance, in an article her group published in the journal *Plant Physiology* in May 2008, Virginia Tech biology Professor Brenda Winkel acknowledged by name the students in Cheryl Weidow’s fall 2006 biotechnology class at Louisa County High School, who first pointed out the enhanced pigmentation phenotype of plants she had provided for study.

“The students noticed that the mutant plants were redder than normal. We were able to quantify the difference and showed that it was real,” said Winkel. “It is easy for us [the scientists] to overlook subtle differences in the appearance of a plant when we are focused on understanding how things work at a molecular level. The students are quite astute. It demonstrates how working with different perspectives can move things forward.”

Shannon Beasley, a teacher at the Central Virginia Governor’s School for Science and Technology, in Lynchburg, Va., said of PREP, “The students are able to directly contribute to science that is current. There are not many opportunities for students to work with universities and for scientists to get data.”

The goal of the Science Education Partnership Award is to expand those opportunities. Dolan hopes it will help PREP collaborate better with people at a geographic distance and involve low and average achievers. “Because low-and-average-achieving students are used to not getting quick answers, they may be more creative in their approach and may blossom doing research where there is not a quick answer,” said Dolan. “Finally, we want to build the capacity for scientists and teachers from all over the country to mentor high school students in research.”

### Helping define opportunities for rural, sustainable growth

Not far from Tech’s main campus, students are helping Floyd, Va., a small rural town that carries a rich sense of place and has a reputation for its creative cadre of artists, identify possible economic opportunities. As in other rural Virginia communities, farmers and others struggle to create a vibrant future, said Lydeana Martin, Floyd County’s community and economic development director.

The Floyd project became the primary assignment of a class called Economic Development Studio @ Virginia Tech. The students proposed new green business opportunities that entrepreneurs could

adopt and nurture. Unlike communities that seek to attract industries or opportunities from the outside, the students learned that no “smokestack chasing” would be allowed. Officials wanted to use methods of development produced, originated, or grown from within.

“The students faced the challenge of working within constraints,” said John Provo, associate director of Virginia Tech’s Office of Economic Development, who teaches the studio class. “The businesses they proposed were required to promote economic development, reduce environmental impacts, and improve social well-being.”

The class came up with four recommended green businesses: wood pellet manufacturing for wood-burning stoves, a micro dairy that could produce simple cheeses along with yogurt and butter, flooring and countertops manufacturing by Floyd’s artisans, and a “sustainable living” training-and-education center.

Feasibility studies must be carried out while investors are sought. But according to Provo, even if the community doesn’t adopt the students’ blueprints, the team’s work is part of a solid foundation for the town’s economic future. “And what’s cool is we can replicate this process for other communities,” he said.

### Working to spread the university motto

Fall 2009 saw the start of the newest themed housing program at Tech, Students Engaging and Responding through Volunteer Experiences (SERVE), which was launched by the Center for Student

## Service

### Lending a helping hand

Community service, outreach, and engagement can take any number of forms, some of them less recognizable than others.

For instance, an innovative educational outreach program that has more than 12,000 high-school students doing research and providing results that scientists can use has energized legions of kids across the state. As a side benefit, the program also attracted a \$1.3 million Science Education Partnership Award from the National Center for Research Resources (NCRR) in 2009-10.

The Fralin Life Science Institute’s Partnership for Research and Education in Plants (PREP) also received a \$200,000

administrative supplement from NCRR to expand benefits to more students and more high schools and to conduct a rigorous study of PREP’s impacts on student learning.

PREP was started in 2004 by Erin Dolan, associate professor of biochemistry in the College of Agriculture and Life Sciences and outreach director for the Fralin Institute, in collaboration with Frans Tax at the University of Arizona and Eric Brooks at Buena High School in Sierra Vista, Ariz.



“It is part of the Fralin Institute’s outreach work with high school students and teachers to involve them in molecular life science. We have the Biotech-in-a-Box program, professional development programs for teachers, and partnership opportunities,” said Dolan. “PREP began when some of the high school students we were working with wanted to collect real data.”

