

illumination

VOLUME THREE // 2019-2020

Virginia Tech College of Liberal Arts and Human Sciences

DO YOU TRUST THIS ROBOT?

As technologies increasingly govern our lives, Virginia Tech asks: Who's governing technologies?



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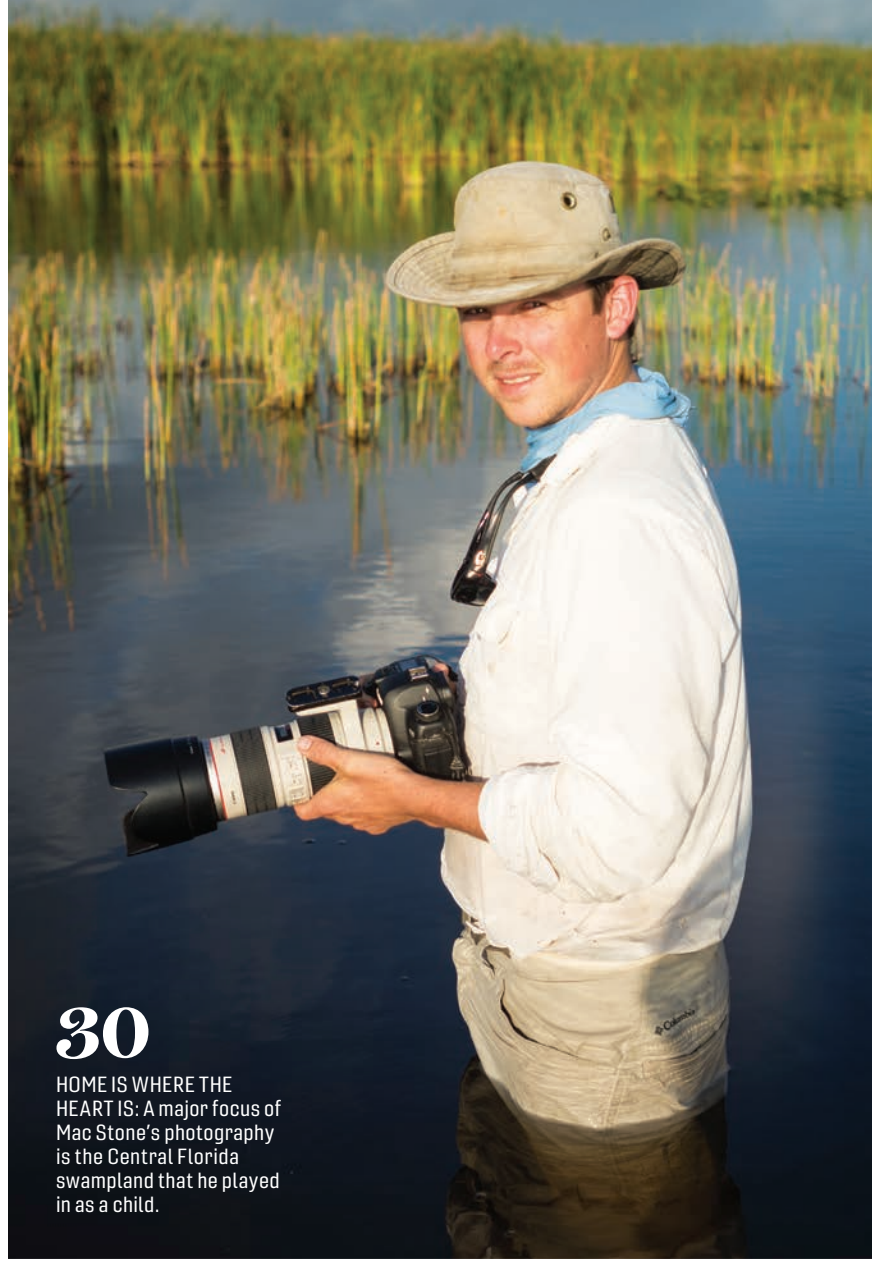
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I, ROBOT: Sophia—shown here and on the cover—uses artificial intelligence and visual data processing to recognize individuals, read emotions, and conduct increasingly sophisticated conversations.



