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magazine

fall 2017



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22 Bringing technology home

Virginia Tech is driving the research that will define how our homes, vehicles, and other devices can help us lead better, more efficient, and even safer lives. We're making bold moves to become a global leader in intelligent infrastructure.

36 Who do you want to be?

Meet some of the students, faculty, and alumni whose commitment to Virginia Tech's Aspirations for Student Learning are helping them find ways to not just have more, but to be more.

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Fired up: Fireworks light up the sky at the 2017 Spirit Rally, a Virginia Tech Homecoming tradition. Photo by Mai Khanh Nguyen.

On the cover: From driverless transportation to cartridge housing and new forms of energy, building smart communities involves developing complex infrastructure focused on how we live, work, and play. Illustration by MUTI.

president's message



LOGAN WALLACE

A Top-ranked education

by TIM SANDS

Student-focused: Virginia Tech President Tim Sands joins students following the State of the University address held in September.

There are many reasons to be excited about Virginia Tech in 2017. National and international rankings confirm what Hokies already know, our university is a special place. We're near the top of every ranking that focuses on value, the student experience, and broader outcomes. Niche, a website that conducts student surveys, recently ranked Virginia Tech fifth out of more than 600 public universities, and first among public land-grant universities. Princeton Review ranked Virginia Tech first in the country in the category of students who love their school. Washington Monthly, a magazine that measures school performance based on their contribution to public good, ranked Virginia Tech in the top 10 among public universities, and the top 20 overall. And in the traditional rankings of U.S. News & World Report, Virginia Tech made the top 25 among public universities, tied for our highest ranking ever. A number of our academic programs have achieved top-10 recognition in national and international rankings.

These rankings reflect a unique Virginia Tech learning experience that works across boundaries, leads to unexpected places, and helps students discover and utilize their passions in the spirit of *Ut Prosim* (That I May Serve).

Our growing strength would not be possible without the alumni, friends, and partners who have set new records for gifts and commitments to the university. Those gifts help support research and education that will transform our world and build the knowledge, skills, and character that prepare our graduates for the opportunities of the future. Thank you for everything you do to support Virginia Tech! □

Tim Sands is Virginia Tech's 16th president.

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letters to the editor

Hokie to Hokie

I am writing to respond to Woody White's request, which appeared in the spring issue of Virginia Tech Magazine.

My grandfather, Earl Thomas Swink, graduated from VPI in 1930. He went on to become a professor and head of the agricultural engineering department. I have attached a photo of his diploma. Unfortunately, it had been stored rolled up and got smashed at some point, so there are some creases.



Dogged attention

I was a proud Virginia Tech Corps of Cadets member for two years in B squadron and an Eager Squad member during my rat year in 1961-1962. I started on the Lower Quad and finished in Brodie.

I am also a dog person, so I enjoyed the Corps of Cadets story that appeared in the spring 2017 edition featuring Growley II, call sign Tank. He appears to be a valued member of the corps with more than a few fans, but I'm a little concerned that Tank may not be getting enough tummy rubs. I am very experienced at this type of therapy and hereby volunteer to correct this obvious mistake.

Bill Fravel (electrical engineering '65), Jupiter, Florida

Editor's note: We shared your letter with the Corps of Cadets. They have assured us that Tank is the center of attention everywhere he goes and gets frequent ear scratches and tummy rubs. They asked us to pass along this picture to assuage your concerns. However, the next time you visit Blacksburg, we are sure that Tank would welcome your willingness to volunteer for a few extra tummy rubs.



Have something to say? Send us a message at vtmag@vt.edu.

Around the Drillfield



OLIVIA COLEMAN

The art of communicating difference

Scientifically speaking: Svenja Both and Felix Ruckl participate in a theater exercise during the German Fulbright Summer Institute organized by the Cranwell International Center. The institute, titled "Communicating Science: Communication, Collaboration, and Connection Across Differences and Disciplines," was inspired by Virginia Tech's graduate course in communicating science.

In the spring Virginia Tech launched the Center for Communicating Science to create and support opportunities for scientists, scholars, health professionals, and others to develop their abilities to communicate and connect.

"Public engagement is a critical element to solving many of our most urgent problems," said Patricia Raun, director of the new center.

The opportunities supported by the center will help faculty, students, and stakeholders build trust, engage public audiences, and bridge the gap of understanding.

According to Carrie Kroehler, associate director of the center, "Our focus goes beyond a mere translation of jargon. We want [our students] to learn to communicate lucidly and passionately,

to use narrative to convey meaning. In essence, we want them to tell the stories their data reveal."

For several years, Raun and Kroehler have offered an increasingly popular graduate-level course on communicating science, based in part on the principles of improvisational theater. "The performing arts have much to teach scientists about communicating their work to a broad audience," said Raun, a theater professor and professional actor who recently stepped down as director of the Virginia Tech School of Performing Arts to lead the new center.

The Center for Communicating Science is supported by the Institute for Society, Culture, and Environment; the Graduate School; and the College of Liberal Arts and Human Sciences. □

How Tech Ticks 8
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Unprecedented generosity

In September, Virginia Tech President Tim Sands announced a \$15 million gift from the A. James and Alice B. Clark Foundation, the largest scholarship gift ever made to the university.

The gift endows the foundation's signature A. James Clark Scholars Program, which provides students with a full-tuition scholarship and a holistic approach to engineering education.



2017 Clark Scholars: Back row (left to right) Makenzie Moore, Ezekiel Volk, Nefetari Heath, and Richard Cotman. Front row (left to right) Trent Kinney, Julio Villarroel, Mia Taylor, Ricabell Pagara, Clemence Hidalgo, and Erica He.

“ Hokies are driven to serve, and giving back is one of the most powerful ways that they show it. Our alumni, parents, faculty, staff, friends, and corporate and foundation partners create tremendous opportunities with their generosity. We can't realize our potential without them. We can't thank them enough. **”**

—CHARLIE PHLEGAR '78,'87
VICE PRESIDENT FOR ADVANCEMENT

FISCAL YEAR 2016-17 STATS



Donations to Virginia Tech topped \$162 million, marking the second consecutive year of record-breaking philanthropy.

162

MILLION DOLLARS
IN NEW GIFTS AND COMMITMENTS.

62

PERCENT
INCREASE IN PHILANTHROPY RECEIVED
COMPARED TO 2015-16.

34,662

DONORS INCLUDING INDIVIDUALS,
CORPORATIONS, AND FOUNDATIONS.

9

COLLEGES OR PROGRAMS RAISED
AT LEAST TWICE AS MUCH
AS THE PREVIOUS YEAR.

Clarke named interim provost



LOGAN WALLACE

V

"Beyond Boundaries envisions Virginia Tech as a leading global university, deeply engaged

with our partners in the spirit of the land-grant university to address the greatest challenges of the commonwealth, the nation, and the world," said Sands. "In Cyril, we have a dedicated and inspirational leader—one with broad knowledge of Virginia Tech. Not only is he deeply committed to our shared vision, but he

also has a unique understanding of the environment and culture we must navigate."

Clarke has served as the dean of the Virginia-Maryland College of Veterinary Medicine at Virginia Tech since 2013.

"As a member of this community the past four years, I can see that Virginia Tech is uniquely situated to move forward boldly in ways that will shape higher education and advance our university to even greater heights," said Clarke.

Under Clarke's leadership, the veterinary college has achieved several recent successes.

In 2018, the college plans to launch its first undergraduate degree program. Together with the master of public health degree program, the undergraduate program in public health will be an integral component of the college's One Health initiative, which recognizes the close connections between animal health, human health, and the environment.

In 2017, more than 1,600 prospective students applied to enter the college's doctor of veterinary medicine program, representing the second-largest applicant pool in North America for the third year in a row.

Gregory Daniel, professor and head of the Department of Small Animal Clinical Sciences, will serve as interim dean of the Virginia-Maryland College of Veterinary Medicine.

Virginia Tech will launch an international search for a new executive vice president and provost in the spring. □

Presidential Fellow appointed

Former provost Thanassis Rikakis has been named Presidential Fellow for Academic Innovation. In this role, he will further his research on organizational change in higher education, looking specifically at concepts related to the Destination Areas and the Partnership for an Incentive-Based Budget, and he will continue his long-standing research in interactive neurorehabilitation.

Rikakis holds a joint faculty appointment as a tenured professor in the Department of Biomedical Engineering and Mechanics in the College of Engineering and professor of music in the School of Performing Arts in the College of Liberal Arts and Human Sciences.

President Tim Sands expressed his gratitude for the transformative

work accomplished by Rikakis since joining the university in 2015.

"Thanassis prepared this university to evolve in order to remain at the forefront of higher education," said Sands. "Thanassis impressed upon us that Virginia Tech has to embrace a much more collaborative, transdisciplinary approach in its teaching and research, and to make strategic investments to support these changes." □



JIM STRONG

New deans take the lead

The 2017-18 academic year began with new deans in three Virginia Tech colleges: Rosemary Blieszner, College of Liberal Arts and Human Sciences (CLAHS); Richard Blythe, College of Architecture and Urban Studies (CAUS); and Julia Ross, College of Engineering (COE).

Blieszner, who previously served as interim dean, will continue to lead CLAHS through June 2019. A faculty member in the Virginia Tech Department of Human Development since 1981, Blieszner was named a Virginia Tech Alumni Distinguished Professor in 2002. Only 10 members of the university faculty hold these endowed professorships. For more than 30 years, Blieszner helped lead the university's Center for Gerontology, and she served as an associate dean of the Graduate School from 2009 through March of this year. Recently, Blieszner chaired the Steering Committee of the university's visioning initiative, Beyond Boundaries.

Blythe is an award-winning architect and educator with more than 25 years in higher education and architectural practice. Prior to joining Virginia Tech, he served as professor and dean of RMIT University School of Architecture and Design in Melbourne, Australia. Blythe, who lectured at the University of Tasmania for 14 years, was the vice chancellor's representative on the Tasmanian government's Building and Construction Industries Council. A founding director of the architecture firm TERROIR, Blythe continues to contribute to the practice.

As the College of Engineering dean, Ross will hold tenured appointments in the departments of Chemical Engineering and Engineering Education at Virginia Tech. Previously dean of engineering and information technology at University of Maryland Baltimore County, Ross researches the role of fluid mechanics in infection formation in the cardiovascular system. In October, Ross was elected to the executive committee of the Global Engineering Dean's Council, which works closely with engineering deans from around the world. □



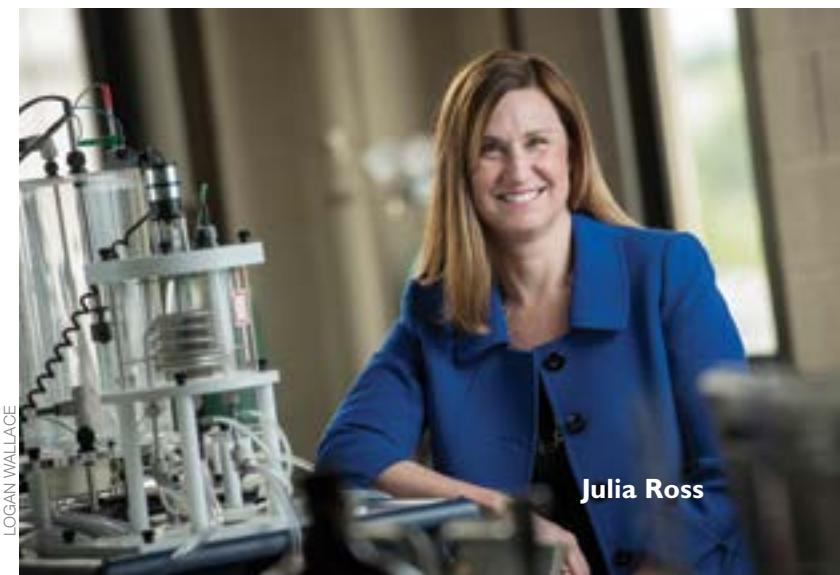
LOGAN WALLACE

Rosemary Blieszner



COURTESY PHOTO

Richard Blythe



LOGAN WALLACE

Julia Ross



on the move

Helping hands: President Tim Sands and Professor Laura Sands help a student move items into her new residence hall.

AUG. 20, 2016

Jean Smoot, project coordinator for housing services, records feedback from the 2016 move-in.

FEBRUARY 2017

Housing and Residence Life updates websites, begins drumming up volunteers, and reviews the budget.

MAY

A new order for Hokie Helper shirts is placed. The shirts are blue (as are tents and other equipment used during move-in) so that they stand out in the sea of maroon and orange. Each shirt has a white name patch, an innovation suggested by a frustrated student who kept losing name tags.

JULY

Staff coordinate campus communication. The Virginia Department of Transportation makes plans to minimize construction delays on I-81 and U.S. 460.

MONDAY, AUG. 21

9 a.m. Corps of Cadets "black shirts" set up tents in six central zones. Special projects team delivers tables, bins, and carts.

10 a.m.

Water arrives from the dining warehouses. The Division of Student Affairs summer conference crew transports snacks, Hokie Helper t-shirts, and other materials.

TUESDAY, AUG. 22

A small tub with maps, registration notebooks, pens, scissors, trash bags, signage, and more is delivered to tents.

Midnight

Virginia Tech police close Washington Street.

WEDNESDAY, AUG. 23 MOVE-IN STARTS!

6:30 a.m.

Vehicles packed with computers, clothes, fans, potted plants, books, full-length mirrors, lava lamps, game systems, refrigerators, microwaves—oh, and students and their families—line up.

7 a.m.

Police open Washington Street.

8 a.m.

Traffic on U.S. 460 at Southgate is backed up a mile, but the line is moving. Police officers and parking services employees keep traffic flowing to parking spots. The aim is to open this space again within 30 minutes. Hokie Helpers assist in getting belongings out of vehicles and up to rooms. Doors that automatically lock are opened by volunteers, and custodians help keep elevators moving.

By 10 a.m.

There's a line for the highly coveted laundry bins and Hokie Helpers, but the mood is jovial. Strangers introduce themselves while they wait.

All day

Facilities department subcontractors set up extra trash containers and cardboard collection sites and ramp up collection schedules, moving out three times the normal weekly amount of refuse.

Late day

Highway traffic is monitored for tie-ups in case resident advisors are needed to stay past 5 p.m. to check in late arrivals.



110
HANDCARTS

78
ROLLING
BINS

1,518
VOLUNTEERS

10,080
WATER
BOTTLES

840
GRANOLA
BARS

9,600
RESIDENTS

38
RESIDENCE
HALLS

30
MINUTES TO
UNLOAD

F Sketch point

by JULIET CRICHTON
and JUSTICE SMITH '19



HOKIESPORTS.COM

While many Hokies may already know that shooting guard Justin Bibbs is a force on Tech's basketball team, the rising senior's skills extend well beyond the three-point line.

"When I was a kid, I used to draw action shots of basketball players," said Bibbs, a Dayton, Ohio, native majoring in multimedia journalism with a minor in graphic design. "They would always have some type of funny face that they do. I always just focused on that."

As with most activities, the practice paid off—quite literally. "In high school, it was a big thing to get tattoos early. My mom would never let me do that," Bibbs said. "A lot of people would ask me to draw them up something, like a cross or some religious thing, and I would."

His mother, however, was not a big fan of his giving away his work to other people. "She was mad because she thought my artwork was worth more than 5 or 2 dollars," Bibbs said, "but it was easy money for me."

Besides, Bibbs genuinely enjoys drawing. "It makes me feel good," he said. "You know the feeling you get when you're hungry—like I need to go to the kitchen and get a snack—it's like that. I just get a feeling and pull out a piece of paper and start drawing. My dad tells me to never ignore that feeling because a lot of people can't do it. So every time I get that feeling, I just do it."

Bibbs describes his approach to drawing as visual, not unlike a talented guard's ability to "see" the court. "A lot of times, I just look at a picture and draw the picture," he said, "but sometimes there could be a deeper meaning from that."

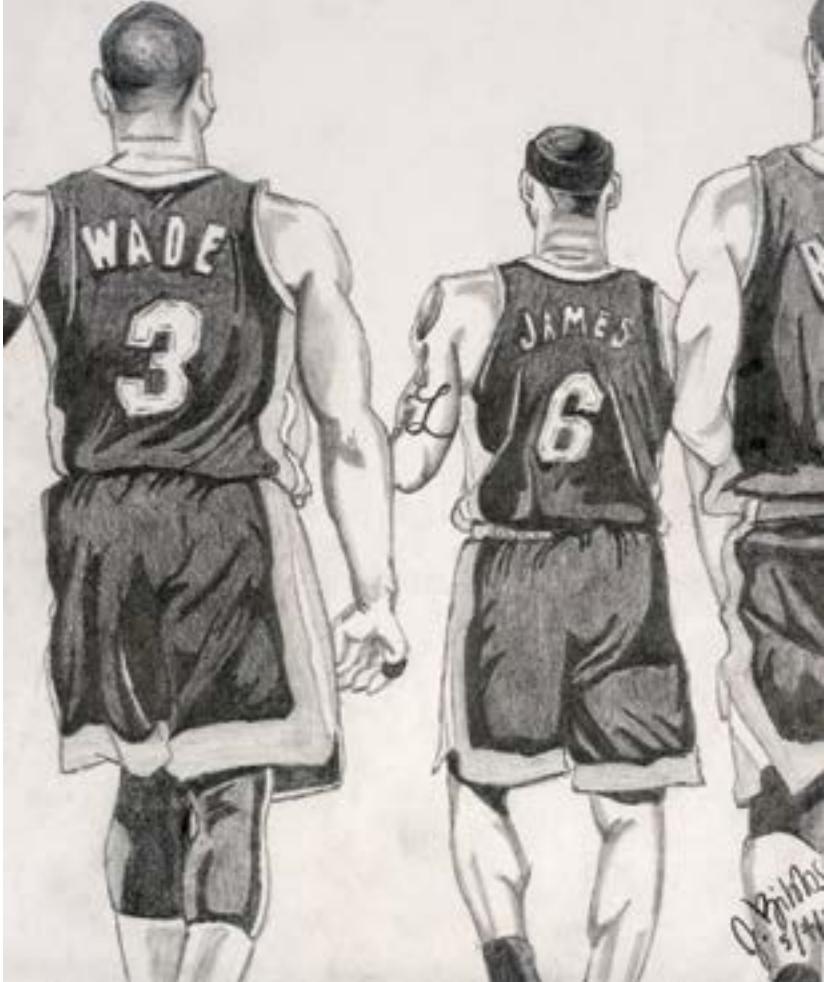
Although he has two uncles who played in the NFL—one of them is College Football and NFL Hall of Famer Michael Haynes—Bibbs understands that a career in professional sports can be a tough route. Basketball may be his focus for now, but his future will likely be filled with plenty of pencils and paper. □

Juliet Crichton is the web manager for the Office of Communications and Marketing in the College of Agriculture and Life Sciences. Justice Smith, a junior majoring in multimedia journalism, was a summer intern with Virginia Tech Magazine.