Engagement and Community Partnerships to more effectively promote the university's land-grant mission and to help students live *Ut Prosim* (That I May Serve).

SERVE creates an environment where first-year students can volunteer throughout the New River Valley, getting to know both themselves and the local community better through the process.

In the pilot year, 19 students lived together on the third floor of Pritchard Hall, serving the community, and learning in courses emphasizing communities, citizenship, and servant leadership. The faculty and students involved in SERVE say they believe that commitment to civic engagement is critical.

In small teams, SERVE volunteered with local nonprofits like the Christiansburg Institute, which focuses on historical preservation of the town's African-American legacy, and Feeding America Southwest Virginia, a local food bank. Students also pursue their own volunteer projects, such as NRV Stage, a community theatre group.

### Haiti earthquake energizes Hokies

On Jan. 12, 2010, a 7.0-magnitude earthquake struck 15 miles outside the Haitian capital of Port-au-Prince, killing an estimated 230,000 people and destroying or damaging 280,000 buildings. Many Hokies were already engaged in humanitarian efforts in Haiti before the quake, and afterward others felt called to join their ranks, engaging in activities from fundraising to helping build a hospital.

One such Hokie was interdisciplinary studies major Annie MacKimmie. "I went outside to get the paper and just started crying at this photo of a girl with [pulverized concrete] on her face," she recalled. "You feel so helpless in America, but that's when I called Brandon [Carroll, Student Government Association president] and said, 'What can I do?'"

At the next meeting of Hokies United, a student-driven movement to help relieve tragedies worldwide, Carroll, MacKimmie, student T.J. Loeffler, and many others, decided to raise funds for Partners in Health (PIH), a nonprofit based in Boston, Mass., with a long-standing presence in Haiti.

"PIH was our best option in terms of receiving our donations because we knew the money would be used appropriately," said Loeffler. Hokies United acted as a middleman through which organizations, businesses, and clubs donated money to PIH.

Allison Jarnagin (art '07), a Web and graphic designer for the Poverty Awareness Coalition for Equality (PACÉ), an organization started in 2006 as a forum to discuss global issues, found a high-tech way to raise money. "When the earthquake hit," said Jarnagin, who is also a graphic designer for Virginia Tech's Athletics Department, "we began grassroots fundraising through social media, which has been really successful."

One founding member of PACÉ, Chris Strock, also a civil and environmental engineering doctoral student, had been involved with Haiti since 2005. He helped build a bridge that spans the river Fonlanfè.

After the quake, Strock flew to Haiti with PIH as part of a small team at the general hospital in Port-au-Prince helping to set up temporary operating rooms and restore electricity to the facility. "The hospital was the only public teaching facility, and in one of the buildings, 20 nurses were taking an exam when the earthquake struck."

With the assistance of PIH, a 180-bed referral hospital that Strock had begun working on before the earthquake, will be finished by January 2011 and will be used as a temporary teaching facility. "Americans are privileged," Strock said. "It is our responsibility to use our creativity to correct systematic problems."

### Martin Luther King Jr. remembered with service

On Jan. 23, 2010, Virginia Tech's Center for Student Engagement and Community Partnerships celebrated Martin Luther King Jr.'s 81st birthday (which was eight days earlier) by deploying teams of volunteers to help the region's daycare centers.

The 2010 Martin Luther King Daycare Facelift Project targeted 20 of the neediest daycare centers in the New River Valley, including seven Head Start centers, to paint walls, fences, and wall murals, and also to carry out construction and landscaping projects. Each team had about \$100 to spend on materials and supplies based on a grant from Campus Compact and funding provided by Tech President Charles W. Steger.

"Childcare has been identified by our community leaders as a key step in helping to break the cycle of poverty," said Karen Gilbert, an assistant director with the center.