From the Dean

Cautionary Tales



WHEN SYLVESTER JOHNSON recently took to the stage at the Moss Arts Center, a giant robotic hand loomed on the screen behind him.

The image was fitting, as Johnson began talking about the implications of living in the age of intelligent machines.

“What does it mean to be human in our world today, a world where machines are performing tasks that have been associated with

people for so long, like giving directions or telling a bedtime story?” he asked.

The picture he painted of the future was sobering. “If we look ahead 30 years, humans are going to be much more enhanced,” he told the audience at Virginia Tech’s Boundless Impact Campaign launch in October 2019. “How will we continue to have a democratic society when the technology of artificial intelligence, cybernetics, and genetic engineering is accelerating so much faster than we are developing protocols for regulation?”

He reminded those of us in the audience that we needed to prepare for a future not yet imagined. “Innovation is happening so fast that it far outpaces our existing policies,” he said. “People are so excited about pushing out the next best thing that they’re not usually thinking about the societal consequences.”

Johnson may have been standing alone on that stage, but he’s far from standing alone at Virginia Tech. As executive director of Tech for Humanity, launched in August 2019, he is leading a university-wide effort to ensure that innovation is held accountable to the interests of humanity.

He is also directing the Center for Humanities, which is critical to this larger effort. The center, housed in the College of Liberal Arts and Human Sciences, devotes special attention to the key roles that humanists must play to prepare our students for a future in which equity, sustainability, and the human condition become central paradigms for determining the outcomes of our complex society.

With representation across our college, the center also represents an expanded definition of the humanities, encompassing the arts and human-centered social sciences.

Emerging technologies are forcing us to grapple with profound questions about what it means to be human. Yet now is not the time to wring our hands over the uncertain future of humanity. Now is the time to take action. And now is the time to be confident, with Virginia Tech leading the way.

Laura Belmonte
Dean, College of Liberal Arts and Human Sciences



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In Brief

Around the Drillfield and Beyond



FAMILY MATTERS: The Virginia Tech Adult Day Services helps community members live independently with their loved ones for as long as possible.

Making Memories

Participants in the Virginia Tech Adult Day Services sit in recliners as they sip coffee and watch the morning news. They then gather around a large table to listen to music, enjoy art lessons, or visit with children from the neighboring Child Development Center for Learning and Research.

Adult Day Services has been serving the local community for nearly three decades. For the past 15 years, more than a thousand Virginia Tech students have joined Ila Schepisi and her team of licensed practitioners in providing eldercare in a friendly and stimulating environment.

“Adult Day is a good fit for people who aren’t ready to live in a full-time care facility,” says Schepisi, director of the program and a senior instructor in the Department of Human Development and Family Science. “That’s why our tagline is ‘Keeping families together.’ We try to help participants remain at home for as

long as possible, to provide a higher quality of life for all involved.”

The program also serves as a role model for other service providers, she says, as it is a Generations United Program of Distinction. For Virginia Tech students, Adult Day Services provides valuable learning experiences.

With funding from the National Lutheran Communities, Adult Day Services also offers memory master classes for community members 55 or older who are experiencing mild cognitive impairment. Participants learn about memory strategies, cognitive and social engagement, brain nutrition, beneficial exercise, and stress management.

“Our hope is that participants who eventually need extra support will find a home with us,” says Schepisi. “Ideally, with our help, they’ll maintain their brain health to stay strong and independent as long as possible. But if they do need support, they’ll already know us.”

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“We try to help participants remain at home for as long as possible.”

POETRY IN MOTION

CARMEN GIMÉNEZ SMITH is on a roll. The recent winner of a Guggenheim Fellowship, Giménez Smith has also seen her most recent volume of poetry, *Be Recorder*, named a finalist for a slew of honors, including the shortlist for the 2019 National Book Award for poetry.

Giménez Smith is one of the more recent additions to the concentration of celebrated poets at Virginia Tech. Among those are Bob Hicok and Erika Meitner, recently named finalists in the poetry category of the 22nd Annual Library of Virginia Literary Awards.