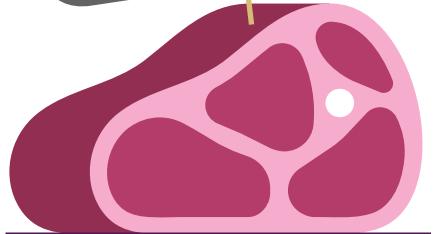
Swish:

For more about Justin Bibbs on and off the court, go to vtmag.vt.edu.

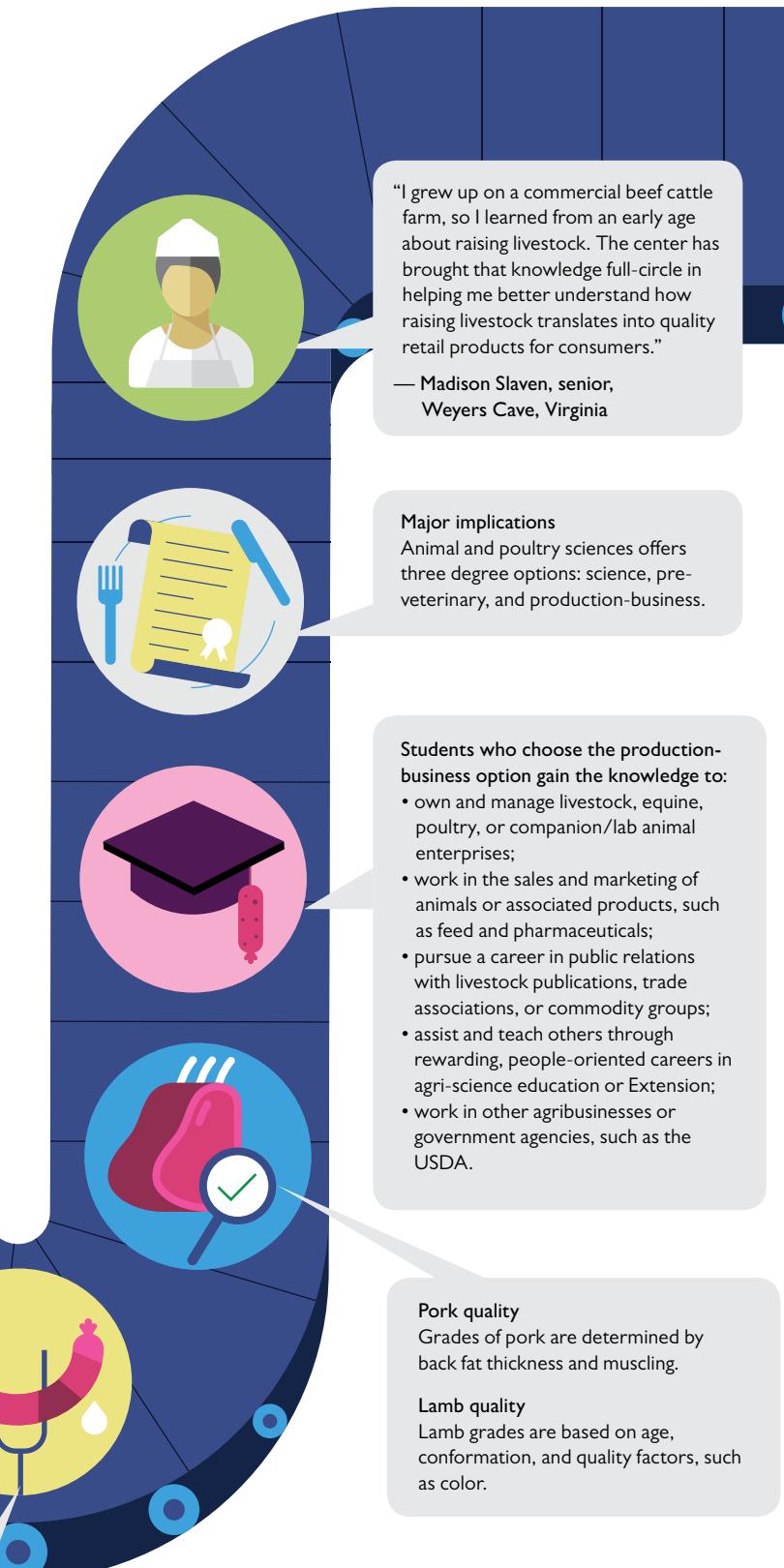
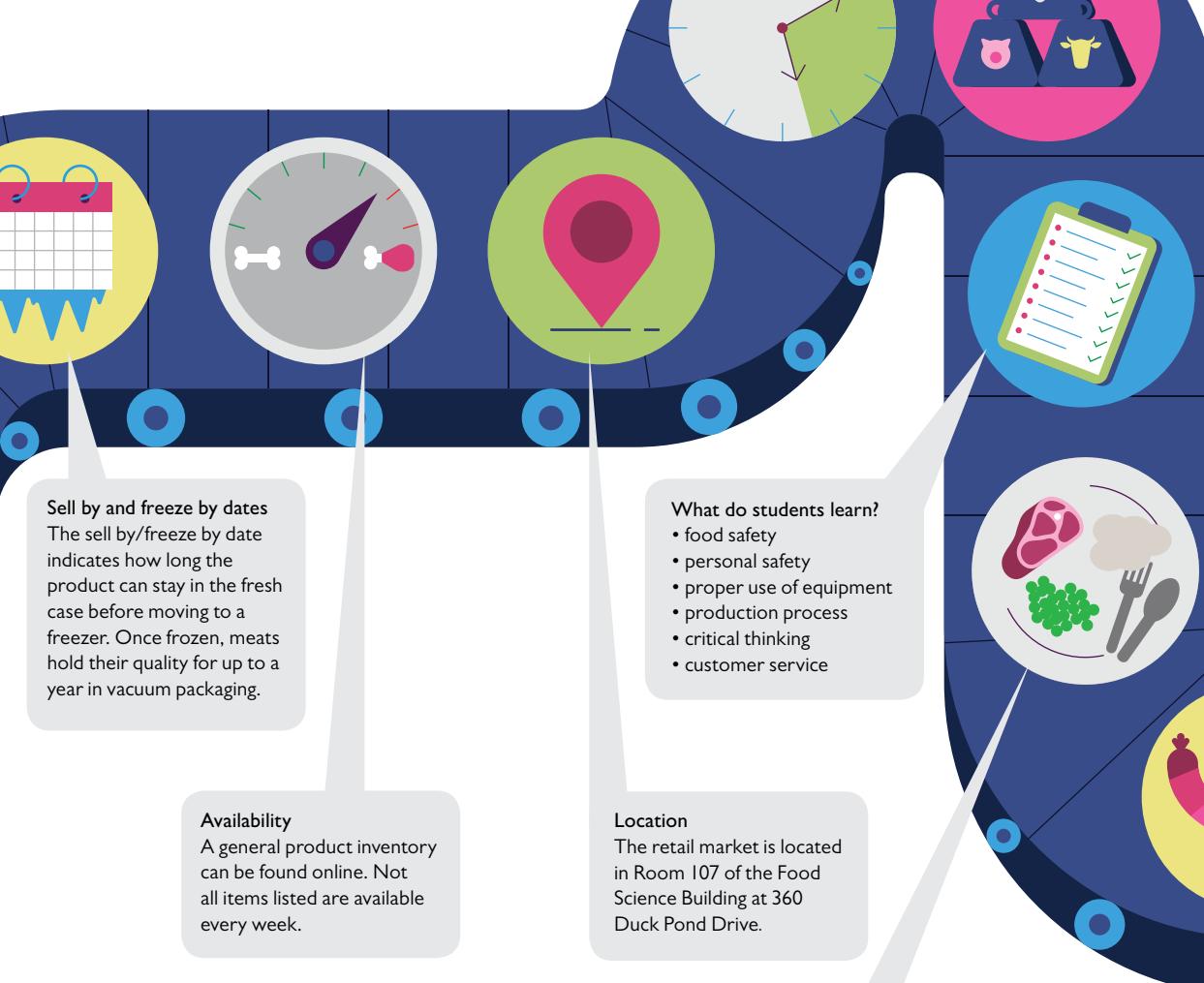
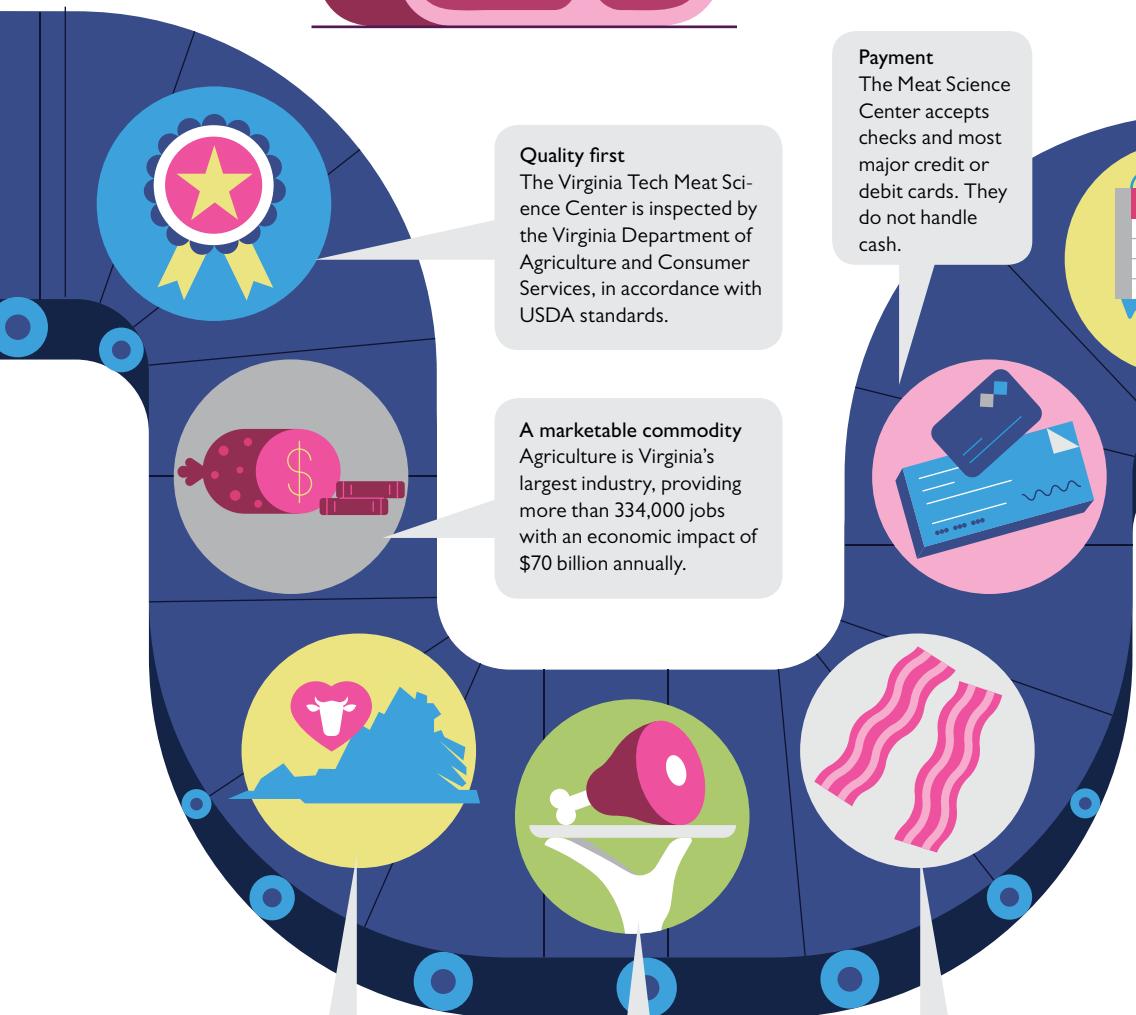


Off the rim: Justin Bibbs, a senior majoring in multimedia journalism, found a way to combine his artistic skill, intellect, and athleticism at Virginia Tech.

Meaty Matters



Beef, pork, and lamb—they're more than what's for dinner. At Virginia Tech's Meat Science Center, the products are part of a partnership of learning that connects students with the community. A fully equipped meat processing program with classroom, production, and retail experiences, the center is associated with the College of Agriculture and Life Sciences' animal and poultry sciences department. Between 10 and 15 undergraduate students and a graduate assistant coordinate operations each academic year.



Learn more:

For more information about the Virginia Tech Meat Science Center, visit vtmag.vt.edu.

Islands in the sky

by SUSAN TRULOVE and TRAVIS WILLIAMS



Ladder up: (right) Researchers work together to safely check a flying squirrel nesting box in Whigg Cove, North Carolina, and a radio-collared female Carolina flying squirrel (above) was secured for monitoring on Whitetop Mountain in Southwest Virginia in 2014.



One of the native woodlands' smallest mammals is offering big answers for Virginia Tech researchers studying climate change and forest conditions in the Southern Appalachians.

Two subspecies of tiny northern flying squirrels are being carefully monitored by Mark Ford, associate professor of wildlife and leader of the U.S. Geological Survey's Virginia Cooperative Fish and Wildlife Research Unit at Virginia Tech, and Corinne Diggins, who earned her doctorate in fish and wildlife conservation from Virginia Tech and is now a post-doctoral research associate in the College of Natural Resources and Environment.

"Red spruce and northern flying squirrels in the Southern Appalachians cannot move further up the mountains to escape climate change," Ford said. "So we monitor the subspecies to see where both passive and active forest management can work to perpetuate and enhance this forest community while we develop strategies to cope with changing conditions."

Flying squirrels don't really fly. A stretchy membrane and rudder-like tail help the little mammal sail through the treetops, avoiding land-bound predators and navigating from den sites to foraging areas. Today, the patches of red spruce atop the Blue

Ridge and Allegheny mountains mark the only habitats south of the Adirondacks for the rare Virginia and endangered Carolina subspecies of northern flying squirrel.

"Monitoring the squirrels tells us about the health of the red spruce forest and the whole high-elevation ecosystem," Ford said. Both subspecies eat truffles—the fruiting bodies of fungi that live symbiotically with the roots of spruce. The fungi help the tree take up nutrients, and the tree provides carbohydrates for the fungi, which in turn depend on the squirrels to disperse spores. Diggins' research helped highlight this three-way dependency between the squirrels, spruce, and fungi, which is essential to their survival. □

Susan Trulove retired as communications director of the Office of Research and Innovation in 2012.



High-flying:

For more images and further information about the flying squirrel research, visit vtmag.vt.edu.



Promoting peak performance

by SHAY BARNHART

Stretch out: Calleigh Fangmeyer, athletic trainer, helps cadet P.J. Bourden with proper stretching techniques. Bourden is a junior from Garnet Valley, Pennsylvania, majoring in mining engineering and serving in Naval ROTC-Marine Option.

Physical fitness is a big part of cadets' daily lives. Calleigh Fangmeyer's job is to help keep them training at their best.

Fangmeyer, a certified athletic trainer employed by Carilion Clinic, joined the Virginia Tech Corps of Cadets staff in fall 2016. Her position is a first for the corps.

"We are delighted to have Calleigh as a partner with our team. Because of the military's emphasis on lifelong wellness, having her here to educate our cadets about the best ways to train properly and avoid injury will benefit them for decades to come," said Maj. Gen. Randal Fullhart, commandant of cadets.

Fangmeyer works with the corps as part of Carilion's sports medicine program. She provides consulting and assistance to cadets, works with the cadet EMT group, and provides advice to the corps and ROTC staffs.

Cadets seeking a military career must be able to perform at the physical standards set by their respective branches. In addition, all cadets attend group workouts a few times a week, practice military drill, train on the corps' obstacle course, and participate in two 13-mile Caldwell Marches. Fangmeyer attends those activities, making sure cadets are training safely and addressing any injuries that arise.

Adding Fangmeyer to the staff "shows that the corps realizes that we are active people," said Beth Demyanovich, a fifth-year

senior from Springfield, Virginia, majoring in civil engineering who serves in Air Force ROTC. "It also shows that the corps cares about the recovery of injured cadets by employing a trainer who has helped many cadets, including many of my close peers."

Fangmeyer keeps an office in New Cadet Hall, making it easy for cadets to see her.

"More cadets are willing to seek help because it is not so far away, and they know that they will be educated on how to recover more efficiently," Demyanovich said.

Fangmeyer earned her bachelor of science in athletic training from James Madison University in 2014 and completed her athletic training graduate assistantship at Harvard University, in conjunction with her master of education from Boston University, in 2016.

"My goal is to demonstrate the role and professional responsibilities of a certified athletic trainer, to provide safe and effective health care, to educate on body awareness and mindfulness, and to create an environment of trust and effective healing," Fangmeyer said. "Returning the cadets to full activity is very rewarding because they are preparing for something so much bigger. It has been great working with a highly motivated and respectful group of people." □

Shay Barnhart is the corps' communications director.



As a materials scientist, Steve McKnight (materials science and engineering '90) was motivated by asking the right questions.

"At the National Science Foundation, I can remember sitting in strategic research planning workshops and thinking to myself, 'The National Capital Region (NCR) is in our neighborhood,'" said McKnight. "They have the intellectual engines to inform national research, priorities, and decision-making. Why isn't Virginia Tech in the room?"

In 2014, Virginia Tech offered McKnight the key to drive the efforts to answer that question, naming him vice president of the NCR. Today, the university isn't just in the room, it's leading the way.

According to McKnight, Washington, D.C.—a city that includes 177 diplomatic embassies, is home to several Fortune 100 companies, and serves as the seat of our government—offers a world of opportunity. "Our goal is to establish a portal that brings Virginia Tech to that world and that world to Virginia Tech," he said. "Every day, the decisions being made here have a global impact, from cutting-edge technologies affecting the world economy and public policies, to issues related to health care in Africa and the work of the Peace Corps. There are so many opportunities that the challenge becomes deciding which one to work on today."

Nearly 58,000 Virginia Tech alumni live within an hour's drive of Washington, D.C., and numerous students participate in classes, internships, and other educational programs in the region annually. "You can't go anywhere without seeing maroon and orange," said McKnight. "Our strong presence is a differentiating factor. We are bringing our ethos and culture—the things that make Virginia Tech great—and sharing them on a globally visible stage. We are poised to address some really pressing societal problems, thanks to our growing urban presence. Our efforts in NCR strengthen what we do in Blacksburg and vice versa."