## Recognizing the university's best

Every year Virginia Tech recognizes alumni and friends who contribute time, expertise, and resources to the future of the university and who therefore best exemplify the motto, *Ut Prosim* (That I May Serve).



Garnett E. Smith Lance Smith Jim Shuler E. Ann Spencer

**Garnett E. Smith**, of Moneta, Va., received the 2010 William H. Ruffner Medal, Tech's highest honor. His career confirms that hard work and determination make it possible to achieve any goal. After the death of his mother, at age 13 he began bagging groceries. While in high school, he worked shifts at the local newspaper, taking breaks to return to school for basketball practice. With his high-school education in hand, Smith began a 43-year career at Advance Auto Parts, rising until he became president and COO in 1985 and CEO in 1997. He retired in 2000.

Smith's career and life are built on the principle of giving recognition and guidance to others. In 2001, he was named one of Roanoke's 50 Most Influential People. He served on the W.E. Skelton 4-H Educational Conference Center Board of Directors for 35 years.

At Virginia Tech, Smith has served on the Virginia Tech Foundation board and as a volunteer for The Campaign for Virginia Tech: Invent the Future. His generosity and that of his wife, Patsy, has benefited the W.E. Skelton 4-H Educational Conference Center, athletics, University Libraries, the Virginia Tech Corps of Cadets, the Marion duPont Scott Equine Medical Center, the Virginia-Maryland Regional College of Veterinary Medicine, the Holtzman Alumni Center, and the Skelton Conference Center. Smith and his wife are the namesakes of the Virginia Tech Smith Career Center.

Retired U.S. Air Force Gen. **Lance Smith**, an alumnus of the Pamplin College of Business, was recognized with the 2010 University Distinguished Achievement Award.

Smith served as commander of the U.S. Joint Forces Command and as NATO's supreme allied commander for transformation from November 2005 to November 2007. He retired from the Air Force in 2008 after 38 years.

A Virginia native, Smith earned his bachelor's in business administration in 1969 and the following year received his commission as a second lieutenant in the Air Force. As a command pilot, Smith logged more than 3,000 flight hours. He flew more than 150 combat missions, including in Vietnam, Laos, Iraq, and Afghanistan. He earned three Silver Stars, three Distinguished Flying Crosses, 10 Air Medals, and the Purple Heart.

Virginia General Assembly **Del. Jim Shuler** and Virginia Tech Associate Vice President Emerita for Personal and Administrative Services **E. Ann Spencer** were the university's 2010 Alumni Distinguished Service Award winners.

While serving as an associate vice president, Spencer reorganized personnel services, started an employee wellness program, and was responsible for installing the university's first comprehensive human-resource system.

Spencer maintains a strong commitment to Tech. She is past president of the Virginia Tech Alumni Association and a member of the Pamplin College of Business Advisory Council, the Women in Leadership and Philanthropy Council, and the Ut Prosim Society.

Spencer earned her bachelor's degree in accounting from Virginia Tech in 1976 and an M.B.A. from the university in 1984.

Shuler is a native of Rockingham County and a member of the Virginia General Assembly, representing the 12th District. He was the founder and operator of Blacksburg's Companion Animal Clinic and is now retired from his practice. Shuler has been a strong advocate for agriculture, veterinary medicine, and the Virginia-Maryland Regional College of Veterinary Medicine.

He has been a member, advocate, and leader of veterinary organizations. He has also worked with numerous business and professional organizations, including serving as a member of the board for both the National Bank of Blacksburg and the Community Foundation of the New River Valley. He was inducted into the veterinary college's John Dalton Society, and was on the original executive board of the Citizens Committee for the Veterinary College that helped bring the college into existence.

Shuler earned a bachelor's degree in animal science from Virginia Tech in 1966 and a doctorate of veterinary medicine from the University of Georgia in 1970.