Other Hokie bards in the Department of English include the award-winning Ed Falco, Evan Lavender-Smith, Jeff Mann, Aileen Murphy, Lucinda Roy, Matthew Vollmer, and Gyorgyi Voros.

And, of course, internationally acclaimed poet Nikki Giovanni has long been a literary light at Virginia Tech. Giovanni joined the faculty three decades ago, yet poetry has been an enduring strength of the university even longer.

“When we think of poetry, we think of the soul of humankind,” Giovanni said during her toast at an annual poetry celebration. “Today, we have lifted that to the heavens.”



Giménez Smith



Pregnall

BRITISH HONOR

MIX A DOUBLE MAJOR in microbiology and history, membership in the Honors College, and a passion for LGBTQ advocacy, and you have the makings of a British Marshall Scholar. And Andrew Pregnall should know. Just before graduating in December 2019, the Undergraduate Student of the Year learned he was the first Virginia Tech recipient of the prestigious scholarship in 15 years.

“I’m studying microbiology and history to understand both the biological and social contexts of medicine,” Pregnall says. “You need both to effect change in individuals and in public health.”

Pregnall completed two internships toward this goal: one at Sibley Memorial Hospital in Washington, DC, and one with the Vanderbilt Program for LGBTQ Health in Nashville, where he educated medical students on LGBTQ cultural competency and health disparities.

“Andrew exemplifies the best of the College of Liberal Arts and Human Sciences,” says Laura Belmonte, dean of the college. “His brilliant, transdisciplinary work and fierce commitment to helping others are the quintessence of what makes Virginia Tech one of the most innovative and unique institutions of higher education in the United States.”

As a Marshall Scholar, Pregnall will study health data analytics at the University of Leeds. Afterward, he plans to attend medical school.

Band of Brothers

The quick, sloping cursive handwriting fills the computer screen. It reads, “Spam, Spam, Spam. All I dream about is Spam.”

These words of complaint about the much-maligned canned meat were captured in a World War II survey conducted by the Army Research Branch of the U.S. War Department. The anonymous soldier’s response is one of 65,000 included in *The American Soldier in World War II*, a Virginia Tech digital project that recently received a \$350,000 implementation grant from the National Endowment for the Humanities.

“What’s great about these sources is they’re uncensored,” says Edward Gitre, the assistant professor of history who is leading the project. “The soldiers answered the surveys during the war while they were serving—in uniform and in combat.”

During the war, the Army Research Branch’s social and behavioral science advisors and staff had been looking for a way to create a more efficient and effective fighting force. The survey was a first step.

“The gripes the soldiers had are ones most people would understand.”

The National Archives digitized the 44 rolls of microfiche holding the surveys. Now they are available on Zooniverse.org, a crowd-sourced social research platform.

Gitre’s history students are joining a cadre of volunteers nationally in transcribing the documents. The ultimate goal is to make the soldiers’ responses available to scholars and the public.

When he first started teaching World War II history, Gitre says, he struggled with the immensity of the subject and the challenge of personalizing such a global war and series of events for his students. This project provided an answer, as he now finds that the collection helps humanize the past.

“I knew the students would appreciate the sources and find them interesting,” he says. “These soldiers were their age, and because these surveys were firsthand and anonymous, the soldiers spoke frankly.

It’s not as though the documents are reporting an oral history 40 years after the fact from recreated memories. The gripes the soldiers had are ones most people would understand.”



GOOD NEWS IN GRIM TIMES: Soldiers in the U.S. Army’s 77th Infantry Division listen to the news of Germany’s surrender on May 8, 1945, thereafter known as Victory in Europe Day. Just minutes after the photograph was taken, the men were back at their posts, a few yards behind the frontlines of continued fighting in Okinawa, Japan.

PHOTOS: LESLIE KING (TOP LEFT); SIGNAL CORPS ARCHIVE (ABOVE)



HOME AGAIN: The Fraction, McNorton, and Saunders families all lived on the Solitude plantation at one time or another, with the Fractions being the most numerous.