McKnight, who grew up in a home that recognized the value of technical science and engineering, credits his family for inspiring his career. "My parents are both Ph.D. scientists, and they helped me develop an appreciation for how science and technology can improve people's lives. It was up to me to find an intersection between study and action," he said. "How could I use science and technology for good?"

As a student at Virginia Tech, McKnight began to discover the answers.

"My personal aspirations are and were aligned with *Ut Prosim*," said McKnight, who also earned a doctorate from the University of Delaware. "In graduate school, I was right at the cusp of how new discoveries change the world. We were encouraged to ask the big questions. 'What are the really important problems? How can we make an impact?' At Virginia Tech, I learned that when you strive to serve others, you should look at the outside world, be willing to get your hands dirty, and tackle the big problems."

Prior to joining Virginia Tech in the NCR, McKnight spent five years as division director for civil, mechanical, and manufacturing innovation within the NSF's Directorate for Engineering. He established a reputation for promoting interdisciplinary research collaborations and cultivating interagency partnerships. Earlier in his career, he worked at the U.S. Army Research Laboratory, progressing through a number of leadership positions, from team leader in the polymers research branch to serving as chief of the materials division. McKnight's research focused on advanced polymer composite materials and polymer adhesion science.

Not surprisingly, McKnight's move to the university began with a question. "I asked myself, 'How can I make a bigger impact?' he said. "The role at Virginia Tech gave me the chance to do more, solve more, engage more, and give more." □



An innovative event: About 36,000 people passed through the Smithsonian's National Museum of American History in Washington, D.C., for the three-day ACCelerate: ACC Smithsonian Creativity and Innovation Festival held Oct. 13-15. Virginia Tech's Institute for Creativity, Arts, and Technology and Smithsonian's Lemelson Center for the Study of Invention and Innovation hosted the festival. It showcased connections between art, science, engineering, and design from 15 universities from the Atlantic Coast Conference. Virginia Tech's Design Robotics: Robot Assisted Fabrication exhibit featured this six-axis robotic arm. To learn more about the event, go to vtmag.vt.edu.

Campus-to-Campus Bus links Blacksburg, Roanoke, and the National Capital Region

Virginia Tech's Campus-to-Campus Bus launched over the summer to provide employees, students, and their guests with safe and convenient transportation between the university's campuses in the Blacksburg/Roanoke and Ballston/Arlington areas.

Each of the three Abbott Transportation buses in service is equipped with free Wi-Fi and have electrical outlets at each seat. The full-size charter buses have seatbelts, reading lights, reclining seats, and a restroom.

The bus departs from and arrives in Blacksburg and the National Capital Region twice each weekday and once each weekend day. It operates year-round, except on university holidays. □



The bus stops here:

To learn more about the bus, including details about reservations, visit vtmag.vt.edu.



SHELBY LUM

Everyday heroes called to serve

by RICHARD LOVEGROVE

The make-do, early months of the Virginia Tech Rescue Squad were more ad hoc than sophisticated.

Rejected for membership in a local first-aid crew, the four students who founded the Virginia Tech Rescue Squad (VTRS) had to persuade multiple layers of administration, including University Council (UC), to approve them as a student organization. While mounting a letter-writing campaign to UC members in May 1970, the four cruised campus during the unrest over Vietnam, putting out fires and helping anybody who needed aid.

In fall 1970, squad founders had no other members, no money, and no headquarters, so they recruited and trained the first cadre. Members drove their own cars to calls and were not allowed to transport patients. (It would take two years of determined lobbying to procure that first ambulance.) Cooperation with other area squads was minimal.

In 1971, denied permission to sleep or store equipment in their "own room" at 342 Squires Student Center, rescue squad members often stashed first-aid kits and other paraphernalia above ceiling tiles and discreetly napped behind closed doors, according to Bob Smallwood (biology '73), one of the squad's founders.

Now, 48 years after Smallwood, Thomas Spain, Wayne Modena (industrial engineering and operations research '73), and Richard Paul (management '73) conceived the idea, VTRS is thought to be the oldest student-run, all-volunteer collegiate rescue squad in the nation—and a fully equipped advanced life support agency with three ambulances and a total of seven vehicles.

The squad's 40 to 50 members respond to an average of 1,200 calls a year, staff nearly every major event on campus, run educational programs for students and the community, and maintain all automatic external defibrillators (AEDs) on campus. Not only do the members regularly garner national awards and recognition during drills and competitions, they earned respect for their response during the April 16, 2007, tragedy.

"I've been in awe of what we as a group have achieved," Smallwood said. "It's so good to see that the university has acknowledged how special the squad is."

Students who choose to join the rescue squad share a collective experience that sets them apart. "They're generally more mature than average students. They're incredibly professional—*incredible* people," said Richard Hirsh, a history professor who has been the faculty representative to the squad and an associate member since 1988. "The rescue squad is the epitome of *Ut Prosim* and community service at Virginia Tech."

For those not already focused on a career in health services, membership may also lead to unexpected career paths. Rescue squad members frequently find themselves "funneling" toward medical, military, or public safety fields, according to Michael Geary, current chief of the squad and a wildlife conservation major who is leaning toward such a role after he graduates in 2019.

Building brotherhood and sisterhood

People who describe the rescue squad's culture and camaraderie liken the experience to being part of a large, extended family. Members eat, sleep, and train in a cozy station in an old mail room in the Military Building's basement, and they support each other on what can be high-stress emergency calls.

"It's very much a brotherhood and a sisterhood ... those relationships are for a lifetime," said Jim Key (education '97), who chose to attend Tech for computer science, but changed course after joining the squad. Now a fire/EMS battalion chief in Prince George's County, Maryland, he said, "It's [VTRS] where I cut my teeth."

When Nick Mattheisen (interdisciplinary studies '11) was training for the squad, his probate class was assigned to write an essay on one of the Pylons. "I picked Brotherhood," said Mattheisen, who is business development manager for Carilion Clinic Life-Guard in Roanoke and is a volunteer medic on the Vinton (Virginia) First Aid Crew. "I still think about how much Brotherhood and *Ut Prosim* go together ... to know that you can count on one another to get through tough times."



Mock DUI: Members of the Virginia Tech Rescue Squad and other fire and rescue teams participated in a simulated crash demonstration to raise awareness of the dangers of drinking and driving.

The rescue squad recruits each semester as members graduate. According to Geary, the group receives about 200 applications to fill between five and 15 spots. Not everyone has prior experience. Successful candidates are well-rounded with diverse backgrounds. "It's very selective," Hirsh said.

Once accepted, new members begin emergency medical technician training at the basic level (EMT-B). Although EMT-Bs can handle 95 percent of the squad's calls, Geary said, quite a few elect to train further, earning EMT advanced, paramedic, or advanced life support certification.

Required to serve a minimum of one night per week, members may average 20 hours a week, while officers log more like 35 to 40, Geary said. The squad covers all home football and basketball games, ACC baseball and softball games, and any large event.

"The Virginia Tech Rescue Squad members don't go to football games; they work football games," Key said. "And they don't always get to go home for breaks" because the station is fully staffed every day of the year.

VTRS also "prides itself in being a training agency," Geary said. Squad members who staff the station each night also participate in one hour of related training. As a result, the group is always a strong competitor at the National Collegiate Emergency Medical Foundation Services conference. This past year, the Tech squad earned first place in basic life support skills and mass casualty incident skills and second in advanced life support skills. "911 doesn't take a break, and so it is important to stay ahead of the curve," said Geary.

Humble beginnings

Smallwood, Modena, Paul, and Spain each had rescue squad experience in their Virginia home communities before they came to Tech. All wanted to continue their service, and they were further convinced of the need for a campus rescue organization when, in fall 1969, nearly 45 minutes passed before emergency personnel were able to reach a student injured playing flag football on the Drillfield, Smallwood said.

Once approved by UC as a student organization, the group was awarded a \$2,700 budget and a space in 320 Squires. Today, that allocation totals about \$160,000, supported in part by student fees and contributions.

Over time, the foursome recruited more members; requisitioned a backboard from a local lumber company; and printed 10,000 green stickers advertising their hours—5:30 p.m. to midnight. “We worked largely the residential side of campus,” Smallwood said.



That first class of recruits included future fire chiefs, EMS directors, and three physicians. Another early member, Cassandra “Sandy” Jones (marketing, housing, and family development ’72), was the first female ambulance driver on the squad. She is also Smallwood’s wife.

After graduation, Smallwood went on to serve in various biomedical engineering roles, including working on a team that developed the first home glucose monitor, the Glucometer, for diabetes. “I’m now using an insulin pump and using a meter from that same company,” Smallwood said.

Over the course of its history, the squad has negotiated some rough patches, including avoiding a closure in 1973 by becoming a unit of the Blacksburg First Aid Crew (BFAC). Back on its own in 1980, VTRS began running shock-trauma calls and graduated its first cardiac technicians. In 2000, the squad received the Governor’s Award for Outstanding EMS Agency in the commonwealth.

Through the years, the squad has been bolstered by the support of the VTRS Life Member and Alumni Association, which numbers more than 250 life members.

Never was that support more apparent—or needed—than in the days following April 16, 2007.

“The Hokie Nation came together, and the rescue squad nation came together. ... It grew the rescue squad as an organization, as tragic as it was,” said Key, who traveled from Maryland to Blacksburg following April 16 to support the squad.

That reaction to the campus tragedy sums up why Geary chose to invest the hard work and sacrifice necessary to become chief during the spring of his sophomore year.

“The squad is where I found my family away from home,” Geary said. “As for the university, the rescue squad is an invaluable resource for students, faculty, and anyone who wishes to visit Virginia Tech’s campus.” □



During a trauma drill, rescue squad members transfer a patient to a medical helicopter for transport.

Every second counts:

To learn more about the student-led Virginia Tech Rescue Squad, go to vtmag.vt.edu.

We've got your back

by ERICA CORDER

The effort needed to load an appliance or move a heavy box of supplies is anything but simple.

Lifting and carrying require an intricate system of finely tuned body mechanics that combine moving body segments, changing joint angles, tightening muscles, loading the spinal column, and balancing under a shifting center of gravity.

Recently, Lowe’s Innovation Labs, the disruptive technology hub for the home improvement retailer, joined forces with robotics expert Alan Asbeck, an assistant professor in the Department of Mechanical Engineering at Virginia Tech, to design a prototype of an exosuit to make lifting safer and easier.

“Over the past couple of years, human assistive devices have become an area of interest,” Asbeck said. “Our technology is different in that it includes soft and flexible elements, and our approach is unique in that we are putting our prototypes in a real-world environment for an extended period of time.”

1 Constructed from lightweight materials in combination with soft, comfortable foam and fabric, the exosuit is designed to reduce the fatigue some employees may experience as a result of lifting and moving heavy or bulky objects.

2 Putting it on is simple. The wearer steps through the suit’s thigh brace straps, pulling the suit into place. Then, he or she buckles the waist belt and chest harness, comfortably securing the suit.

3 At the leg, webbing straps connect thigh braces to the carbon fiber.

4 At the back of the chest, a harness transmits force from the shoulder straps to a carbon fiber structure that slides up and down to accommodate motion.

5 Side blocks made from aluminum and steel hold the carbon fiber beams and rotate to allow the legs to move to the side.

6 Once on, the suit functions as an extension of the body’s mechanics. Its carbon fiber legs act like a bow and arrow, storing the user’s energy and returning it when they straighten. Also, it flexes to match the curvature of the body.

7 Aluminum teflon sliders at the back of the leg slide up and down to accommodate leg motion.

Four suits are currently in use by the Lowe’s stocking team in Christiansburg, Virginia. “This is a way to help keep our associates from being as worn out,” said store manager Joe Sirico, for whom employee safety is a top priority.

Asbeck and his team will work with Lowe’s to assess the physical impact of the suits and to better understand their impact on work experiences. “This project really pairs a company like ours that has been doing business and has been a part of this community for many, many years with an institution like Tech, and takes those two worlds and smashes them together, and we both come out stronger,” Sirico said. □

Erica Corder is the College of Engineering’s communications manager.



BRINGING

TECHNOLOGY HOME

by MASON ADAMS, MARYA BARLOW, and ELEANOR NELSEN
photos by LOGAN WALLACE | illustrations by MUTI

ON A DAY IN THE NEAR FUTURE, in the dark hour just before dawn, automated lights illuminate the room, waking you gently. You summon your digital assistant to review the day's schedule and to monitor your home's energy consumption. Ready for work, you step into an autonomous car that slides into a self-organizing caravan on the interstate, giving you time to read email and catch up on the news.

At the office, after a busy morning, you order lunch. The meal arrives at your desk minutes later, delivered by drone. Later that evening, as you return home, sensors recognize your arrival, bringing up the lights. You prepare dinner, remembering to scan each ingredient. The grocer will deliver a new order on Friday.

Before settling in for the night, you check in with your digital assistant, confirming that your elderly mother has taken her medicine. As you slip into bed, the lights dim automatically, and soothing music pipes in to help you relax.

Once dismissed as science fiction, such a scenario is an advancing reality. Smart devices, including digital assistants and home energy monitors, are already available. Businesses are field-testing the digital networking of the not-so-distant future, and lawmakers are wrestling with policies to manage consumer security, safety, and privacy in this changing environment.

Capitalizing on existing strengths, Virginia Tech is driving the research and technology even further, becoming a global leader in the developing field through the university's Destination Area known as Intelligent Infrastructure for Human-Centered Communities (IIHCC).

Last year, the university announced it plans to invest \$78.45 million over five years to build capacity in intelligent infrastructure disciplines, such as smart design and construction, and autonomous vehicles that navigate land, air, and water.

"The commitment across campus to create a unique and valuable living-learning experience for our students is extraordinary," said Virginia Tech President Tim Sands. "We expect more than 2,000 students to be involved in intelligent infrastructure study and research by 2022."

More than 230 faculty members from multiple colleges and institutes are involved as the university ties new assets into existing programs and research facilities across the Blacksburg campus to create an unparalleled educational experience.

"When someone is doing research or getting a degree or coming to work on a topic, we're not specializing with a widget—we are now solving a problem," said Myra Blanco, advanced-vehicle researcher at the Virginia Tech Transportation Institute; director of the Center for Public Policy, Partnerships, and Outreach; and former chairwoman of the IIHCC stakeholder group.

"Students come to Virginia Tech for its reputation and then get immersed into the Virginia Tech way," said Blanco (M.S. industrial and systems engineering '99, Ph.D. '02). They can participate

in a real project funded by the government, and they are also able to participate in proprietary research. We're allowing them to participate in all of that with professors and researchers who are exposing them to something more than just being in a classroom. When they graduate, they are going to be well prepared to tackle any problems they may have in real life."

The Destination Area is based around four themes: energy, robotics and autonomous vehicle systems; smart design and construction; and ubiquitous mobility—anywhere connectivity that brings the world to the individual who may be hindered by physical limitations.

"Everything is glued together with human-centered communities," said Blanco. "It's not pushing technology for technology's sake; it's to improve quality of life, to improve equality, and to ensure at the end of the day that we have a healthier community."

Energy is similarly important as an underlying concept. As communities become increasingly mobile and data-driven, how will they be powered in a sustainable way? Virginia Tech faculty and students already engage on the cutting-edge of energy research through competitions like the Solar Decathlon and institutions such as the Virginia Tech Center for Power Electronics Systems, which partners with more than 90 industrial affiliates.

"With all of the activities involved, energy must be available and flow seamlessly and transparently between systems," said IIHCC Program Manager Tracy McElroy. "Energy ties all of this together."

IN LATE JULY, Torc Robotics' Lexus RX hybrid completed an autonomous drive of more than 4,300 miles from Virginia to Seattle and then back to Richmond. Gov. Terry McAuliffe was there to greet its return. "I am proud to see a homegrown engineering firm develop self-driving technology and introduce it to the rest of the country on a coast-to-coast drive," McAuliffe said. "This technology is coming, and we want to be in front of it here in Virginia. We want to be the leader."

SELF-DRIVING TECHNOLOGY

Virginia plans to install about 85 miles of sensors for autonomous vehicles along I-95 near the National Capital Region. The private company, Uber, invested millions into a real-world test of driverless cars in Pittsburgh, Pennsylvania, over the past two years, and commercial car makers are investigating the use of automated driving systems as well.

Hokie-run, Blacksburg-based Torc is making a big splash in this world. Tech publication TechCrunch noted Torc's arrival among the businesses offering self-driving car technology to carmakers, indicating that "this one likely has a bit more experience than most."

Torc's vehicle traveled across 20 states as part of the Seattle trip. The car drove all but about 1,000 miles; occasionally, one of three standby drivers took the wheel because of traffic obstacles or varying autonomous vehicle certification requirements in each state.

More than half of the Torc's employees are Virginia Tech alumni, including its CEO, Michael Fleming (mechanical engineering '02, M.S. '03). Fleming co-founded Torc in 2005, after participating on a Virginia Tech team that won an intelligent ground vehicle competition five years in a row, as well as placing two vehicles in the top 10 among 195 entrants in the 2005 Defense Advanced Research Projects Agency (DARPA) Grand Challenge.



In fall 2015, Sen. Mark Warner attended a special demonstration of autonomous and connected vehicles hosted by the Virginia Tech Transportation Institute in Arlington, Virginia.

LOGAN WALLACE



LOGAN WALLACE

Testing is already underway to determine the role of driverless cars and advanced vehicle connectivity in improving urban traffic safety in Arlington, Virginia.

Frustrated by seeing a recurring cycle in which students and professors grew to collaborate at a high level, only for the students to move on after graduation, Fleming remained in Blacksburg to break that pattern and continue the work.

"The autonomous vehicle team worked right beside the Baja team, right beside the sub team and the bridge team," Fleming said. "We spent endless nights and weekends building and breaking and rebuilding things. That's where a lot of education takes place. It takes place in the classroom, too, but it's also important for students to apply engineering know-how and for teams to figure out what works and what doesn't work."

Virginia Tech and Torc have collaborated on more than \$10 million worth of research and development that could lead to driverless cars entering the consumer market in a matter of years.

But technology development is just one aspect of the growing autonomous vehicle industry. The Virginia Tech Transportation

Institute (VTTI) plays a significant role in related research, testing not just vehicle capacities but also the social effects of driverless cars. VTTI research on the reaction of motorists to driverless cars went viral in August, when an apparently driverless gray van drew the attention of people in Arlington, Virginia. A reporter chased down the van, exposing the driver, who was disguised as the seat.

Although there has been tremendous progress in the industry in recent years, Virginia Tech and allied partners like Torc have only begun to scrape the surface of what's possible.

"I've worked in this space for a decade," Fleming said. "I think about self-driving impact in society every day, and I still don't comprehend the impact it's going to have. Who would've thought that we could pay our taxes, order pizza, and find a date when cell phones were first invented? Self-driving vehicles will have that similar impact."