## Creating innovative physicians for tomorrow

Research in various aspects of life sciences has been a growing and ongoing commitment across the Virginia Tech campus since Charles W. Steger became president. Creative collaboration and an eye toward the art of the possible are essential elements of that growth.



Nowhere is that more on display than in the new Virginia Tech Carilion School of Medicine and Research Institute (VTC), which announced its first class of 42 students in the summer of 2010 and was putting the final touches on opening preparations.

The medical school itself is a bold, first-of-its-kind public-private partnership between Tech and Carilion Clinic, a regional health care network. The curriculum is built around problem-based learning, a faculty-intensive and demanding approach where students will learn through a guided, self-taught approach focused on the patient's perspective. Just 15 percent of U.S. medical colleges use this method.

VTC envisions that these physicians of tomorrow will be "thought leaders," intellectually nimble, research-minded doctors adept at bringing the latest knowledge to bear for the benefit of each patient.

"What is the future? This is the challenging part of starting a medical school, because we don't know what this future is going to look like," said Cynda Johnson, the school's founding dean. "So that is why our school is based on the mission of developing 'physician thought leaders,' through inquiry, research, and discovery. We're going to be training these stu-

dents to be able to face — and lead — this unknown world of medicine."

Even the method for winnowing the inaugural class from 1,650 applicants to just 42 future physicians was unique. Interviewers culled applications for students who wanted to serve others through medicine; who showed a driving interest in academics, music, athletics, research, and more; and who pushed themselves to excel.



About 230 hopefuls were then invited to Roanoke to face multiple mini interviews (MMI), a technique only a half-dozen U.S. medical colleges employ (the Virginia-Maryland Regional College of Veterinary Medicine has also started using the technique). Similar to speed-dating, students rotated through 10 interview stations to react to various scenarios posted on the door of each room. For instance, one practice question asked applicants to discuss the ethical implications of a doctor prescribing homeopathic

medicine to a patient as a reassuring placebo, even without evidence to support its effectiveness.

The MMI identifies students who don't "necessarily take the party line at face value," said Stephen Workman, director of admissions. "They will be inquiring. They will examine the evidence. They will ask when evidence is in absence. We think that will be reflective of their ability to be a better physician down the road."

Once classes started, six teams of seven students each were given an actual patient case. Students then work through the case together, guided by a faculty facilitator, researching specific topics to present to the team at the next session. The week culminates with a private session for students to interact with the physician and the actual patient.

Adding to the buzz surrounding the medical school is the Virginia Tech Carilion Research Institute, which will eventually house hundreds of researchers while giving Virginia Tech students an outlet for conducting primary research of their own. Students and faculty members will carve out the time for meaningful involvement in research. "It's not just going to be dabbling," said Michael Friedlander, the institute's founding executive director. "They're going to be fully engaged in research."

### Undergraduate rankings *U.S. News & World Report*

In 2009-10, Virginia Tech ranked 30th among national public universities. Among national universities, including such private institutions as Harvard and Yale, Tech ranked 71st.

The College of Engineering undergraduate program ranked 14th in the nation among all accredited engineering schools that offer doctorates. It was seventh among engineering schools at public universities. Nine of the college's undergraduate engineering programs ranked among the top 20 of their peer programs.

The Pamplin College of Business undergraduate program ranked 42nd among the nation's undergraduate business programs and 24th among public institutions. Pamplin's overall ranking places it in the top 10 percent of the approximately 524 U.S. undergraduate programs accredited by the Association to Advance Collegiate Schools of Business International.

Virginia Tech was also recognized as having one of the top 14 cooperative education and internship programs in the nation.

### Other rankings

*DesignIntelligence* ranked the undergraduate landscape architecture program in the School of Architecture + Design No. 1 in North America in the 11th annual America's Best

Architecture and Design Schools study on behalf of the Design Futures Council. Both the architecture and interior design programs were ranked fourth, and the undergraduate industrial design program was ranked No. 11.