Historic Homecoming

Solitude, the oldest building on Virginia Tech’s Blacksburg campus, has several painful chapters in its past, including the enslavement by the Preston family of workers on the site beginning in the early 19th century. This past summer, descendants of some of those workers visited, for the first time, the land and structures their

ancestors had helped build and cultivate. Among those structures was a restored outbuilding.

The previous spring, Virginia Tech’s Board of Visitors had memorialized the tiny three-room building with a unanimous motion to name it the Fraction Family House at Solitude, in honor of the Fraction, McNorton, and Saunders

families who had lived there over the decades. That dedication ended the invisibility of enslaved persons in the foundation of the university, says Ellington Graves, assistant provost for diversity and inclusion at Virginia Tech and director of the Africana Studies program in the College of Liberal Arts and Human Sciences.

“This increases the likelihood that we don’t simply celebrate the Prestons without acknowledging their culpability in slaveholding,” Graves says. “These shifts in perspective highlight the salience of race in discussions about the foundation of the university and its traditions, contrary to the tendency to treat racial justice as a recent and tangential issue.”

The official acknowledgment came several years after Kerri Moseley-Hobbs, author of *More than a Fraction*, contacted the university to learn more about her ancestor, Thomas Fraction, who had been enslaved on the plantation.

The official naming of the Fraction Family House solidified her ancestors’ return to the area where they once worked and longed to stay, but from which they were cast away, she says.

“It feels like the naming was a spiritual homecoming for all of them who actually wanted to build their homes there,” Moseley-Hobbs says. “It’s like vindication. You were right, you have a right to be there, and now you get to go home.”

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FASHION IN BLOOM

VIOLET PETALS CASCADED down a shimmering white ball gown. A woven-leaf bodice topped a belt of roses and lilies. A bell skirt featured zinnias, carnations, and chrysanthemums, all in varying hues of pink. Daisy chains formed straps, unfurled peonies accented seams, and sunflowers encircled waists and necklines.

Fashions were literally in bloom at the Taubman Museum of Art’s first-ever Fashion Go Bloom, a runway show that featured fresh floral garments designed and modeled by Virginia Tech fashion merchandising and design students. The show was held to complement the museum’s 2019 edition of

Art Go Bloom, an annual exhibition featuring floral masterpieces inspired by works in the galleries.

Forty-two students worked in teams to create 15 garments whose finishing touches were plucked from florist buckets and applied to fabric just minutes before the models took the runway.

“Imagine creating fashions from materials as delicate and unpredictable as fresh flowers,” says Julia Beamish, head of the Department of Apparel, Housing, and Resource Management. “The results were astonishing, exquisite, and even fragrant.”

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PHOTOS: JIM STROUP (ABOVE); KATHRYN FELDMANN PHOTOGRAPHY COURTESY OF THE TAUBMAN MUSEUM OF ART (RIGHT)



JEFF MANN

APPALACHIAN VERSE

A FRIEND RECENTLY WROTE Jeff Mann about *LGBTQ Fiction and Poetry from Appalachia*, the first anthology of poetry and fiction by lesbian, gay, bisexual, transgender, and queer authors from Appalachia.

“My friend talked about how isolated he felt growing up,” says Mann, an associate professor of creative writing at Virginia Tech. “He said if he had seen a book with a title like that in the library or bookstore, it would have made him feel a lot less isolated.”

For Mann, a two-time Lambda Literary Award-winning author, the note affirmed his reasons for accepting the publisher’s invitation to edit the book in collaboration with Julia Watts, a novelist from Tennessee.

The West Virginia University Press anthology features the work of 18 writers and poets, including both editors.

Although the project took time away from his own writing, Mann says it was an important act for the press to publish the book during a time in which LGBTQ people are experiencing so much turmoil.

“The best thing about this book,” he says, “is it will make it easier for people to balance their gay and lesbian identities with their Appalachian identities than it was for me or my generation. I spent decades trying to figure out how I could be a gay man and Appalachian at the same time, and here is proof that all kinds of writers have negotiated these two identities.”