VIRGINIA TECH STUDENTS, researchers, and staff gathered near campus a year ago to place a special lunch order from Chipotle Mexican Grill. The novelty of burritos, chips, and salsa delivered by an unmanned aerial system (UAS), or drone, drew the interest of individuals across campus. The project resulted from a partnership between Virginia Tech Mid-Atlantic Aviation Partnership and Project Wing, which is part of X, an innovation lab formerly known as Google[x] that incubates breakthroughs in science or technology.

UNMANNED AERIAL SYSTEMS



The flights marked two firsts for Project Wing—Involving external users in the U.S. and collaborating with a Federal Aviation Administration (FAA)-approved unmanned aircraft systems test site.

In June, Virginia Tech and Project Wing, along with other partners, field-tested technology developed by NASA that is designed to allow multiple aircraft to safely share the same airspace.

There is no shortage of “dull, dirty, and dangerous” tasks that drones can handle much more safely and efficiently than a human in a helicopter—jobs like inspecting bridges and powerlines or delivering emergency medical supplies after natural disasters. As use of the UAS becomes more common for commercial and other purposes, a variety of aircraft controlled by different operators conducting unrelated missions will increasingly share airspace. The rigorously choreographed June operation explored scenarios that may arise as UAS flights become commonplace.

The test site at Virginia Tech is one of seven in the U.S. ap-

proved by the FAA for tests of unmanned aircraft. The Mid-Atlantic Aviation Partnership (MAAP), which runs the site, works with researchers, government agencies, and companies ranging from UAS startups to major corporations like Intel and Dominion Energy.

“These aren’t speculative research projects that may come to fruition 15 or 20 years in the future—these are companies who want to operate this year or next year,” said Mark Blanks, director of the Virginia Tech MAAP. “It’s not an overstatement to say that Virginia Tech is the laboratory where we’re



RAY MEES



(above) This fall, Virginia Tech began construction of an innovative testing ground for students and researchers to fly unmanned aerial vehicles. Located on Oak Lane, the netted facility will measure 300 feet by 120 feet when complete, making it the tallest drone park in the country.

(at left) In June, the Virginia Tech Mid-Atlantic Aviation Partnership and commercial partners, including Project Wing, field-tested NASA’s traffic management system for unmanned aircraft.

ALTHEA OLINGER



(at left) Virginia Gov. Terry McAuliffe closely examines a drone following a drone demonstration held in August 2014 at the Smart Road. The demonstration was part of a special media event at the Virginia Tech Transportation Institute celebrating the university's unmanned aerial system test site.

(below) This summer, representatives from the Mid-Atlantic Aviation Partnership, NASA, and Project Wing studied software designed to allow multiple craft to share airspace safely.

LOGAN WALLACE



ALTHEAH OUNGER



mapping out the future of unmanned systems. It's an incubator not just for the technology, but also for the regulations and guidelines that will determine what operations people are going to be allowed to do."

MAAP is collaborating with Virginia Tech's world-renowned injury biomechanics program to quantify the injury risk associated with drone-human impacts. The FAA won't allow commercial drone flights over people until companies can demonstrate that there's little or no risk to people on the ground—a major roadblock for applications like package delivery. Currently, the empirical data to assess such risks doesn't exist. MAAP and the injury biomechanics team are designing test methods and running the experiments that will begin to answer those questions.

"It's not an overstatement to say that Virginia Tech is the laboratory where we're mapping out the future of unmanned systems."

—Mark Blanks,
director of the Virginia Tech MAAP

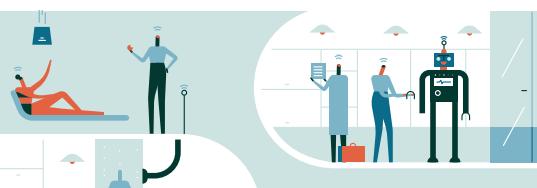
subject to FAA regulations. A space for education and research in addition to recreation, it will be adjacent to classroom and lab space where students can work on original projects and learn how to use drones safely for applications from journalism to agroforestry.

For a physical manifestation of the university's commitment to UAS research, you don't have to look any farther than Oak Lane, where a netted, 80-foot-tall drone park now overlooks the golf course.

The structure will offer nearly three million cubic feet of outdoor flight space that gives researchers access to real-world wind and weather conditions, enclosed by a net that means the airspace isn't

Picture a high-tech, high-quality LEGO kit that allows you to build a home within the cost and spatial parameters of your lifestyle. That's what a team of faculty-student researchers led by Professor Joe Wheeler in the College of Architecture and Urban Studies (CAUS) has been developing. But unlike LEGOs, the effort is not child's play. "We're working on housing solutions to meet a world population and climate change crisis," Wheeler said.

SMART DESIGN AND CONSTRUCTION



"Our planet will grow by over 2 billion people before 2050, and we need to be ready with practical, affordable housing," Wheeler, co-director of Virginia Tech's Center for Design Research, calls the solution the "cartridge concept." The concept borrows the best of factory and assembly line processes to connect modular building with sleek futuristic design, smart technology, and sustainability.

The research is being explored for uses ranging from homes and condos to hospitals, hotels, and disaster relief shelters, attracting interest from world-leading architecture firms, consumer brands, and foreign and domestic governments.

In July, the U.S. Department of Housing and Urban Development met with the team to learn how Virginia Tech's research could be adapted for disaster relief shelters and low-income single and multifamily homes. At the event, a student-led demonstration showcased the benefits of the concept. The students unloaded components and deployed a 288-square-foot disaster relief prototype house in under two hours.

Nelson Bregon, associate assistant deputy secretary for the U.S. Department of Housing and Urban Development, was effusive. "The Virginia Tech students are stepping to the forefront of technology and innovation," he said. "I think that this concept is a concept that will be taken to scale eventually. We'll have a product that will be very marketable—not only in this country but internationally."

CAUS has long worked ahead of the smart construction and design curve. With Virginia Tech's 2010 world-winning Solar Decathlon home, Lumenhaus, and, more recently, FutureHAUS, the School of Architecture + Design has brought smart, sustainable housing solutions to the world stage.



(above) The kitchen pantry of the future may be equipped with scanning devices to communicate updates to grocery orders in real time.

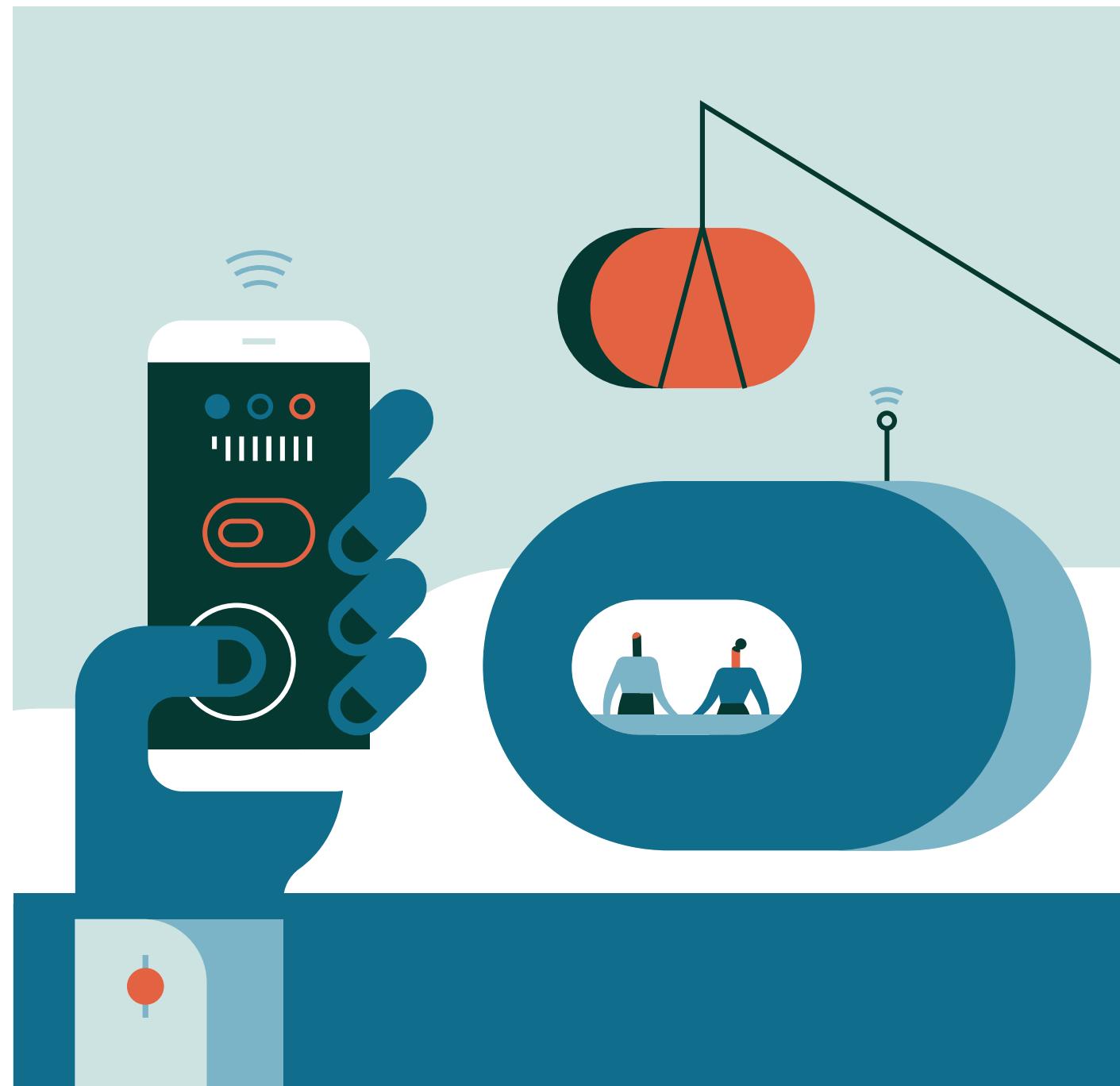
(left) Bobby Vance '13, '17, a principal investigator and team leader of the FutureHAUS project, installs an audiovisual wall between the office and living room. The wall, which rotates 180 degrees, functions as a speaker, television, computer screen, videoconferencing monitor, and dry-erase board on one side, while the other displays scenic photography.

The FutureHAUS prototype was lost a month later in a fire that destroyed its construction and fabrication shop at the Prices Fork Research Station. However, the research lives on. FutureHAUS Dubai, a net-positive energy solar home will be unveiled at the Solar Decathlon Middle East in October 2018. Virginia Tech is the only U.S.-based college team invited to the worldwide competition.

The Myers-Lawson School of Construction is also leading the charge in smart construction and design, supported by leading industry partners and federal grants. The school's projects range

from research on the use of drones and robots for building inspections, to wearable technology for enhanced worker safety, to augmented reality that improves construction site efficiency. In addition to National Science Foundation and federally funded projects, the research involves industry partners, including W.M. Jordan, HITT, Hourigan Construction, Clark Construction, and the Associated General Contractors of America.

"The construction industry is ripe for incorporating new production processes and technologies," said Brian Kleiner, director of the Myers-Lawson School of Construction. "Our faculty and



RAY MEESKE

A student-led demonstration, held in July for officials from the U.S. Department of Housing and Urban Development, showcased the process for setting up a disaster relief housing prototype designed by Virginia Tech researchers.

students are inventing the future of construction with a human-centered approach. There is a natural assumption that increased automation yields improved productivity, efficiency, safety, and cost control. But without human-centered design, humans are left to perform 'leftover functions' that can be inefficient, boring, or even dangerous. Myers-Lawson is working with industry to ensure that automation supports human health and efficiency."

In January, the team traveled to KBIS Orlando, the world's largest kitchen and bath industry expo, to exhibit the final phase of a three-year research project presenting the smart home of the future. The team's conceptual bedroom and home office, with their flexible spaces, moveable walls, and integrated, user-responsive technology, drew nearly 40,000 spectators during the three-day show.

Get smart:

For more on smart cars, smart communities, and smart living, visit vtmag.vt.edu.

Laying the foundation

Six months after Virginia Tech President Tim Sands announced an investment in intelligent infrastructure, several major donors jumpstarted the project by contributing \$25 million toward construction of a \$50 million, two-building Intelligent Infrastructure Complex and other projects that total about \$28.45 million, including an Autonomous Systems Park, Intelligent Infrastructure Corridor, and Smart Village.

The donor group includes John Lawson (geophysics '75), president and CEO of W.M. Jordan Company and a namesake of Virginia Tech's Myers-Lawson School of Construction; Brett Hitt and Russell Hitt, co-president and chairman of HITT Contracting Inc.; and others.

"Virginia Tech is a national leader in construction education, but today's fast-moving technology demands a broader view," said Lawson. "By combining knowledge of smart construction with expertise in autonomous vehicles and energy systems, Virginia Tech can be the world's leading source of expertise in intelligent infrastructure."

intelligent infrastructure

CONNECTING THE CAMPUS

Over the next five years, Virginia Tech intends to build upon an existing network of facilities across Blacksburg to maximize opportunities for intelligent infrastructure initiatives. These additions, renovations, and expansions will be the background against which students, faculty, and university partners will discover new technologies and develop practical applications to make a meaningful impact on the quality of life in communities around the globe.

SMART investments

The \$45.5 million Intelligent Infrastructure Complex will include two new interdisciplinary research and education buildings and smart dining facilities.

The \$1 million "drone park" near the Duck Pond will provide a place for students to experiment with autonomous land vehicles and unmanned aircraft.

The \$9 million Advanced Design and Construction Facility on Plantation Road will feature a hangar-like facility where faculty and students can connect basic research to practical applications in areas ranging from smart houses to smart energy.

The \$2 million Automation/Intern Hub at the Virginia Tech Transportation Institute will enable students to work directly with industry leaders to drive innovation and entrepreneurship.

The \$1 million Intelligent Infrastructure Corridor will connect with existing facilities on Plantation Road for automated vehicle experiments.

The \$10 million Rural Roadway Expansion and a \$3.5 million Surface Street Expansion, along with existing smart road facilities, will result in a test-bed for self-driving cars and unmanned aircraft systems.

The \$3 million expansion at the Urban Living Lab in the National Capital Region will enhance study opportunities in the metropolitan environment. □

Marya Barlow is the CAUS communications director. Eleanor Nelsen is the communications manager for the Institute of Critical Technology and Applied Science.

RAY MEISE

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WHO DO YOU WANT TO BE?

by TRAVIS WILLIAMS

On the first day of kindergarten, children begin thinking about the future. By the time they graduate from high school, they have drawn pictures, written papers, and given presentations answering the age-old question, "What do you want to be when you grow up?"

Today, universities are preparing students for careers in fields that may not yet exist and positions that have not yet been imagined. So the question becomes not what do you want to be, but who?



Virginia Tech Student Affairs, which includes two-dozen departments, is dedicated to providing a rich co-curricular experience and essential services for students. In 2011, Student Affairs introduced the Aspire! Awards. The awards recognize students who represent one of the Aspirations for Student

Learning—committing to unwavering curiosity, pursuing self-understanding and integrity, practicing civility, preparing for a life of courageous leadership, and embracing *Ut Prosim* (That I May Serve) as a way of life.

"In a time when college is often associated with jobs and careers, we wanted also to accentuate the importance of character development," said Frank Shushok, senior associate vice president for student affairs. "We want our students to find a career, but we also want them to find a life full of meaning and purpose. That's the biggest gift an education can provide."

The purpose of the award program resonated with Robert Julius (management '07) and his wife Kara Julius (music '07).

The couple credits co-curricular involvement with enhancing their time at Virginia Tech and molding them into who they are today.

Robert, Kara, and their four children live just south of Pittsburgh, more than 300 miles away from the university, but the couple's connection to Tech easily spans the distance. To help provide enriching experiences for students, Robert and Kara created an endowment to support Student Affairs.

"We just really wanted to support something that provides those opportunities of learning beyond the classroom in a

structured way and really showcases the students' talents and skills," Robert Julius said.

"The Aspirations for Student Learning have become an integral part of how we guide students in making the most of their Virginia Tech experience," said Patty Perillo, vice president for student affairs.

In 2013, the division began honoring a faculty member, and in 2015 they added a category for alumni. Residence Life Resource Officer John Tarter was recognized in 2015. "Tarter" as he is affectionately known by students, serves as an officer, a resource, a listening ear, a cheerleader, and a friend. He understands that building positive relationships with students makes a difference. "We walk and talk to students," said Tarter. "I don't write a lot of tickets. I don't make a lot of arrests. I try to talk them out of doing stupid stuff before they do it."

In April, Robert and Kara Julius were honored as the alumni recipients. "What was more valuable than the award was being able to see the students who were recognized. They are just remarkable individuals, and being able to share a part of those kids' lives is a really cool experience," Robert Julius said.

Since the awards began, hundreds of nominations have been submitted and, as of this summer, 174 Aspire! Awards have been presented.

At the recognition events, recipients have the opportunity to share their stories. Here are a few from the past six years.

innovator



EMBRACING *UT PROSIM* AS A WAY OF LIFE

RIAL TOMBES CARVER (environmental policy and planning '12) was long aware that she wanted to serve. During her first semester at Virginia Tech, she determined that role would include serving food.

"Once we started talking [in class] about food and agriculture, it was like, this is something where we can make changes every day, three times a day," Carver said. Over the next four years, Carver's passion for feeding the world led her to found an on-campus farmers market, organize Tech's Food Day, and spearhead the first-ever Student Foodshed Summit.

Following graduation, Carver took a position as sustainability manager for the university's dining services. "My job was really connecting the farmer with the staff," Carver said. By 2015 Virginia Tech was purchasing around 13 percent of its food locally, up from about 7 percent in previous years. Carver also initiated the hiring of a faculty member to oversee the Dining Services Kentland Farm and helped institute the use of reusable to-go containers.

Today, Carver is a graduate research assistant at Kansas State University, working with that state's rural grocery initiative. She assists Kansas grocers with managing such issues as business development, public health, and community sustainability.

Carver credits Virginia Tech with creating opportunities and providing mentors that allowed her to transform her passion into a career. "There's a lot about the people and that place that just foster something very special," Carver said.

role model



PREPARING FOR A LIFE OF COURAGEOUS LEADERSHIP

LAMONT LIVINGSTON'S face lit up as he watched the video. "That's Sept. 14, 2015. That's crazy," said the Virginia Tech senior.

The recording showed Livingston's then-22-month-old son, Jaiden, at a desk drawing during a lecture. It was Jaiden's first university classroom experience and a milestone for his father, who spent more than a year battling homelessness and single parenthood on his quest to get back into school.