*The Princeton Review* ranked Virginia Tech eighth nationally among public universities in its "Best Value Colleges" for 2010. The publication picked 50 public institutions and 50 private ones for its rankings.

Virginia Tech ranked 16th nationally among public colleges and universities for offering a first-class educational experience at a bargain price, according to *Kiplinger's Personal Finance* magazine.

### Graduate rankings *U.S. News & World Report*

The College of Engineering's overall graduate program moved up two places to 25th among all schools of engineering, the first time the program made the top 25. Four departments within the College of Engineering finished in the top 10 of their respective categories.

The Career and Technical Education graduate program in the College of Liberal Arts and Human Sciences School of Education tied for fourth among vocational and technical specialties for the second year in a row.

The public affairs program in the School of Public and International



Affairs in the College of Architecture and Urban Studies ranked 27th in the nation.

Three programs within the College of Science were rated among the best in the nation. In the geosciences department, the paleontology program ranked ninth and the earth sciences program ranked 28th. The clinical psychology program ranked 33rd.

The Pamplin College of Business ranked 41st among the nation's best part-time M.B.A. schools.

### Other graduate rankings

*DesignIntelligence* ranked Tech's graduate architecture program sixth in the nation. It also ranked the graduate landscape architecture program second and the graduate interior design program seventh.



## 2009 JULY

### **SCHEV gives VTC go-ahead**

The Virginia Tech Carilion School of Medicine and Research Institute (VTC) receives approval from the State Council of Higher Education for Virginia (SCHEV) to operate a postsecondary institution in the Commonwealth of Virginia. Certification by SCHEV gives VTC degree-granting authority and makes the school eligible to apply for scholarship and grant funding.

### **New CALS dean is named**

Virginia Tech names Alan Grant the new dean of the College of Agriculture and Life Sciences. Grant, who comes to Blacksburg from Purdue University, succeeds Interim Dean L.T. Kok. Recognized as a University Faculty Scholar at Purdue, Grant received several teaching awards over the years and oversaw capital projects, including a \$2.3 million swine environmental research building and the renovation of research laboratories.

### **Tech names first director of Center for the Arts**

Ruth Waalkes, director of artistic initiatives at the Clarice Smith Performing Arts Center at the University of Maryland, becomes the first executive director of the Center for the Arts at Virginia Tech. Waalkes, who has a broad array of experience in the arts in higher education, will oversee center programming and operations. Slated to open in 2013, the Center for the Arts will support the Institute for Creativity, Arts, and Technology, which will bring together the visual and performing arts with Virginia Tech's strong scientific, computing, and engineering capabilities.

## AUGUST

### **Tech earns commuter recognition**

Virginia Tech is designated one of the Best Workplaces for Commuters by the U.S. Environmental Protection Agency and U.S. Department of Transportation. Best Workplaces for Commuters, a voluntary program designed to cut traffic congestion and traffic-related air pollution, recognizes employers that provide environmentally friendly commuter benefits to employees.

### **Campus mourns two murdered students**

The Montgomery County Sheriff's Department confirms that David Metzler, of Lynchburg, Va., a sophomore industrial and systems engineering major, and Heidi Childs, of Forest, Va., a sophomore majoring in biochemistry, were victims of a double homicide at Caldwell Fields, a popular outdoor spot about 15 miles from campus.

### **Students have two more housing options**

The university offers two new themed housing communities, SERVE and Green. SERVE, which stands for Students Engaging and Responding through Volunteer Experiences, focuses on service-learning, and Green educates students about sustainable living.

## SEPTEMBER

### **Carter and Cash memorabilia arrives at library**

Materials from the musically famous Carter and Cash families, including June Carter and Johnny Cash, are now available at University

Libraries' Special Collections. The collection includes biographies and memoirs, sheet music, programs from performances and festivals, funeral programs, photographs, newspaper and magazine articles, and other family memorabilia.