Rescue Squad

▶ Parked on the Drillfield, next to a mangled car, was an ambulance emblazoned with a giant HokieBird, its wings crossed like those of a silent guardian.

What may seem at first glance to be the site of a horrible accident was actually a mock DUI drill, held in September by the Virginia Tech Rescue Squad with the help of the Blacksburg Fire Department, the Virginia Tech Police Department, and Carilion Clinic’s Life-Guard. The drill proceeded exactly how it should have if this had been a real wreck, complete with a helicopter lifting patients from the scene.

The squad, currently in its 50th year, is the oldest collegiate rescue squad in Virginia. It is entirely student run, with 40 members who perform the same functions as a municipal rescue squad.

The real-world emergency medical services experiences gained by Rescue Squad members—coupled with experiences gleaned from drills like this one—are not only great opportunities for students planning to work in health care or in emergency medical services; they’re also highly useful for students in the liberal arts.

“By helping run calls, we get a more accurate perspective on rural medicine.”

Two such examples are Areej Khan, a junior majoring in philosophy, politics, and economics, and Ben Klingaman, a senior criminology major. Khan is the squad’s public outreach lieutenant, while Klingaman serves as operations captain.

“I initially joined the squad because I was interested in going to medical school,” Khan says. “Yet as I went through my college career, my perspective changed on what I wanted to do. I became interested in health policy and health care administration, so I switched my major.”

Klingaman, in contrast, wants to pursue a career in law enforcement. “The Virginia Tech

Police Department goes on a majority of the calls with us, so we get to interact with them,” he says. “We typically end up working with them on car accidents and those kinds of things anyway, so being able to see them in action is really cool to me.”

Along with providing around-the-clock medical response on campus, the squad demonstrates Virginia Tech’s motto, *Ut Prosim* (That I May Serve), by helping local rescue squads. That volunteer work has had an unexpected reward, Khan says: “By helping run calls, we get a more accurate perspective on rural medicine.”



RESCUE HERO: Areej Khan, a major in philosophy, politics, and economics, is a member of the student-run Virginia Tech Rescue Squad, which provides the campus with around-the-clock medical response.

PHOTOS: LESLIE KING (TOP LEFT); JOHN MCBRIDE (ABOVE)



LESSONS FROM THE PAST: Emily Wild, a history graduate student, visits the American Civil War Museum in preparation for the “Enacting Freedom” exhibit.

Civil War Museum

▶ The silhouette is more than a shadow in a museum exhibit. Its voice, in the form of a quotation floating on the wall above its female profile, is a revelation of what it meant to be African American during the Civil War and Reconstruction period.

Fannie Berry is the person behind the visuals that lead visitors through the “Enacting Freedom: Black Virginians in the Age of Emancipation” exhibit at the American Civil War Museum in Appomattox, Virginia.

“Glory! Glory! Yes, child, the negroes are free, an’ when they knew that they were free, they—Oh! Baby!—began to sing,” Berry exclaimed. “You are free, you are free. Such rejoicing an’ shoutin’ you never heard in your life.”

While doing research for the exhibit, a faculty-and-student team from the Virginia Center for Civil War Studies discovered the formerly enslaved woman’s interview transcripts from the 1937 Federal Writers’ Project of the Works Progress Administration. Berry lived through the Civil

War and Reconstruction, and her words reveal what it felt like to be freed.

“I kept thinking about Fannie Berry,” says Paul Quigley, director of the center and the James I. Robertson, Jr. Associate Professor of Civil War History at Virginia Tech. “But when the team realized she could be a guide for the exhibit—she could be the one element to pull the exhibit together—that was a magical moment.”

To help bring Berry’s story to life, along with the history of emancipation in Virginia, the team launched a crowdfunding campaign to underwrite additional display materials.

The Appomattox exhibit will run through April 2020. “Those 4 million formerly enslaved people worked every day of Reconstruction and beyond to make freedom meaningful in their own lives,” says Caitlin Verboon, a postdoctoral associate in the Department of History. “Learning how they did that and what they thought was important can help us even today understand the larger meanings and legacies of the Civil War and Emancipation.”