Livingston came to Virginia Tech on an academic scholarship in 2012. In the spring of that year, his world changed when he learned he would soon become a father. "Then it was pretty much like, what do I do now? So that semester, I pretty much did nothing," Livingston said.

Livingston's GPA dropped to 0.4, he lost his scholarship, and that summer he returned to Newport News, Virginia. He bounced between the homes of friends and family and the streets, even taking refuge on the porches of strangers.

Jaiden was born in November 2013. The child was the catalyst for a change. "It's like I just woke up one day and was like, this is not for me," Livingston said. "I was basically in defeat mode ... if I stay in defeat mode, I'm basically putting him in defeat mode and not even giving him a chance to enjoy life."

Livingston reached out to friends in Blacksburg, where he took a fast food job. He enrolled in classes in fall 2015, adjusting his course load to balance his responsibilities. By spring 2016, he

had worked his way onto the Dean's List, raised his GPA to 2.65, and earned back his scholarship.

Livingston hopes to graduate in spring 2018 with a 3.3 GPA. He believes that the way Hokies embrace the spirit of *Ut Prosim* (That I May Serve) is what allowed him to change his life.

LOGAN WALLACE



PRACTICING CIVILITY

OBайд REHMAN (biological sciences, religion and culture '16) believes human connectivity can change the world. "Real, meaningful relationships—that is what I think will truly bring about change," said Rehman.

A two-time recipient of the Warren W. Hobbie Scholarship and a former research assistant at the Virginia Tech Carilion Research Institute, Rehman served as president of the Muslim Student Association and as a web designer and manager of the Appalachian Foodshed Project. He also participated in Tech's first international interfaith service trip. "I've had a lot of opportunities at Tech that I wouldn't have had other places," he said.

In fall 2015, when negative graffiti on campus targeted Muslim students, Rehman found opportunity in the midst of adversity and helped organize an event to bring people together. "Standing in Solidarity: A Gathering Against Hate," spurred a series of activities that would demonstrate support across campus.

A native of Pakistan, Rehman moved to Clifton, Virginia, when he was four. He developed friendships with people from various backgrounds. These relationships, combined with his faith and the leadership he cultivated as an Eagle Scout, nurtured a desire to build bridges between people. Rehman believes that more bridges built equals more problems solved. "It's kind of like turning on the lights and seeing that there is nothing to be afraid of," he said.

Following his 2016 graduation from Tech, Rehman spent a year studying Islamic faith at the Tayseer Seminary in Knoxville, Tennessee. In July 2017, he enrolled in the West Virginia School of Osteopathic Medicine. "I believe that in medicine there is a sacred bond between the patient and doctor. I believe in thinking globally and acting locally as a way to bring about change in this world," he said. "I feel a duty to serve the immense need in Appalachia, my backyard growing up and the place I've called home for the past five years."

COMMITTING TO UNWAVERING CURIOSITY

For as long as he can remember, **PATRICK GOLEY** (electrical engineering '13, M.E.E. '15) has been itching to learn more about how things work. "I had a curiosity. I was curious about science. I was curious about technology. It was like an itch, you know," Goley said.

A Northern Virginia native, Goley took a full-time job as a line cook shortly after high school. The job was good, but limited his opportunities to satisfy his craving for knowledge. By the age of 25, he'd had enough. "The curiosity kept snowballing. It was like, I can't live without knowing anymore," Goley said. He enrolled at Northern Virginia Community College in 2008 and later transferred to Virginia Tech.

Goley, who is currently pursing a Ph.D. at Georgia Tech, has worked two summer internships at the United States Naval Research Laboratory and presented at this summer's Institute of Electrical and Electronics Engineers' Nuclear and Space Radiation Effects Conference.

Though his curiosity was long-present, Goley said it was his admission to Tech that allowed him to put it to use. "It's the place that gave me a shot. They were willing to take some kid, a non-traditional student who took a few classes at a community college ... and Virginia Tech said, 'Hey, we want you here,'" Goley said.

Although the rigorous engineering curriculum pushed his limits, it also helped alleviate self-doubt. "By being immersed in that environment, that's what gets you started down the road. That was where I wanted to be," he said. Goley said he's not sure exactly where that road will eventually lead, but he's now confident his ability to use his curiosity will serve him well. "I think curiosity is the fuel that drives the learning engine. And as an engineer and a scientist, you have to constantly be learning," Goley said.



PURSUING SELF-UNDERSTANDING AND INTEGRITY

Senior **ANNEMARIE BRESSON** expected to learn more about herself at Virginia Tech, but she didn't know just how much more.

The "verbal squeaking" and involuntary movements started one February night. It took a month of frequent emergency care and appointments with specialists to provide an answer. "I remember when the doctor told me it was Tourette's Syndrome, I was like, 'Yes! Let's roll with the Tourette's,' because I finally had a name for it," she said.

Bresson, who spent the remainder of the spring semester and most of the summer, learning about her condition, was inundated by messages of concern from teachers and friends. "I thought, you know, I'll just knock it out. I'll tell a lot of people at once," Bresson said.

So, she did, via YouTube. The response was overwhelming, inspiring her to create nearly a dozen awareness-building videos. "It stinks when you don't understand. It can be scary or confusing," Bresson said. "I like talking about those things because then other people realize it's OK."

Bresson will graduate in December and hopes to pursue a career that will allow her to guide other students to Virginia Tech. "I'm currently an ambassador for my department [dairy science], so if I could be an ambassador for the entire university, that would be amazing," she said.

"I always say that at Virginia Tech, you're not just a number. Yeah, we're a school of 30,000, and when you go to a football game, you feel that, but when you go to your department or you go to your classes, you realize you're an individual, not just a student," Bresson said. □



Class Notes

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Accruing experience: During his senior year at Virginia Tech, Jorge Del Alamo '69 (front row, second from left) served as treasurer of the Gamma Lambda Chapter of Beta Alpha Psi, a national honorary and professional accounting fraternity.

Jorge Del Alamo was an English-challenged teenager with mixed emotions when he stepped off a Pan Am flight from Havana onto U.S. soil in 1961. Although the distance between the two cities was a modest 228 miles, for Del Alamo, who was traveling without parents and understood just a few English phrases, it was a world away from everything he knew.

"It's kind of like, at 14, this is a great adventure. This is kind of fun," said the Cuban native. "But it didn't turn out exactly the way I expected."

Del Alamo relocated to the U.S. through Operation Pedro Pan, a mass exodus of more than 14,000 unaccompanied Cuban children. The minors fled to Miami between 1960 and 1962,

shortly after Fidel Castro became Cuba's prime minister. For the Del Alamo family, "the plan was, OK, you guys get away from here. The Bay of Pigs will come. Castro is going to fall. We're going to get a new government, and then you guys come back," he said.

Instead, ongoing political strife extended Del Alamo's brief adventure to a lifetime—eventually leading him to Southwest Virginia and, ultimately, Virginia Tech. Del Alamo credits his university experiences with propelling him into a successful accounting career that's spanned more than four decades. "The education and experience at Tech have allowed me to do the things I did," Del Alamo said. "I don't think I could have gotten a better education anywhere."

Operation Pedro Pan was created in 1960 by the Catholic Welfare Bureau (Catholic Charities) of Miami to assist Cuban parents seeking to protect their children from the increasingly volatile political environment. After arriving in the United States, some of the children were reunited with family or friends, some were cared for by the Catholic Welfare Bureau, and others were placed in temporary shelters and later relocated.

Del Alamo, his sister, Isa, and cousin, Jose, remained in Miami for a brief time but were eventually sent to Buffalo, New York. The experience helped him learn to be self-reliant.

"We went from a family situation where we had loving grandparents and everything to a situation where if you don't want to eat, well that's your choice," Del Alamo said.

A year and a half later, Del Alamo was reunited with his parents. The family emigrated to Danville, Virginia, where his father, who had been a lawyer in Cuba, found work as a Spanish instructor.

"I don't think I could have gotten a better education anywhere."

—Jorge Del Alamo '69

His experiences in the classroom and around campus exceeded his expectations. "There were outstanding educators and a great atmosphere," he said.

Del Alamo earned an accounting degree in 1969 and accepted a position at the firm that would later become the audit, tax, and advisory services firm KPMG. He remained with the company for 23 years, moving from Greensboro, North Carolina, to Corpus Christi, Texas.

In 2002, he opened his own business, which he operated until he retired just last year.

The longevity and success of Del Alamo's career fueled a desire to support opportunities for future Hokies. Along with his late wife, Rosa, he contributed funds to establish a professorship, a scholarship, and an excellence fund. Later, he and his wife, Lin, joined alumnus Bob Hogan (accounting '78, master of accountancy

'80), to endow funds to support the Pamplin College of Business symposium on business ethics. "Some of the stuff we've gotten, I feel the education I earned is directly responsible for ... I want to give some of it back," he said.

Although diplomatic relations between the U.S. and Cuba were restored in 2015, Del Alamo said he'll likely never return to the country of his birth. The U.S. is home. "I have good memories of my parents' house and my grandparents' house, and they've been destroyed, so I haven't got a lot of desire to go back," he said.

Instead, Del Alamo's current adventures include visiting family in Charlottesville—where he always attempts to wear maroon and orange—and traveling to Blacksburg for Hokie football games.

Del Alamo embraces his role in helping provide opportunities for current and future Hokies, and he encourages students to make the most of what's available. "Find a program you enjoy, and that will provide you the means to live. Work as hard as you possibly can," he said. "At Virginia Tech, you're going to get the education you need to succeed, but it's going to be up to you to take advantage of it." □

Sookhan Ho is the communications director for the Pamplin College of Business.



COURTESY PHOTO

Jorge Del Alamo



COURTESY PHOTO

Translating on the fly

At home: Anna Bolton '07 scored a dream job as the translator for the Cleveland Indians. Her role takes her from the team's home base, Progressive Field in Cleveland, Ohio, to practice locations and major league venues across the nation.

Anna Bolton dodged the cooler of Gatorade aimed at Cleveland Indians shortstop José Ramírez, but she couldn't avoid the cooler of water that followed. "Bienvenida al equipo," Indians shortstop Francisco Lindor said. Welcome to the team.

Soaking wet but undaunted, Bolton (Spanish '07, M.A. Spanish and second language education '08) carried on in her role as the Indian's Spanish translator by working with Ramírez, who was being interviewed about his game-tying home run in August 2016.

An Indians fan while growing up in Winston-Salem, North Carolina (her cousins were from Cleveland), Bolton has been building toward this job ever since she first went to the Dominican Republic at age 15. The dream position got even better in 2016 when the team played in the World Series.

"Because of the language barrier, fans often do not have the opportunity to get to know Latino players on MLB teams the same way that they know English-speaking players," Bolton said. "I love that I am able to give fans a chance to hear the more in-depth responses that [the Spanish-speaking players] are able to give in their first language, and that fans are able to see a bit more of their personalities." □

Batting 1.000:

Alumna Anna Bolton combined her love of baseball and passion for languages for a winning career. Learn more at vtmag.vt.edu.

Alumni, we want to hear what you've been doing. Mail career, wedding, birth, and death news to Class Notes, Virginia Tech Alumni Association, Holtzman Alumni Center, 901 Prices Fork Rd., Blacksburg, VA 24061; email the news to fleets@vt.edu; or submit the news online at vtmag.vt.edu/submit-classnote.php, where photos may also be uploaded for consideration.

Alumni mailing addresses may be viewed online at alumni.vt.edu/ directory by logging in with your Virginia Tech PID and password. For assistance, call 540-231-6285.

- career accomplishments
- weddings
- births and adoptions
- deceased

'36 William F. Guenther Jr. (MINE), Lake Havasu City, Ariz., 5/14/16.

Cleveland M. Meador (BAD), Charleston, W.Va., 9/14/16.

'38 Karl E. Beisel (EE), Virginia Beach, Va., 3/8/16.

Milton A. Pilcher (EE), McLean, Va., 4/16/17.

Alfred H. Thompson II (AGEC) Falls Church, Va., 8/17/16.

'39 Harry C. Whitlock (AGR), Richmond, Va., 5/5/17.

'40 Philip E. Frankfort (IE), Franklin, Va., 4/14/17.

James G. Walker (BIOL), King Of Prussia, Penn., 4/22/16.

'41 Israel Longman (CE), Livingston, N.J., 1/31/17.

'42 Anne Warriner Holberton (GHEC, MHFD '43), Blacksburg, Va., 4/12/17.

Kermit "Mike" R. Kelley (ACCT), Suffolk, Va., 1/22/17.

'43 E.D. "Gene" Bales (CE '47, CE '47), Chattanooga, Tenn., 4/25/17.

Walter A. Neisz (METE), Virginia Beach, Va., 3/9/16.

'44 Paul B. Bates (CHE, CHE '47), Midlothian, Va., 5/8/17.

Orran O. Hansbarger (IE), Roanoke, Va., 3/8/17.

Aldo M. Pulito (CHE), Orange, Conn., 1/28/17.

Arthur H. Rosenfeld Jr. (PHYS), Berkeley, Calif., 1/27/17.

Anne Slusser Siar (GHEC), Saint Petersburg, Fla., 2/2/17.

'45 Robert C. Flaherty (BIOL), Olney, Md., 1/27/17.

Robert K. Floyd (BAD '48), Danville, Va., 4/4/17.

Jay B. Foote Jr. (EE), Charlottesville, Va., 9/28/16.

William W. Jeffers (IE), Fort Belvoir, Va., 1/17/13.

J.B. Jones (ME '44), Blacksburg, Va., 5/17/17.

Albert W. Hall (ASE '47), Newport News, Va., 4/22/17.

Carl M. Leonard (EE), Hot Springs National, Ark., 1/29/17.

Philip B. Magruder Jr. (BAD '49), Williamsburg, Va., 4/16/17.

Cornelia Nye Mowry (HNF), Hayes, Va., 3/13/17.

Joseph C. Reed (EE '48), Wilmington, Del., 4/20/17.

William A. White (CHE), Madison, W.Va., 11/18/16.

'46 William W. Burke (BAD '49), Leon, Va., 4/1/17.

Thomas W. Gillespie Jr. (FW), East St. Louis, Ill., 2/10/17.

Nancy Galloway Markland (GHEC '49), Spencerville, Ind., 3/15/17.

Norman W. Pedigo Sr. (BAD '49), Bedford, Va., 2/15/17.

Donald F. Reilly Sr. (BAD '47), Midlothian, Va., 1/6/17.

Charles H. Worley (DASC '47), Greeneville, Tenn., 1/26/17.

'47 Alan L. Rhodes (ME), Roanoke, Va., 5/14/17.

Hallie Anthony Slagle (HEED '53), South Boston, Va., 1/23/17.

John W. Watson (BIOL), Raleigh, N.C., 1/27/17.

Kathleen A. King Young (GSC), Blacksburg, Va., 1/31/17.

'48 Roger "Bob" Firstbrook (CE), North Plainfield, N.J., 1/16/17.

Arthur D. Henderson (ME), Charlottesville, Va., 5/20/17.

Milton H. Shackelford (ME '49), Wheaton, Ill., 2/26/17.

Helen Hillman Shears (GSC), Middleburg, Fla., 3/28/17.



Smiling selfie: (top) Matt Winston '90, vice president of alumni relations, snaps a selfie with Reginald Stroble M.A. Ed. '14 and Jummy Olanbanji '06, while Lisa Carter Ellison '86 (above) celebrates at the 2016 reunion. As a student leader, Ellison helped found the Black Cultural Center on campus.

Let's celebrate:

Learn more about plans for the 2018 Black Alumni Reunion by visiting alumni.vt.edu/bar2018.

April 13-15, 2018 | Virginia Tech campus

Every other year, the Virginia Tech Alumni Association hosts its Black Alumni Reunion to celebrate diversity at Virginia Tech and to honor the achievements of black alumni.

This year's reunion will recognize:

- the 50th anniversary of Groove Phi Groove, the first black organization on campus
- the 50th anniversary of the Human Relations Council
- the 25th anniversary of the National Pan-Hellenic Council at Virginia Tech
- the 40th anniversary of the Black Student Alliance
- the 25th anniversary of the Center for the Enhancement of Engineering Diversity