### **BOV names biomechanics lab for Kevin P. Granata**

The Virginia Tech Board of Visitors names the new biomechanics research laboratory in room 208 of Norris Hall the Kevin P. Granata Biomechanics Laboratory as a tribute to the engineering professor who lost his life on April 16, 2007.

## OCTOBER

### **Engineering tops recruiting rankings**

Virginia Tech's College of Engineering is named as the No. 1 U.S. school for industry workforce recruiting by *Aviation Week & Space Technology* magazine. The 2009 magazine ranking is a first for the engineering college. In recent years, Tech ranked either No. 2 or No. 3, behind Penn State, Purdue University, and the University of Illinois.

### **Former cadet is killed in action**

U.S. Marine Corps Capt. David Seth Mitchell, a 2001 graduate of Tech and an alumnus of the Virginia Tech Corps of Cadets, dies in action while supporting combat operations in Helmand Province, Afghanistan. Mitchell, originally from Loveland, Ohio, is the fourth member of the corps' Class of 2001 lost since graduation. Mitchell earned a degree in English, was a member of the German Club, and was the male member-at-large for the Class of 2001.

### **Army ROTC takes first place in D.C. race**

For the second year in a row, the Virginia Tech Army ROTC unit takes first place in the ROTC division of the Army 10-miler race in Washington, D.C. Tech's second team also does well with an eighth-place finish.

### **Sacrifices of law enforcement dogs remembered**

The Virginia-Maryland Regional College of Veterinary Medicine honors law enforcement dogs with a memorial consisting of a life-size bronze German shepherd police dog sculpted by Blacksburg artist Larry Bechtel. Located adjacent to the main entrance of the college's Veterinary Teaching Hospital, the statue is attached to a granite base that lists the names of the 12 Virginia dogs that have lost their lives in the line of duty.

### **100 years of class rings**

The Class of 2011 celebrates the centennial anniversary of the Virginia Tech ring tradition by premiering the 100th collection of rings in the university's history. Since 1911, each Virginia Tech class has designed a ring distinctive and unique to the class. Today, Tech is one of only a few colleges and universities in the nation that designs a distinctive ring collection each year. The 2011 ring is the first to offer Hokie Stone as a gem choice.

## NOVEMBER

### **Pamplin and VCOM partner to offer dual-degree program**

Virginia Tech's Pamplin College of Business and the

Edward Via Virginia College of Osteopathic Medicine (VCOM) team up to launch a cooperative two-degree program that allows students to earn both the doctor of osteopathic medicine and master of business administration degrees. Under the program, VCOM students will complete the M.B.A. requirements between their third and fourth years of medical school.

### **Graduate school welcomes largest class in history**

The Virginia Tech Graduate School enrolls a total of 6,947 students from all campuses, its largest class ever. There are 4,114 master's students and 2,833 doctoral students. This growth highlights the steady increase in doctoral students, which now make up more than 40 percent of the Graduate School community. Overall, graduate students constitute 22.5 percent of the total student population.

### **VP for equity and inclusion departs**

Kevin McDonald, vice president for equity and inclusion since 2007, accepts a position as chief equity officer for the Rochester Institute of Technology. Among his accomplishments during his tenure, McDonald oversaw the creation of the Presidential Scholarship Initiative, partnered with the An Achievable Dream organization, and established the Conflict Resolution Program.

### **Center is named in honored of beloved professor**

The Engineering Science and Mechanics Student Engagement Center, one of the six new rooms created

when the university renovated the second floor of the west wing of Norris Hall, is renamed the Dr. Liviu Librescu Student Engagement Center in memory of Librescu, who lost his life saving students in his class on April 16, 2007. Librescu was a highly esteemed researcher in the field of aeronautical engineering.

## DECEMBER

### **Peggy Hahn dies**

Peggy Lee Hahn, a major university benefactor and wife of university President Emeritus T. Marshall Hahn Jr., dies at age 85. The university's first lady from 1962 to 1974 had a talent for maintaining relationships with stakeholders that helped transform the institution into a major research university. The Hahn Horticulture Garden, a garden pavilion, and a meadow garden are all named in her honor.