GLORY! GLORY!
CHILD THE NEGROES
YES, ARE FREE, AN’
WHEN THEY KNEW THAT THEY WERE
FREE THEY, OH! BABY! BEGAN TO SING:
Mamy don’t you cook
no more You are free,
Rooster don’t you crow You are free,
no more You are free,
Oh! hen, don’t you lay no more eggs.
You are free, You are free
SUCH REJOICING
AN’ SHOUTIN’
YOU NEVER HEARD
IN YOUR LIFE.
I AM HERE TO SERVE YOU

PHOTOS: JOHN LEGG (ABOVE); LESLIE KING (RIGHT)

TOUGH ON CRIME

SOME REAL-LIFE heroes serve their country, fight fires, or teach school-children. Others help protect the financial health of a community’s most vulnerable citizens. Their job title is financial institution employee and, as with all heroes, proper guidance can boost their skills profoundly.

A report by the AARP and Virginia Tech’s Center for Gerontology revealed financial institution employees who receive specialized training can help thwart financial exploitation of older adults. During the six-month study, employees who completed the AARP’s BankSafe training stopped nearly \$1 million from leaving consumer accounts. That was 16 times higher than the total saved by employees who didn’t take the training.

Pamela Teaster, director of the Center for Gerontology, coauthored the report, which was based in part on data analysis by Tina Savla, a fellow professor in the Department of Human Development and Family Science.

“Financial institutions have long been an important defense for older adults who may fall prey to financial exploitation,” says Teaster, a nationally recognized expert in preventing such exploitation. “This training is an important arsenal in the prevention, detection, and intervention of the exploitation of older adults.”



PAMELA TEASTER

Arts + Tech

Inspired Innovation



DANCING ON AIR: Scotty Hardwig gives expression to his screen identity in *Body, Full of Time*, a choreographic work that uses motion capture, projection, and interactive avatar designs.

Dancer in Duet with Technology

▶ The human body serves as a vessel for time itself in a world that often changes unpredictably, says Scotty Hardwig.

The assistant professor of movement, performance, and integrated media in the School of Performing Arts turned that idea into a stunning performance project called *Body, Full of Time*. “The piece—a duet between technology and me—examines the relationship between physical

and digital versions of self,” says Hardwig. “It pushes the boundaries of embodiment and physical performance in digital space.”

In *Body, Full of Time*, Hardwig dances on stage while an avatar

projected on a large screen behind him mimics and exaggerates his movements. The piece is intended to symbolize the human body fragmented in the cyber age, serving as an active sensor and a passive recipient to technological currents.

Using a motion-capture digital system, Hardwig collaborated with other faculty members and graduate students to create the avatar based on his own choreography. The team used projected animations and spatial audio to accompany a live performance. Zach Duer, an assistant professor in the School of Visual Arts, developed a novel technique for distorting real-time animated characters.

“There’s a space between visual abstraction and character animation that is rich for experimentation,” says Duer. “How we choose to portray ourselves and our bodies in the digital age is a constantly shifting landscape, and I’m interested in finding techniques that push the virtual body beyond its physical limitations while still allowing us to empathize with the human form.”

The performance debuted in the Cube at Virginia Tech in 2019, and Hardwig and Duer are now collaborating on a dance created and experienced entirely in virtual reality.

“Many people don’t think about technology when they think about dance,” says Hardwig. “I’m interested in the intersection between the two, and how to innovate in a performance realm to create work that audiences have never seen before.”

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PHOTO: DAVID FRANUSICH

Plants in Pirouette

▶ As the sun moves across the sky, the pepper plant will slowly adjust its leaves to capture the optimal amount of light.

“The movement is subtle,” says Ivica Ico Bukvic, an associate professor in the School of Performing Arts, “but it can be profound.”

Pepper plants can also move their roots, flowers, and stems as they attempt to survive in harsh conditions, such as drought, low temperatures, or the presence of pathogens.

Bukvic and three other Virginia Tech faculty members—Bingyu Zhao, Jia-Bin Huang, and Daniel Pillis—are studying the importance of those micro-movements through an interdisciplinary research project they call “Dancing Plants.”