- '49** **Floyd B. Bowles Jr.** (ME), Henrico, Va., 1/16/17.
George L. Britton Jr. (CHE), Williamsburg, Va., 4/7/17.
Roland E. Latta (CE), Farmville, Va., 3/29/17.
Elizabeth "Becky" Gabriel McGann (HEED), Waynesboro, Va., 2/16/17.
A.A. Modena (BAD), Midlothian, Va., 3/8/17.
Dorothy Johnston Moore (CE), Martinsville, Va., 3/9/17.
Joe C. Shaner Jr. (HORT), Lexington, Va., 3/8/17.
Hobart "Hobe" Speegle Jr. (ME '50), Yorktown, Va., 1/23/17.
Chester A. Waldron (ECON), Charleston, S.C., 3/4/17.
Robert B. Younger Jr. (IE), Glen Allen, Va., 4/15/17.
- '50** **Forrest C. Bailey III** (METE), Delatrille, Va., 2/25/17.
Thomas L. Beale (ASE), Willow Street, Penn., 3/22/17.
Horace G. Blalock Jr. (GAG), Evans, Ga., 4/13/17.
Chet A. Duke Jr. (BAD), Timonium, Md., 3/24/17.
James W. Gilkeson Jr. (CE), Harrisonburg, Va., 5/10/17.
Hugh M. Jones (ANSO), Chilhowie, Va., 1/20/17.
William K. Lambert (BAD), Knoxville, Tenn., 4/28/17.
Arthur L. Lane Jr. (BAD '58), Scottsville, Va., 5/16/17.
Leslie M. LaPlace Jr. (ME), Mechanicsville, Va., 4/29/17.
Robert H. Magarian (CE), Richmond, Va., 5/16/17.
William L. Proffitt (ME), Henrico, Va., 1/28/17.
- '51** **Ernest H. Bowling Jr.** (ANSO), Dillwyn, Va., 5/13/17.
Allen R. Cross Jr. (ARE), Atlanta, Ga., 1/31/17.
L.R. "Dee" Deitrick (BC '52), Winter Haven, Fla., 2/15/17.
L. Warren Entsminger (SOC '54), Beckley, W.Va., 1/23/17.
John P. Fairey (EE), Fort Myers, Fla., 1/25/17.
C. Richard Guthrie (AGE), Dublin, Va., 1/28/17.
Leon "Buck" D. Jordan (CHE), Cincinnati, Ohio, 1/18/17.
Berton H. Kaplan (BAD), Chapel Hill, N.C., 5/5/17.
Pauline Scholz Lombardi (GHEC), Broomfield, Colo., 3/12/16.
Charles E. Renner Jr. (CE), Bowie, Md., 3/25/17.
William A. Summerson (ME), Ashburn, Va., 2/24/17.
- '52** **Frank W. Carpenter III** (CE), Matthews, N.C., 5/11/17.
- '53** **F.G. "Fred" Blottner** (ASE, EM '54), Albuquerque, N.M., 5/15/17.
Harry P. Boley Jr. (BAD '52), Burlington, N.C., 2/1/17.
David A. Jones (CE '51, '55), Cocoa Beach, Fla., 1/27/17.
Donald E. Knibb (CE), Greensboro, N.C., 1/29/17.
Frank R. Kwiatkowski (DASC '54), Radford, Va., 4/21/17.
Vernon M. Sheppard Jr. (AGEC '60), Roanoke, Va., 2/7/17.
Stanley P. Stewart Jr. (ARE '52), Herndon, Va., 3/14/17.
- '54** **Donald E. Hayford** (CHEM), Appleton, Wis., 5/15/17.
David P. Olinger (GSC), Tazewell, Va., 3/7/17.
- '55** **John A. Bostian** (EE), Daleville, Va., 3/21/17.
George H. Spruce III (BIOL '56), Greeley, Colo., 5/19/17.
Donovan S. West (BAD), Spartanburg, S.C., 2/8/17.
- '56** **Charles E. Hamner Jr.** (ANSO), Chapel Hill, N.C., was named to WRAL TechWire's Hall of Fame in recognition of lifetime achievement.
- '57** **Harry L. Daughtry III** (BAD), Roswell, Ga., 4/2/17.
Shannon G. Higginbotham Jr. (ANSO), Midlothian, Va., 4/25/17.
Roscoe E. Kirk Jr. (BAD), Blacksburg, Va., 4/20/17.
W. Thomas Moore (DASC), Street, Md., 5/16/17.
C. Crockett Morris Jr. (FW), Waverly, Va., 4/27/17.
- '58** **Theodore M. Cole Jr.** (BAD '61), Fishersville, Va., 5/14/17.
John R. Hinkle (BC), Salem, Va., 3/29/17.
Glenn H. Lineberry (AGEC), Kings Mountain, N.C., 5/24/17.
William Mays (MINE '59), Bedford, Va., 2/8/17.
J.T. "Jim" McMaster (ME '59), Chillicothe, Ohio, 5/12/17.
Clinton "Mike" Robertson (BAD '60), Madison, Va., 2/3/17.
- '59** **S.D.R. Moore** (BAD), Roanoke, Va., was selected for inclusion in the 2017 edition of "Virginia Super Lawyers."
- '60** **James T. Corbett** (CHE), Greenville, S.C., 5/1/17.
Walter A. Leyland Jr. (PHYS), Williamsburg, Va., 3/14/17.
Hunter R. McKenney (IE '61), Rocky Mount, N.C., 2/1/16.
Herbert S. Mollen (VOED), Palm Desert, Calif., 9/28/16.
James R. Nichols (EE), Germantown, Tenn., 2/15/17.
William Joseph Story III (BAD), Waverly, Va., 7/14/17.
- '61** **W. Andrew Beckstoffer** (BC), Rutherford, Calif., was featured on the cover of the June issue of Wine Spectator.
- '62** **Lanny H. Brock** (ME), Saint Simons Island, Ga., 4/9/17.
Kitty Gardner Dickerson (CTRA '63), Columbia, Mo., 1/15/17.
Douglas S. Divers Jr. (EDBS), Roanoke, Va., 1/15/17.
Richard A. Fliess (BC '63), Jacksonville, Fla., 1/22/17.
Fred B. Givens Jr. (AGE), Newport, Va., 4/13/17.
Robert S. Graham Jr. (CE), Greensboro, N.C., 2/23/17.
- '63** **William C. Robertson Jr.** (BAD), Bridgeville, Del., 4/3/17.
- '64** **John "Jack" G. Danz Jr.** (HIST '64), Towson, Md., was certified as a lay minister for the Methodist church in March 2016.
- '65** **Larry T. Frazier** (MATH '71, STAT '72), Purcellville, Va., 4/16/17.
John W. Hall (EE), Pompano Beach, Fla., 4/20/17.
Donald L. Harris (ANSC '65), Pensacola Bch, Fla., 4/21/17.
Richard D. Lunsford (FW '64), Falls Church, Va., 2/13/17.
Robert J. McGhee (ME), Lincolnshire, Ill., 4/18/17.
- '66** **William K. Bair** (DE), Lake Lure, N.C., 1/3/17.
Henry J. Balch Jr. (AGE), Hendersonville, N.C., 3/21/17.
Stephen L. Cohen (ARCH '67), Chester, N.J., 2/12/17.
Vincent F. Ewell Jr. (ECAS), Evergreen, Colo., 4/13/17.
Steven B. Korman (BAD), Milford, Conn., 5/9/17.
John S. Mullins (HIST), Decatur, Ga. 1/17/17.
William H. Von Mahland (ARCH '66), Middletown, Conn., 3/22/17.
Ronald L. Salyer (FIN '66), Roanoke, Va., 5/4/17.
Thomas W. White Sr. (BAD '65), Saint Albans, W.Va., 5/26/17.
Robert C. Whitmore (BAD), Myrtle Beach, S.C., 3/1/17.
John E. Wright (ME), Chester, Va., 4/7/17.
- '67** **Grayson William Marshall Jr.** (MSE), Larkspur, Calif., received an Innovation in Oral Care Award from the International Association for Dental Research and GlaxoSmithKline for work on a remineralizing cement for dental caries.
- '68** **Raymond W. Beaudry Jr.** (EE), Naples, Fla., 5/1/17.
Roger D. Copenhagen Jr. (ANSO), Meadowview, Va., 2/24/17.
William T. Forbes (CE '67), Hampton, Va., 4/22/17.
John H. Lewis (ME), Lynchburg, Va., 3/8/17.
Shirley D. McCormick (EDBS), Wytheville, Va., 8/30/16.
Kerry A. Nothnagel (CE '68), Chesapeake, Va., 3/8/17.
George T. Werner (GSC '66), Richmond, Va., 3/7/17.
- '69** **Asa "Ace" L. Harris** (BAD), Leesburg, Fla., 3/22/17.
Thomas M. Mountjoy (MGT), Naples, Fla., 2/10/17.

'67 Howard R. Dawson (ME), Pulaski, Va., 3/12/17.
Howard P. King Jr. (BAD), Blacksburg, Va., 1/20/17.

'68 Victor E. Sower (CHEM), Huntsville, Texas, co-authored a book, "We Move Our Own Cheese: A Business Fable About Championing Change."

Richard Alley Jr. (BIOL), Clarksville, Va., 4/18/17.
Richard D. Chaises Sr. (MGT '91), Roanoke, Va., 4/6/17.
Martha Guerreiro Valentine (BIOL), Martinsville, Va., 4/7/17.

'69 Jacqueline Dunn Bannerman (ENGL), Bland, Va., 3/18/17.
Stephen J. Conrad (IAED), Harrisonburg, Va., 5/14/17.

hokie business showcase

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Byron E. Wates Jr. (HORT), Clifton, Va., 3/14/17.
G. Rudy Wright Jr. (BAD '70), Conover, N.C., 5/11/17.

'70 Robert A. Davis (GSC), Union Hall, Va., 4/26/17.
J.D. East Jr. (BAD), Houston, Texas, 1/23/17.

Susan A. Fraser (CTRA, EDVT '76), Arlington, Va., 1/31/17.
Michael C. Frieders (ASE, ASE '73), Falls Church, Va., 2/27/17.
George C. Grigg (ARCH), Nashville, Tenn., 1/14/17.
Charles R. Leonard (ME), Little River, S.C., 4/16/17.
G.E. Ludwick (EDBS), Roanoke, Va., 5/22/17.

Steven M. Riddle (BAD), Pompano Beach, Fla., 6/23/16.
George E. Rowand (HIST '71), Orlean, Va., 3/17/17.

Honoring excellence

Tom Tillar's dedication to the advancement of higher education throughout his 46-year career at Virginia Tech was recognized by the Council for Advancement and Support of Education (CASE) during the organization's Summit for Leaders in Advancement held in July. At the event, the former vice president for Alumni Relations, who earned a bachelors in 1969, a masters in 1978, and an Ed.D. in 1993, was presented with the Frank L. Ashmore Award.

James E. Webster III (BAD), Jensen Beach, Fla., 3/7/17.

'71 David Foglesong (BION), San Antonio, Texas, was promoted to professor emeritus of biology at University of the Incarnate Word in San Antonio, Texas.
Nancy Lankford Hargroves (HNF, HNF '73), Manakin Sabot, Va., is president of the National Garden Club, Inc.

Linda Ratcliffe Ayers (HIST), Pulaski, Va., 4/26/17.

Gerald P. Griffith (CHE '72, CHE '72), Seminole, Fla., 4/3/17.
Stephen C. Kenyon (EE), Charlottesville, Va., 4/21/17.

'72 Joseph N. Uzel (ASE), Lake Mary, Fla., retired from Northrop Grumman Corp., where he served as integration and test manager for live virtual constructive mission integration.

Marianne Larkin Berman (HNF '73), Richmond, Va., 3/21/17.

'73 Leonard A. Budsock (SOC '74), Kennesaw, Ga., 1/20/17.
Sidney "Gene" E. Gibson (ESM), Knoxville, Tenn., 1/6/17.
Susan Lambert Odell (FW), Silver Spring, Md., 4/13/17.

'74 James A. Wesson III (FW, FIW '76), Gloucester, Va., retired from the Virginia Marine Resources Commission.

Michael B. Armstrong (BAD '75), Staunton, Va., 1/15/17.
Sanat "Santu" K. Dutta (IE), Mission Viejo, Calif., 10/31/16.



Spirited giving

Supporting student organizations makes a difference

Gobblerfest 2017: Students kick off the fall semester at the annual event, featuring hundreds of student organizations, music, freebies, a food court, and more.

The Commonwealth Kiddush Cup is an online giving challenge between the Malcolm Rosenberg Hillel Center – Hillel at Virginia Tech and the Brody Jewish Center – Hillel at UVA. Not only does the winner get bragging rights, but Hillel leadership at the losing school must wear the winning school's gear.

Sue Kurtz, executive director of Hillel at Virginia Tech, said her organization takes advantage of the rivalry, which helps engage young alums and grow new donors. "Young alumni are remembering their experiences and living their values—values that were reinforced, not only from academic life in college, but from their time spent in Hillel," she said.

Joining in the friendly competition is just one way for Hokies to support student organizations.

At Virginia Tech, there are approximately 800 student organizations that bring programs and community to campus. They encourage students to get involved, provide opportunities for service and learning, and enhance the university experience.

In addition to maintaining strong connections to the university after graduation, many alumni continue to give back to the orga-

nizations they enjoyed as students by mentoring current members, sharing programming ideas, and supporting activities and events.

In spring 2017, the university initiated a new platform for giving that enables alumni, students, and friends of the university to directly support projects and programs across campus. Aptly named Jump, so far crowdfunding has secured more than \$6,000 in financial aid to the Beyond Boundaries Scholars program, supported the student-led management of Relay for Life, fueled research for concussion prevention in youth soccer, and enabled more than 1,200 schoolchildren to have an inspiring experience at the Moss Arts Center. □

Coming soon:

TUESDAY
20
 MARCH
GIVING DAY

Jump in:

To support student organizations at Virginia Tech, go to alumni.vt.edu/studentorgs.



Gateway to Sunshine, April 6-22

The sunny scenery of Central America awaits you after you embark on the luxurious Marina in iconic Los Angeles. Visit Cabo San Lucas, Acapulco, Puerto Quetzal, San Juan del Sur, and other amazing destinations before you disembark in Miami.

2018 Alumni

travel tours

LIVE, LOVE, and TRAVEL

Join the Traveling Hokies on a journey of exploration, learning, and discovery this year. For nearly 45 years, the Virginia Tech Alumni Association has offered quality group travel to alumni and their family and friends. Our trips will allow you to broaden your horizons and breathe in adventure.

For a full list of the 2018 destinations, visit us on the web at alumni.vt.edu/travel.

Expedition to Antarctica | Jan. 4-17

Tahiti and French Polynesia | Feb. 6-16

Great Trains and Grand Canyons | March 18-23

Gateway to Sunshine | April 6-22

Southern Grandeur | May 6-14

Riviera Rhapsody | May 9-17

Gems of the Danube | May 14-24

Virginia Tech Grad Trip | May 20-June 6

Isle of Enchantment | June 7-18

 alumni.vt.edu/travel

For more information about this trip and other Alumni Association travel tours, go to alumni.vt.edu/travel.



What next? Tapping into the Hokie network

No matter what your degree or where you are in your career, as a Hokie you have access to job boards, networking opportunities, career tips, videos, and much more. The Alumni Association, the Office of Career and Professional Development, and college-based career centers offer professional development programs, lifelong learning opportunities, and career and networking events. Not sure where to start? The Alumni Association helps Virginia Tech graduates navigate the wealth of career resources available.



Career-oriented:

Visit alumni.vt.edu/careers to learn more.

The power of your alumni network

The Virginia Tech Alumni Association has more than 100 chapters across the country and around the world. Our chapters build strong relationships among alumni, students, parents, and their local communities. Several chapters host alumni career fairs, including our largest chapters—the National Capital Region and Richmond.

Virginia Tech also hosts networking events across the globe that provide opportunities to connect with fellow alumni and industry experts in a variety of career fields and regions—from Silicon Valley to Wall Street. Through these events, alumni share experiences, build professional networks, and explore industry trends.

The Alumni Association LinkedIn Group and the university LinkedIn page provide immediate access to over 200,000 Hokies. Through these online resources, alumni are able to connect by vocation, company, industry, or region.

Candid videos

The Office of Career and Professional Development has partnered with CandidCareer.com to offer a free resource for students and alumni. Candid Career hosts thousands of videos featuring informational interviews with professionals from varying industries. The videos offer tips to give you an edge in your employment search. Visit career.vt.edu/exploring/candid_career for more information. □



Students involved in Commodity Investing by Students meet to discuss investment portfolios.



Meghan Oakes '15 capitalized on her experience in the Hokies on the Hill internship program to land a job on a U.S. representative's staff.

You're hired

The cover feature of the fall 2015 issue of Virginia Tech Magazine highlighted the networking power of the Hokie Nation. Learn more about how alumni, students, and the university work together to create jobs, usher Tech graduates into the professional world, and build the reputation of the Hokie Nation at vtmag.vt.edu.



COURTESY PHOTO

Be an inspiration for just about anyone

Kristi Hedges (communications '92) is a leadership coach to senior executives and C-level leaders at companies around the world. Recognized for her expertise in leadership communication, she's authored two books, "The Power of Presence" and "The Inspiration Code."

For "The Inspiration Code," which was released in 2017, Hedges spoke with hundreds of leaders to identify behaviors that profoundly affected them. What she learned challenged conventional wisdom. "My research found that inspirational leadership isn't about captivating personalities or grand visions," said Hedges. "It's about small moments of real connection."

Hedges' findings suggest that whether work takes place in the executive board room, at a community volunteer venue, or even within a family, there are five practices that contribute to becoming an inspiring leader.

Be present

The individuals interviewed frequently described how meaningful it was when leaders made time to truly focus on them at key moments. They weren't distracted or rushed, but prioritized the person in front of them. The amount of time involved wasn't as significant as the willingness to be in the moment.

"It blew me away to hear how many times something said in 10 minutes was carried by another an entire lifetime," Hedges said.

Listen well

Open, attentive listening was the most-cited inspirational behavior in Hedges' research. "When we listen, we create space for another person to have their own insights. We don't make it our agenda, but let it be their agenda," she said. For the person speaking, listening feels like care, and attention feels like respect.

Call out potential

The simple act of highlighting the capacity we see in another person can change what they see as possible for themselves. According to Hedges, most of us understand the specific skills of the people around us, we just have to remember to recognize those attributes often and out loud. Calling out someone's strengths supercharges their growth.

Show emotion

Perfection, reserve, stoicism—none of those motivate like authenticity. "We're inspired by people who are real and can connect on a human level no matter their stature," Hedges said. "We need to see how much our leader cares to determine how much we should care."

Talk about purpose

Inspirational leaders engage in a larger conversation about purpose and help others to connect the threads between what they're doing now and what they want for themselves moving forward. They model a purpose-driven life, serving as catalysts for meaning, which encourages others to follow suit. □

Kristi Hedges '92 writes about leadership for Forbes, and her work is periodically featured in Harvard Business and The Wall Street Journal and on CNBC. She founded and manages The Hedges Company and is a faculty member of the Georgetown University Institute for Transformational Leadership. At Virginia Tech, Hedges was inducted into Phi Beta Kappa and was selected as the Outstanding Senior for the College of Liberal Arts and Human Sciences.

'78 **Dennis H. Treacy** (FW), Hanover, Va., was elected chairman of the Virginia Chamber of Commerce Board of Directors. He is also the Virginia Tech Board of Visitors rector for 2017-18.

Robert W. Brooks (BIOL, MICR '83), Acworth, Ga., 12/26/16.

W. Terry Dickey (FW), Greensboro, N.C., 5/11/17.

Michele B. McQuigg (EDAC), Woodbridge, Va., 2/16/17.

Peter M. Preisner (ETM), Quinton, Va., 2/2/17.

Gary E. Snapp (MGT), Strasburg, Va., 5/12/17.

'79 **Louis T. Levy** (EDSP), Nebraska City, Neb., is a consultant assisting qualified students from Shanghai, China, with enrollment in American colleges and preparatory schools.

Mark R. Smith (FW), Montpelier, Va., 2/28/17.

Scott H. Williams (MKTG), Charlotte, N.C., 5/11/17.

'80 **Robert B. Anderson Jr.** (EDAD), Bland, Va., 4/24/17.

Robert "Jack" O. Briscoe (EDAD), Abingdon, Va., 2/9/17.

Michael C. Dalton (IEOR), Byhalia, Miss., 2/17/17.

David P. George Jr. (MKTG), Sugar Land, Texas, 4/28/17.

Edward L. Goforth Jr. (FW), Richlands, Va., 4/28/17.

William "Wes" Hogan (CE), Lynchburg, Va., 1/30/17.

'81 **Karl S. Hossli** (ARCH '87), Hilton Head Island, S.C., 12/31/16.

Bruce R. Jones (GEOL), Norfolk, Va., 2/18/17.

Richard L. Kelly (AE '94), Clifton, Va., 5/7/17.

Kevin W. Martin (FIN), Roanoke, Va., 3/9/17.

Betty Howard Peters (EDAD, EDAD '87), Hampton, Va., 3/3/17.