### **New residential and office building has grand opening**

Virginia Tech's newest residential and office building, New Hall West, located between Harper and the Student Services building on West Campus Drive, officially opens. The co-ed halls feature modern study lounges, break rooms, and kitchens. The first floor of the building houses student affairs staff members.

### **Student lounge named in honor of fallen student**

The university names a student lounge in Litton-Reaves Hall in honor of Emily Jane Hilscher, a freshman animal and poultry sciences major who died on April 16, 2007. Jacques Klempf of Jacksonville, Fla., the owner of Dixie Egg Company, established the Emily Jane

Hilscher Memorial Classroom Renovation Fund to renovate educational space in the hall and create a permanent tribute to Hilscher.

## 2010 JANUARY

### **McDonnell invites Highty-Tighties to inaugural parade**

Governor-elect Bob McDonnell invites the Highty-Tighties and the corps Color Guard to march in his inaugural parade. In addition, 20 cadets volunteer to serve as VIP escorts during the parade and swearing-in ceremony. The Highty-Tighties have performed in the past four Virginia gubernatorial inaugural parades.

### **Tech ranks among top public colleges**

Virginia Tech once again ranks among the top public colleges and universities in the nation, according to *Kiplinger's Personal Finance* magazine. Tech ranks 16th among 100 institutions that combine economic value with top-quality education. Since 2006, *Kiplinger* has ranked Virginia Tech among the top 20 public universities in this annual survey.

### **University takes third in challenge**

Virginia Tech places third in the Green Commonwealth Challenge issued by Gov. Timothy M. Kaine, in which he challenged state agencies to reduce pollution and become more sustainable. Tech is the only university among the top-scoring participants.

### **Missing student's body found**

Albemarle County authorities

identify a body found in a farm field as that of Morgan Harrington, a Virginia Tech junior who disappeared from near the University of Virginia campus in October 2009 while attending a rock concert. Police rule her death a homicide and as of a year later are still looking for her killer.

## FEBRUARY

### **Research funding rises**

Research expenditures for fiscal year 2009 rise to \$396.7 million, an increase of \$23.4 million from the previous year. More than half of the growth (\$12.8 million) comes from federal agencies. The federal funding increase is offset by a further reduction in Commonwealth Research Initiative funding.

### **24/7 Wall St. praises endowment management**

The 24/7 Wall St. website ranks Virginia Tech second-best in the nation among universities for management of its endowment during the fiscal year ending June 30, 2009. Although the endowment loses 14 percent of its value during that period, the decline was less than the broad investment markets and most university endowments. The endowment's long-term performance ranks among the top 25 percent over the past five years.

## MARCH

### **Governor taps Hokie for education post**

Virginia Gov. Bob McDonnell announces that Laura Fornash, director of state government relations for Virginia Tech, will serve as deputy secretary of education. Fornash is a long-time member of the Virginia Tech community.

### BOV approves Greek housing expansion

The Virginia Tech Board of Visitors approves a plan to expand the existing Greek housing community, Oak Lane, through a partnership between the university and individual fraternity and sorority chapters. Each interested fraternity or sorority chapter will work with the university to design its own house, allowing chapters to occupy on-campus houses that are uniquely theirs while still adhering to Commonwealth of Virginia construction standards.

### VTC research institute names director

Michael J. Friedlander, the Wilhelmina Robertson Professor, chair of the Department of Neuroscience, and the director of Neuroscience Initiatives at the Baylor College of Medicine, is named founding executive director of the Virginia Tech Carilion Research Institute.

## APRIL

### Engineering grad program reaches new heights

Virginia Tech's College of Engineering graduate program comes in at 25th in *U.S. News & World Report's* "America's Best Graduate Schools 2011" survey. It is the first time the graduate program has cracked the top 25.