Jean C. Robbins (HNF '81), Buchanan, Va., 5/5/17.

'82 **Jane Huff Austin** (CHE), Avondale, Penn., is senior vice president, integrated supply chain, for Hexcel Corp.

Robin D. Dalmas (ENGL), Redmond, Wash., authored a book, "Boisterous Bird of Paradise: Nonfiction Tales of Travel, Sailing, and Love."

Ellen M. Buck (BIOC, VM '86), Davidsonville, Md., 1/24/17.

Karen Throckmorton Zekert (MGT), Mechanicsville, Va., 1/24/17.

V. Randall Tinsley (FIW), Summerfield, N.C., was recognized in the 2017 edition of Chambers USA: America's Leading Lawyers for Business.

Matthew S. Duggan (ME), Clemmons, N.C., 2/20/17.

William E. Fish (AOE), Pataskala, Ohio, 4/4/17.

John W. Tuttle (CS), Stanardsville, Va., 2/9/17.

Gregory W. Updike (FIN), Fairfax, Va., 4/2/17.

'85 **Jeffrey S. Midkiff** (MUS), Blacksburg, Va., was the recipient of 2017 Yale Distinguished Music Educator Award. He also performed an original concerto, "From the Blue Ridge," at The Kennedy Center along with the Boulder Philharmonic.

Susan Saboe Springirth (ACCT), Carmel, Ind., is vice president of finance at the Virginia Tech Center for the Performing Arts.

Belinda Stone Carroll (FW, EDVT '96), Blacksburg, Va., 3/21/17.

Beverly D. Pinckard White (ANSC), Virginia Beach, Va., 3/16/17.

H. Thompson "Huntley" Kendall (ID), Virginia Beach, Va., 4/22/17.

'86 **Matthew R. Heffernan** (COMM), Spartanburg, S.C., is director, master control hubs and project services for Nexstar Media Group.

James B. Lackey (AOE), Madison, Ala., is senior vice president of Quantum Research International in Huntsville, Ala.

Carol J. Mahmood (HIDM), Blacksburg, Va., 5/25/17.

Timothy P. Michael (EDSS), New Hope, Penn., 5/6/17.

'87 **Jeannine E. Beaudoin**

James (COMM), La Plata, Md., is the first female mayor of La Plata, Md.

Percival G. Ricketts (POUL), Pembroke Pines, Fla., has developed a new record-keeping tool to help patients log their progress between visits for medical or mental health services.

James D. Godek (MGT), Virginia Beach, Va., 2/18/17.

Mitchell W. Holshouser (FIN), Chesterfield, Va., 4/28/17.

Judith G. Patterson (GEOL), Montreal, Quebec, 1/27/17.

'88 **Robert M. Brooke**

(MKTG), Fairfax, Va., was selected as a U.S. Small Business Administration 2016 Tibbets Award winner for contributions to the Small Business Innovation Research Program.

Steven Patrick McConnell (FOR), Spokane, Wash., was named city forester for Billings, Mont.

STAY CONNECTED!

Make sure the university has your up-to-date mailing/contact information. Use your Virginia Tech PID and password to view and make corrections to your mailing address, email address, and other information. You can inspect and update your alumni profile anytime, from anywhere.

It's easy to update your contact information and email address at vt.edu.

- Choose Hokie SPA from the Quicklinks dropdown
- Login with your VT PID and password
- Choose "Hokie Plus"
- Then choose "Update Address(es) and Phone(s)" or "Update Alumni Email Address(es)"

You can also email your updates to alumnidata@vt.edu. Make sure you include your full name and class year in the email.



Virginia Tech Alumni Association 2016-17 chapter awards



Outstanding Chapter Award

Bronze

Dallas/Fort Worth
Knoxville
North Alabama
Orange County
Southeastern Michigan
Southwest Virginia
Triangle

Silver

Alleghany Highlands
Baltimore
Chicago
Fauquier
Fredericksburg
Greater Seattle
Minnesota
New England
New River Valley
San Diego
Williamsburg

Gold

Atlanta
Central Florida
Central Pennsylvania
Central Virginia
Charleston
Charlotte
Denver
First State
Jacksonville
Middle Tennessee
National Capital Region
N.C. Triad
Palmetto
Richmond
San Antonio
Shenandoah
Tidewater

Superlative Awards

Outstanding Chapter Event

Chicago Chapter,
Virginia Tech vs. Notre Dame Bus Trip
Tidewater Chapter,
Tidewater Tailgate for Coach Beamer

Outstanding Community Service Project

Tidewater Chapter,
Salvation Army Christmas Depot

Outstanding Fundraising Event

Pittsburgh Chapter,
Virginia Tech vs. University of Pittsburgh Tailgate

Outstanding Chapter Networking Event

National Capital Region Chapter,
Graduate School Alumni Networking Event

Outstanding Chapter Marketing Program

Jacksonville Chapter

Innovation Award

Shenandoah Chapter,
Hokiepreneur Newsletter

Broadening Alumni Engagement Award

Fauquier Chapter,
Warrenton Spring Festival

Most Improved Chapter

Central Virginia Chapter

Outstanding Chapter Volunteer

Patrice Strachan '80, Richmond Chapter

Outstanding Chapter Officer

Brent Blevins '03, National Capital Region Chapter

Outstanding New Chapter

Vandalia Chapter

Marc T. Steiner (ECAS), Chesapeake, Va., was honored with the third annual Franchise Action Network of the Year Award by the International Franchise Association.

Audrey L. Anderson Biggs (ENGL), Dublin, Va., 1/6/17.

Steve M. Hankinson (FIN), Ashburn, Va., 4/24/17.

Taylor R. Johnson (LASC), Richmond, Va., 3/26/17.

'89 **Joseph W. Guthrie** (AGEC), Dublin, Va., is senior instructor in the agricultural technology program at Virginia Tech.

Robert C. Lowerre (PSCI), Glen Allen, Va., is director for the Maggie L. Walker Governor's School for Government and International Studies in Richmond, Va.

E. Austin Short III (FW, FOR '91), Georgetown, Del., is deputy secretary of agriculture for Delaware.

Jamie C. Perrine Stewart (COMM), Portsmouth, Va., earned her Ed.D. in higher education from Regent University and also received the 2017 Award of Excellence for Outstanding Ed.D. Graduate.

Jennifer E. Hooper (FIN), Springfield, Va., 3/27/17.

'90 **Alan L. Eisenberg** (COMM), Burke, Va., published his second novel, "Crossing the Line," which focuses on the long-term damage of bullying.

Jon R. Smibert (UA), Dulles, Va., is a finalist for the Samuel J. Heyman Service to America Medal for his work reforming Albania's criminal justice system.

Susan M. Webb (MGT, BAD '92), Spring, Texas, was promoted to vice president of human resources/surface technologies for TechnipFMC in Houston.

Susan R. Lawrence (EDSP), Apex, N.C., 2/2/17.

Michael D. Monk (MINE), Tazewell, Va., 5/2/17.

Sherman L. Lewis III (ECAS), Pearland, Texas, is chief executive officer of the Lewis Group, LLC.

Heather M. Bishop Bryson (MKTG), Woodstock, Ga., 3/22/17.

'91 **Christopher L. Bennett** (FIN, ACCT), Vienna, Va., was named vice chair of the Hospitality and Gaming Group for Eckert Seamans Cherin & Mellott.

Laura W. Fornash (MKTG, HTM '98), Richmond, Va., is senior vice president and co-leader of McGuire Woods Consulting's National Education Practice.

Diana L. Zehrer Connolly (MSCI), Papillion, Neb., 4/8/17.

'92 **Chandrika J. Bhalla** (BAD), Pleasanton, Calif., is senior vice president and chief financial officer for Kaiser Permanente Northern California.

Kristi L. Hedges (COMM), McLean, Va., authored a book, "The Inspiration Code: How Leaders Energize People."

Patrick S. Larkin (HORT), Nashville, Tenn., is executive director of Daniel Stow Botanical Garden in Belmont, N.C.

Thomas D. Mays (HIST), Eureka, Calif., has authored his fourth book, "American Guerrillas: From the French and Indian Wars to Iraq to Afghanistan - How Americans Fight Unconventional Wars."

Milton R. Liverman (EDAD, EDAD '97), Suffolk, Va., 2/2/17.

'93 **Shannan A. Billings** (CHE), Chattanooga, Tenn., received the Women in Manufacturing STEP (Science, Technology, Engineering and Production) Ahead Award from The Manufacturing Institute.

Richard A. Collie (BIOL), Radford, Va., 4/30/17.

'97 **William B. Lamb** (BMGT), Needham, Mass., is dean of the Hagan School of Business at Iona College.

David L. Jackson (PHED, EDPE '99), Blacksburg, Va., a daughter, 4/05/17.

Keith D. Switzer (ID) and Jill Thompson Switzer (ITDS '10), Fairfax, Va., a daughter, 2/5/17.

Matthew J. Lanz (BIOL), Canonsburg, Penn., a son, 4/14/17.



COURTESY PHOTO

Robert J. Mills Jr. '94, from Briar View Farm in Pittsylvania County, Virginia, has been named the 2017 Virginia Farmer of the Year. A member of the Virginia Tech Board of Visitors, Mills has made a name for himself as an innovative and diversified producer. For more about Mills and the award, visit vtmag.vt.edu.

Laura M. Casella (LASC), Roanoke, Va., 5/1/17.

Almira J. Leslie (VM), Seattle, Wash., 3/10/17.

Sarah Brown Steuteville (FOR), Ithaca, N.Y., 3/10/17.

Jym G. Boucher (ACCT), Annandale, Va., 4/9/17.

Mitzi L. Frank (PSYC '97), Palm Beach Gardens, Fla., 3/19/17.

'99 **Crystal F. Graham** (COMM), Waynesboro, Va., was named Virginia area director for the American Foundation for Suicide Prevention.

Steven K. Kuntz (CE), Haymarket, Va., was named a 2017 Top Young Professional by ENR MidAtlantic.

Janet Broadley Densmore (EDCO), Roanoke, Va., 3/9/17.

'00 **Kimberly Dail Forbes** (PUA), Chesapeake, Va., was named a 2017 Top Young Professional by ENR MidAtlantic.

, **Noah D. Conner Jr.** (MATH '01), Christiansburg, Va. a daughter, 1/18/17.

Stephen J. Korving (FIN) and **Megan Halstead Korving** (FCD '01, EDCI '02), Chesapeake, Va., a son, 1/25/17.

Matthew J. Lanz (BIOL), Canonsburg, Penn., a son, 4/14/17.

Virginia Tech Magazine online

We have so much news to share, there just isn't enough space in our printed version. Visit us at vtmag.vt.edu to read even more stories about your fellow Hokies, find links to events and campus activities, and stay up-to-date on university news.



Stepping up

by MASON ADAMS

On foot: Sebastien Jacques '11 walked from Virginia Beach, Virginia, to Santa Monica, California, to demonstrate the power of persistence.

What began as a typical day on the practice court at Virginia Tech for then-senior Sebastien Jacques ended in a bout of dizziness that would not only change his game, but would profoundly affect his university experience and his life.

A Tech tennis standout, Jacques (marketing management '11) had been named to the All-ACC Academic men's tennis team and the ACC Academic Honor Roll. Over his four years, he racked up a 64-36 record in singles and 64-43 in doubles.

Jacques was a focused competitor with a passion for improving his game. So, although that moment on the court gave him pause, he ignored the dizzy feeling, determined to play through it.

Shrugging off the symptoms worked for a while. Yet, as the days passed, his struggles grew, both on the court and off. After two increasingly tough weeks, Jacques sought help from tennis coach Jim Thompson, who suggested that he visit a doctor.

The diagnosis: a pineal cystic tumor. The tumor, located on his brain, was creating pressure within his head, sapping his energy and interfering with his ability to concentrate. Eventually, it would result in loss of motor skills, making it difficult for the former tennis star to complete simple tasks or even walk across a room.

The fatigue, dizziness, and inability to focus overshadowed his senior year and continued to nag at him for four years after he graduated. The doctors in Jacques' native Canada, however, weren't convinced the tumor was behind his troubles and declined to operate, deeming the brain surgery too risky.

Jacques, who was accustomed to overcoming challenges on the court, refused to accept that this would be his lot in life. Instead, he poured his efforts into researching the problem online.

In 2014, Jacques' commitment paid off. Through his online research, he found a doctor in Santa Monica, California—Daniel Kelly—with extensive experience in the kind of surgery needed to remove the tumor. With the Canadian health care system unwilling to pay for the procedure, Jacques embarked on a campaign to raise the funds himself. Ultimately, his friends, supporters from the tennis community, and members of the Hokie Nation contributed \$110,000 toward the surgery.

On Feb. 12, 2015, Kelly removed the tumor from Jacques' brain. The surgery was a success, and following a lengthy recovery period, Jacques pursued tennis again, taking a job as an instructor in Australia.

Walk on:

For pictures, videos, and Jacques' personal reflections about his journey, go to vtmag.vt.edu.



MAI KHANH NGUYEN

As Jacques' new co-workers and students learned about his experiences, he was invited to speak to families facing serious health issues. Inspired by how his experiences might offer hope to others, Jacques began to think about how to take his message to an even larger audience.

So it was that Jacques began to walk across America. His goal was simple: to raise awareness of the power of persistence, one step at a time. His trek started in his native Canada with a walk from Magog to Montreal and then to Quebec City.

Then, on April 21, Jacques started across the United States with a plan to traverse from Virginia Beach to California.

In early May, Jacques reached Blacksburg, walking up Beamer Way cheered on by a group of about 25 people, including his old coach and current tennis team members.

"This is absolutely amazing," said Jacques, beaming, as he embraced old friends.

The moment marked a homecoming, but also a turning point in his journey. Jacques' mom had followed him by car as he walked with a stroller to carry supplies that bore a sign reading "Walk Across America," along with his website and social media handle. After Blacksburg, however, he'd be on his own, moving at a pace of about 25 miles per day. Jacques ended his 3,000 mile trek in September walking into Santa Monica, California, to Providence Saint John's Health Center, where he had received the life-changing surgery.

Jacques hopes his story will inspire others during tough times. "If you've got your health, you're good to go," Jacques said. "You can make it, even if you're just taking it one day at a time." □

Plants that roar

Topiary, which can be traced back to the gardens of ancient Egypt, Persia, and Greece, is one of the oldest and most familiar types of living sculpture. In theme parks and on the grounds of many modern botanical gardens across the U.S., talented designers have taken the art to a new level.

For Joe Parr (horticulture '83), director of horticulture at Busch Gardens and Adventure Island, Tampa, Florida, these giant topiaries are the result of months of planning, careful construction, and fastidious plant maintenance. "What I try to do is to create planting designs that you can't ignore," said Parr. "Topiaries take plants off the ground and put them right in your face."

Parr leads the team of landscape artists who transform the green spaces throughout the 335-acre park into magnificent canvases where art comes alive. This year, his designs have been nominated for a prestigious National Design Award, sponsored by the Cooper Hewitt, Smithsonian Design Museum. □



COURTESY PHOTO

The Spirit of Spring is a giant topiary at Busch Gardens designed by Joe Parr '83.

It's alive:

To learn more about Joe Parr and to view a gallery of his living sculptures, visit vtmag.vt.edu.

'01 **Travis E. Hardy** (GEOG), Leesburg, Va., a daughter, 2/18/17.

'05 **Brian V. Bowman** (ART), Ashburn, Va., 4/1/17.

Christopher S. Rogers (VM), Roanoke, Va., 4/6/17.

'02 **John T. Farnum** (PSCI), Arlington, Va., is partner in the Commercial Litigation/Bankruptcy Group with Linowes and Blocher LLP in Bethesda, Md.

Courtney Perschall Nalty (AHRM), New Orleans, La., will serve as secretary for the Junior League of New Orleans Board of Directors for the 2017-18 term.

Jaclyn B. Shipley (BIT), Chapel Hill, N.C., a son, 4/26/17.

Anthony J. Timpano (ENSC, ESEN '11) and **Autumn Clapp Timpano** (BIOL '03, PH '13), Christiansburg, Va., a daughter, 10/13/16.

'03 **Kristin Donnally Doller** (ACIS), Trophy Club, Texas, is principal, investor relations for Sabre at the NASDAQ in New York City.

Felicia M. Rankin Qashu (BIOL), Germantown, Md., is a health science administrator in the Office of Strategic Coordination, Division of Program Coordination, Planning, and Strategic Initiatives for the National Institutes of Health.

Kristin Donnally Doller (ACIS), Trophy Club, Texas, and Jonathan Doller, 2/28/17.

Kelly A. Hughes (HNFE), Chamblee, Ga., a son, 4/14/17.

Jeremy R. Moss (PSCI, SOC), Norfolk, Va., a son, 4/23/17.

Emily B. Peterson (COMM), Chicago, Ill., a daughter, 12/25/16.

'04 **Cliff Hyra** (AOE), Mechanicsville, Va., is the Libertarian Party candidate for the gubernatorial race in Virginia.

Lindsay P. Reames (AAEC, PAPA '06), Amelia Court House, Va., was appointed assistant secretary of agriculture and forestry of Virginia by Gov. Terry McAuliffe.

Pablo A. Tarazaga (ME, ME '09), Blacksburg, Va., received the John R. Jones III Faculty Fellowship in mechanical engineering from the Virginia Tech Board of Visitors.

Teresa Cimorelli Willis (MATH), Springfield, Va., is an assistant professor at George Mason University.

Karina K. Cheung (PHYS '04, GEOS '05, GEOS '12), Houston, Texas, and Ian McGlynn, 2/28/16.

Carolyn Penry Fisher (CE), Columbia, S.C., a son, 3/25/17.

'05 **Matt Hepler** (GEOG), Norton, Va., was named central Appalachian water scientist for Appalachian Voices.

Eugene Jackson Jr. (MKED), Fredericktown, Mo., was named publisher of the Daily Journal in Park Hills, Mo.

Brigitte K. Orrick (FPR), Colorado Springs, Colo., was named director for grants for Pikes Peak Community College.

Christopher J. Parker (HNFE), Concord, N.C., is executive director of the National Junior College Athletic Association.

Brendyn A. Ward (ARCH), Yorktown, Va., is an associate with Commonwealth Architects in Richmond, Va.

James T. Scanlon (MKTG, COMM) and **Emily J. Olsen** (MKTG '08), Burke, Va., 5/7/16.

Laura King Schinkel (HD), Colonial Heights, Va., and Marcus Schinkel, 10/22/16.

Clara Cullen Sharp (PSCI), Chappaqua, N.Y., a daughter, 9/23/16.

Jonathan M. Tremonte (CS), Alexandria, Va., a son, 9/16/16.