### TWU honors Tech dean

Karen P. DePauw, vice president and dean of the Graduate School at Tech, is honored as a 2010 Distinguished Alumna at Texas Woman's University.

### BOV increases tuition for coming academic year

Facing even further decline

in state support, the Virginia Tech Board of Visitors Executive Committee sets tuition and fees for the 2010-11 academic year, raising the in-state total by \$854 to \$9,589. Adjusted for inflation, state support per Virginia student is about half what it was at the beginning of the decade.

### Program celebrates 25 years

The Appalachian Studies Program at Virginia Tech celebrates its 25th anniversary through a series of public events. Started in 1985 in the Department of Religion and Culture in the College of Liberal Arts and Human Sciences, the Appalachian studies minor provides students with the opportunity to investigate complex social, political, economic, and environmental issues important to the region.

### Center addresses U.S. security

The university establishes the Ted and Karyn Hume Center for National Security and Technology to help address the intelligence community's need for qualified U.S. citizens to work on national security projects, particularly technical ones. Ted Hume, who received a degree in electrical engineering in 1975, makes the donation that allows the launch of the center.

### Former cadet dies in training accident

U.S. Navy Ensign Zachary Eckhart, a 2007 graduate of the corps of cadets and a 2008 Tech graduate, dies in the crash of his T-39 training aircraft in Georgia. He was 25. Eckhart was a member of the Highty-Tighties and

served as the Third Battalion academics officer for the spring semester of his senior year.

## MAY

### Publications director updates Tech history publication

The *History and Historical Data of Virginia Tech*, an updated and expanded edition of the *Historical Data Book* first available in 1972, is published online. The online version is compiled, written, and edited by Clara B. Cox, the university's publications director, expanding upon the original book by the late Jenkins M. Robertson. "This is an extraordinary compilation," says Larry Hincker, associate vice president for university relations.

### APLU honors Steger

Virginia Tech President Charles W. Steger is among the three recipients of the 2010 Michael P. Malone International Leadership Award, sponsored by the Association of Public and Land-grant Universities. The award recognizes individuals who have made significant contributions to international education at public and land-grant institutions. In Steger's 10-year tenure as president of Tech, five international centers have been established around the globe.

### Basketball facility is named for family of former president

The Virginia Tech Board of Visitors approves naming the 49,000-square-foot Hahn Hurst Basketball Practice Center in honor of the

family of former President T. Marshall Hahn Jr. in recognition of their generosity and long-standing influence on Virginia Tech athletics.

## JUNE

### Lumenhaus design wins Solar Decathlon Europe

Virginia Tech's entry in Solar Decathlon Europe wins the 10-day competition in Madrid, Spain. After being inspected in different categories each day, the solar house is declared the most efficient structure in the decathlon.

### University breaks ground on new arts center

Virginia Tech begins construction on its \$89 million Center for the Arts, the cornerstone project of the university's Arts Initiative.

### BOV approves college's name change

The Virginia Tech Board of Visitors approves changing the name of the College of Natural Resources to the College of Natural Resources and Environment to more accurately reflect the broad range of programs the college offers, including many programs focusing on managing and sustaining the environment.

### Medical school prepares for inaugural class

The Virginia Tech Carilion School of Medicine and Research Institute announces its inaugural class of 42 students. The students were selected based on their competitive portfolios, including high academic credentials; their personal and professional experiences; and their potential to become physician thought leaders.

## University Administration

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### College of Architecture and Urban Studies

A. Jack Davis

### Pamplin College of Business

Richard E. Sorensen

### College of Engineering

Richard Benson

### College of Liberal Arts and Human Sciences

Sue Ott Rowlands

### College of Natural Resources and Environment

Paul Winistorffer

### College of Science

Lay Nam Chang

### Virginia-Maryland Regional College of Veterinary Medicine

Gerhardt Schurig

### Virginia Tech Carilion School of Medicine

Cynda A. Johnson

### University Libraries

Eileen E. Hitchingham



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