'06 **Mittal Desai** (BIT), Fairfax, Va., received the 2017 Federal 100 Award from Federal Computer Week.

Catherine J. Huff (COMM), Forest, Va., was selected for inclusion in the 2017 edition of "Virginia Super Lawyers."

Stacy C. Whipple Daley (FIN) and **J. Charles Daley** (FIN '09), Fairfax, Va., a daughter, 3/17/17.

Benjamin W. Deen (MKTG) and **Cynthia Ahari Deen** (AHRM '07), Leesburg, Va., a son, 12/24/16.

Joshua D. Elliott (PSCI, MGT), Glen Allen, Va., a daughter, 3/3/17.

Heather Hewitt Lockridge (AAEC), Winchester, Va., a son, 8/12/16.

'07 **Christian M. Barlow** (BIOL), Manteo, N.C., is chief resident at Pennsylvania Hospital/University of Pennsylvania Health System.

Daniel S. Cheatham (ENGL, EDCI '08) and **Megan E. Hoops** (IDST '11), Chesterfield, Va., 10/22/16.

Leigh B. Rogers (HNFE), Sparks, Md., 2/17/17.

'09 **Adedoyin O. Adewodu** (EE), Veronica Gentry Adewodu (ACIS '08), Crofton, Md., a daughter, 7/20/16.

Aimee Lane Fausser Hawkaluk (IS) and Justin Hawkaluk, Montana City, Mont., 9/2/16.

Carolyn Penry Fisher (CE), Columbia, S.C., a son, 3/25/17.

John Christopher Flores (MKTG) and **Molly Joy Flores** (AHRM), West New York, N.J., a daughter, 05/21/17.

Andre J. Ford (MGT) and **Megan Moriarty Ford** (PSYC '08), Glen Allen, Va., a son, 2/26/17.

David A. Machaj (CS, CSA '09) and **Erin R. Machaj** (AHRM '08), Redmond, Wash., a daughter, 11/16/16.

Jennifer Sue Harris Miller (HNFE), Locus Hill, Va., a daughter, 10/3/16.

Gregory J. Sagstetter (PSCI, PHIL), Moseley, Va., a daughter, 4/9/17.

Mark R. White (CS), Leesburg, Va., a son, 3/23/17.

Charity Kimpel Zajac (HTM) and **Michael P. Zajac** (FIN '08, MGT '08), Salisbury, Md., a son, 10/30/16.

Bryan L. Griffith (ENGL), Richmond, Va., 2/22/17.

'08 **Luis O. Velez Alvarez** (ARCH), New Carrollton, Md., received the American Institute of Architects 2017 Young Architects Award.

Phillip Chong (PSCI, AAEC), Baltimore, Md., was the keynote speaker at the 47th Annual Korean American Education Foundation Dinner.

Ashley N. Duncan (CE), Etters, Penn., was promoted to senior engineer for the solid waste department with Barton & Loguidice.

Megan C. Mather (BIOL), Allison Park, Penn., is a physician for Baylor Scott & White Healthcare System.

Manisha P. Patel (ECAS, HIST), Greensboro, N.C., was selected for the North Carolina Bar Association Leadership Academy Class of 2017.

Paul D. McLean (ELPS), Newport News, Va., 1/15/17.

Brian Akinyanju (BIT) and **Behnaz Bonyadian** (BIOL, IS '09), Washington, D.C., 3/31/17.

Shari Baloch Delung (SOC) and **Joshua A. Delung** (COMM '09), Sterling, Va., a daughter, 1/17/17.

Brian M. Jasion (CE, CE '09) and **Patricia Adkins Jasion** (CHE '11), New Kent, Va., a daughter, 1/2/17.

Stephen A. Guardipee (EPP) and **Laura K. Guardipee** (EDCI '15, GSCR '15, HIST '15), Charlotte, N.C., 4/29/17.

Leigh B. Rogers (HNFE), Sparks, Md., 2/17/17.

'09 **Katherine Huffman Bau**man (HNFE) and **Scott M. Bauman** (ENSC '15), Glenmoore, Penn., 11/6/16.



Imagine that: Over the summer, Kevin Jones '14 (below), a founding member of JoBa Design, interacted with rising seventh-and eighth-grade students during the Imagination day camp organized through the College of Engineering's Center for Enhancement of Engineering Diversity.

Paying it forward, Hokie-style

by TRAVIS WILLIAMS

More than a decade removed from crafting his way to the end zone in Lane Stadium, Kevin Jones (industrial design '14) is still helping design wins for Virginia Tech.

Since founding JoBa Design in 2015, Jones and co-founder Alex Barrette (industrial design '14) have sold thousands of "Gokies," helped design athletic facility upgrades, and provided numerous university students with real-world experiences through internships.

"Tech has made us better people. We've grown since we've been involved with [the university], so we want to give back to [it]," Jones said.

The desire to stay connected to their alma mater drove their 2016 decision to relocate to the Virginia Tech Corporate Research Center. Today, that office is buzzing with employees and interns working on everything from building interiors to utensils for toddlers.

Jones and Barrette became friends when Jones returned to Virginia Tech in 2010 following his NFL career.

As part of an industrial design class, the pair partnered on a project. "Long story short, we asked our professor if we could work on a thesis project together, and the excuse was, 'we're thinking about starting a company after school and we want to test this out,'" Jones said.

The Gokie was one of the first products the team created. The goal for the Gokie, a keychain in the shape of a turkey track, grew from a desire to unite Hokie fans during the "key play" tradition on third downs during football games. "We thought if we could create a product where everybody was shaking the same thing, then we'd be a part of Virginia Tech history," Jones said.

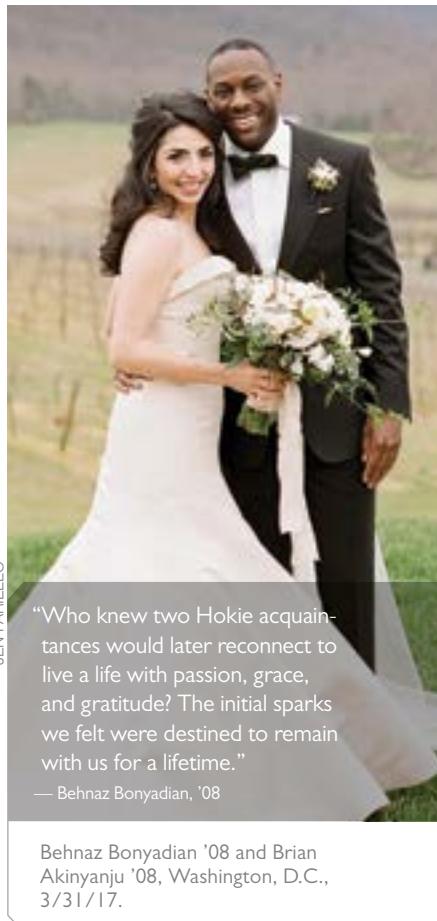


In addition to developing their own ideas, JoBa Design works with clients to breathe life into entrepreneurial visions. Such was the case when Kiyah Duffey, co-founder of Kizingo LLC, had an idea for a spoon for toddlers that would encourage successful self-feeding. In 2017, the spoon JoBa designed with Duffey was named a silver award winner in the European Product Design Awards held annually in Brussels, Belgium.

Associate Professor of Industrial Design Brook Kennedy, who taught both Barrette and Jones, said JoBa's award-winning work is an asset for the New River Valley's growing startup environment and current Tech students.

"So often our students leave right after graduation for jobs in the Silicon Valley, Chicago, New York, and other cities, so it is great to see [Kevin and Alex] stay and help contribute to building the local economy," Kennedy said.

If Barrette and Jones have it their way, paying it forward will become a long-standing tradition for their company. "That's what JoBa is—that holistic experience—and we're trying to help students get that locally," Jones said. □



You help tell our story

by MARK S. LAWRENCE '80

I'm a proud Hokie and longtime member of the Virginia Tech Alumni Association's Board of Directors.

As the recently appointed board president, I want all Hokies to know that staying active and remaining engaged is essential to our university's success. You help tell our story. You help move us forward. Virginia Tech depends on you. How can you help? Here's how:

- Be an ambassador for the university that has supported you by sharing what makes our community special and advocating for issues that support higher education.
- Mentor other Hokies. Give back to a new generation and offer guidance to those beginning their journey.
- Connect with your local alumni chapter. Meet Hokies in your area, volunteer with them, have fun with them.
- Make a gift. Alumni generosity fuels research, teaching, and innovation. It's also one of the most watched indicators of quality in higher education. When you give, it helps all Hokies, present and future. It's living *Ut Prosim* and building a better Virginia Tech.
- Visit campus often. You'll have a new opportunity to do that this summer as we make a change to how we hold reunions.

The Virginia Tech Alumni Association will hold its first-ever reunion weekend, June 7-10, 2018. It's a new tradition for us and one we know will be a destination for alumni. We expect it will be one of the largest on-campus gatherings of Hokie alumni.

The new reunion weekend will not affect Homecoming or the 50th reunion, which will still occur each fall. Specialty reunions and college tailgates will also take place as usual.

We believe hosting one large weekend, rather than a handful of weekends throughout the fall, means a better experience. It's a chance to spend more time in Blacksburg connecting with more Hokies and experiencing campus like never before.

Please join us. We can't wait. □

Mark S. Lawrence (business administration '80) is vice president of governmental and external affairs at Carilion Clinic and president of the Virginia Tech Alumni Association Board of Directors.

Reunion 2018: our first ever reunion weekend

Join us June 7-10, 2018
Learn more online at:
alumni.vt.edu/reunion2018

Kevin S. Jones Sr. (IDS), Blacksburg, Va., is a co-founder of JoBa, a design firm that was named a silver award-winner in the European Product Design Awards for the Kizingo toddler spoon.

Brian F. McNulty (ME), Orlando, Fla., is a planner with Walt Disney World.

Benjamin A. Shryock (WSCI), Blacksburg, Va., is a park ranger for Alaska state parks.

'15 **Paige E. Kassalen** (EE), Pittsburgh, Penn., was selected to the Forbes Thirty under Thirty Class of 2017.

obituaries

Jessica K. Li (HNFE, BIOL), Martinsville, Va., received the inaugural Richmond Academy of Medicine medical student scholarship at Virginia Commonwealth University School of Medicine.

Thomas J. Grizzard, Jr. (civil engineering '68, M.S. '72, Ph.D. '77), professor emeritus of civil and environmental engineering in the College of Engineering at Virginia Tech and former director of the Occoquan Watershed Monitoring Laboratory, died on June 24. Grizzard worked at the university from 1974 to 2014—an impressive 40-year span that included three decades also serving as director for civil and environmental engineering graduate programs in the National Capital Region.

James Beverly "J.B." Jones (mechanical engineering '45), a William H. Ruffner Medal recipient and former mechanical engineering department head at Virginia Tech, died on May 17. Jones earned the American Society of Mechanical Engineers' James Harry Potter Gold Medal for contributions in thermodynamics, and in 2008, he was awarded the William H. Ruffner Medal, Virginia Tech's most prestigious honor.

Fernando Ruiz, associate professor emeritus of architecture in the Virginia Tech College of Architecture and Urban Studies, died on July 10. Ruiz traveled extensively, collecting visual information and experiencing significant works of architecture in the U.S., Central America, Puerto Rico, Europe, and the People's Republic of China, where he served as a visiting faculty member at the Department of Architecture at Zhengzhou Institute of Technology.

Alumni eclipsed: On Aug. 21, the Virginia Tech Alumni Association hosted a solar eclipse watch party on the Holtzman Alumni Center lawn. Virginia Tech, Blacksburg, and the larger Southwest Virginia region fell within the 90-percent range for the eclipse. To view a gallery of photos of eclipse-watching across campus, go to vtmag.vt.edu.



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A new chapter

by TRACY VOSBURGH

Our motto—*Ut Prosim (That I May Serve)*—and the deep history and traditions of Virginia Tech create a sense of community pride and purpose that are readily apparent.

Hokies are genuine and kind. They have grit and determination. They apply their minds to solving the world's biggest problems. And they are proud—proud of where the university has been and where it is going.

These qualities will sound familiar to you, as alumni and friends—and these are the qualities that are driving Virginia Tech forward. President Tim Sands and other Virginia Tech leaders are guided by the Beyond Boundaries roadmap, the Destination Areas model of transdisciplinary problem-solving, and a deep commitment to building a welcoming, inclusive community. This is the foundation of how we have evolved the Virginia Tech brand.

Behind the scenes, we have worked in earnest to reshape the university's brand in a way that captures the energy and momentum of Virginia Tech. In our words and imagery, you'll notice a more cohesive and vibrant expression of the role we claim as a community.

Perhaps the most visible change you will see is in the new university logo. To evolve our logo, we leveraged the external awareness of, and our attachment to, the “flying VT” athletics logo that our student-athletes proudly wear, using that recognizable shape to create a university logo that both relates to and stands apart from the athletics logo. We have not changed or replaced the athletics logo for a few important reasons—the most important being that the university logo must represent the full breadth of our community and represent the institution at the highest level. The university logo now appears on vt.edu pages and many printed materials, and in 2018, you'll see a revitalized Virginia Tech Magazine in your mailboxes.

Throughout the process of developing a new brand platform and logo, we purposefully engaged with various audiences, including

alumni, to guide our strategy and thinking. And we certainly welcome additional feedback as we continue to evolve our creative platform. Please feel free to write to me at tracyv@vt.edu.

Amid the changes, please know this: Our tradition stands strong. Chicago maroon and burnt orange are our colors, even as we introduce more contemporary colors to our palette. The beloved HokieBird will always have a roost in Blacksburg, even as we continue on the path of becoming a global land-grant university with a deep commitment to research and service. And Hokie Stone will always reflect the golden sunsets of Southwest Virginia, even as our campus footprint grows in Roanoke, the National Capital Region, and around the world.

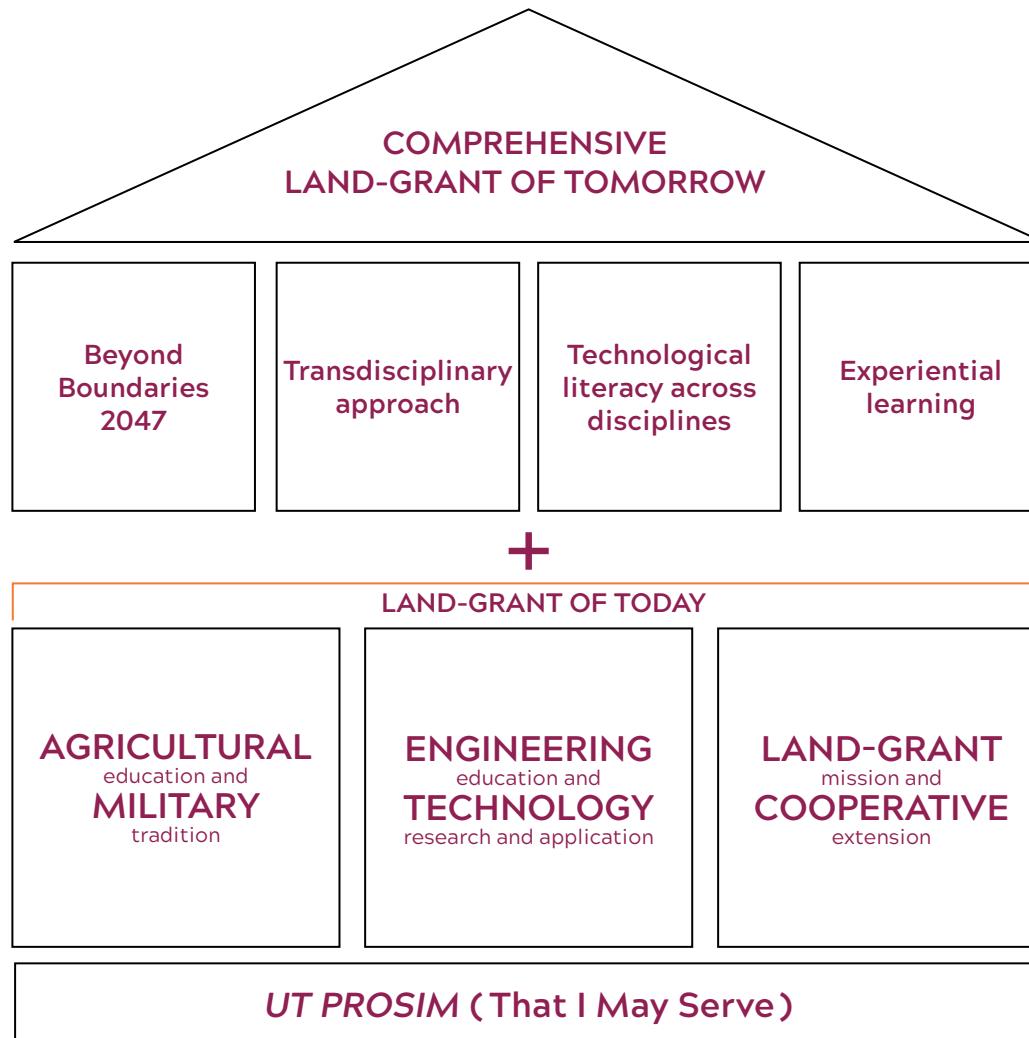
Now is truly a great time to be a Hokie. It is a moment to claim who we are and who we want to be. Our commitment to serve is stronger than ever. And, as you know, any time you put orange and maroon together, good things happen. Let's go, Hokies! □

Tracy Vosburgh is the senior associate vice president for University Relations.



Inside the new logo: Our logo reflects the spirit of the Hokie community, the quality of the university's educational culture, and Virginia Tech's identity as an inclusive community that thrives at the intersection of academic disciplines.

The footprint of the new logo matches that of the athletics logo, which will remain in use. The fresh look unifies how we represent the university, which is especially important for attracting new students, faculty, staff, and friends.



Building on greatness: Our history is a source of pride and a driving force for who we are and what we want to achieve. Our new brand builds on that foundation, advancing our progress toward creating the comprehensive land-grant university of tomorrow.

See more:

For a video about how we developed the brand, visit vt.edu/brand.

To view the commercial that has aired nationally during football games, search YouTube for “Virginia Tech Get Ready: Lunch Pail.”

For more on the university's future, watch President Tim Sands' State of the University address at vt.edu/state-of-university.

Ready to update your wardrobe?

Your favorite retailers of Hokie apparel have the goods.



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BRINGING MINDS TOGETHER. THAT'S OUR ROLE.

At Virginia Tech, we're dedicated to connecting diverse backgrounds, perspectives, and beliefs. Why? We know that real change is rooted in empathy and driven by embracing differences.

Our role in creating that change is to empower courageous and compassionate leaders for our ever-evolving world.