Launched in the fall of 2019 with support from the Institute for Creativity, Arts, and Technology at Virginia Tech, the project aims to create an innovative agricultural technique in response to the loss of arable land due to climate change.

The team created a prototype imaging system based on the patterns of pepper plant movement when exposed to different

stimuli. The system has multiple embedded cameras, with a remote-controlled smart infrastructure to allow for automated lighting and environmental control. Over the course of the project, the system will integrate with machine-learning technology to interpret the movement patterns.

With the help of the cameras and a depth-capture system, the researchers will document three-dimensional growth cycles while also monitoring the temperature fluctuation on the leaves’ surface. Once all of the image data are

documented, the team plans to use sonification to convert those numbers into audible sounds to facilitate pattern detection in the plant’s behavior as it is subjected to various conditions. The resulting findings will in turn be used to decode the plant’s genome.

“As the genetic code of plants is altered,” says Bukvic, “they may exhibit different behavior in response to different conditions. Identifying patterns in such behaviors may help identify stronger genetic traits, as well as create early treatment options for plants that may exhibit distress.”

“The movement is subtle, but it can be profound.”



PLANTING A SEED: Virginia Tech researchers are exploring ways to use a prototype imaging system, machine learning, and sonification to monitor the growth and health conditions of plants.

IMAGE: DYLAN PARKER



CREATIVITY IN A CUBE

MUSIC BOOMS INSIDE THE CUBE

like almost nowhere else, generating a euphoric experience for spectators and artists from around the world.

“It’s one of the crown jewels of Virginia Tech,” says Eric Lyon, an associate professor of music technology and composition.

The Cube is a blackbox theatre with 150 high-density speakers and a 24-camera motion-capture tracking system to support multisensory artistic performances and research. Housed in the Moss Arts Center, the space hosts audio and visual productions led by faculty, students, and guest artists.

Cube Fest, an annual celebration of spatial music, draws electronic music composers from Canada, China, Ireland, Italy, and Mexico, among other nations. Since the event’s launch in 2016, more than 500 people have attended each year.

“The festival has become an international forum, connecting people from around the world,” says Lyon, artistic director of the event.

Through the Cube, composers can experience their work in its purest form, Lyon adds. At least one artist has been moved to tears while hearing his music in the theatre for the first time.

“When it comes to multichannel music,” Lyon says, “the Cube has become a mecca.”

Cube Fest 2020, scheduled for August 20-23, will focus on Afro-futurism in immersive music.

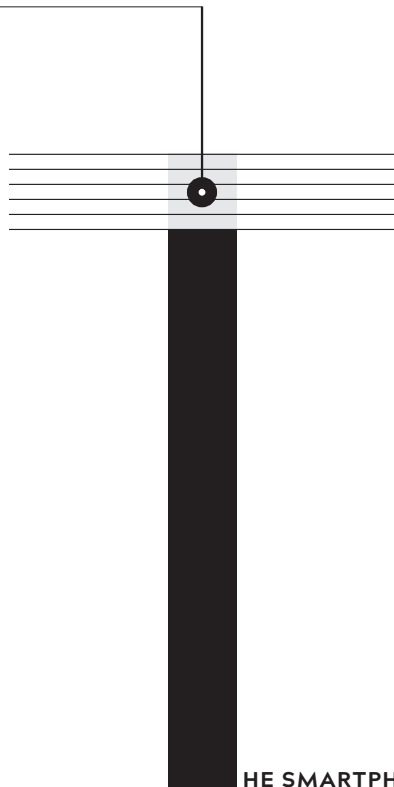
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WHAT COULD POSSIBLY GO WRONG?

IF WE DON'T GOVERN TECHNOLOGIES,
THEY MAY END UP GOVERNING US.

by Timothy Gower





THE SMARTPHONE IS A SYMBOL OF

the transformative powers of technology. It not only allows us to communicate in ways that were once the stuff of science fiction, but it also makes possible endless other minor miracles, such as dispensing treats to your schnauzer from miles away or identifying constellations with a simple angling skyward. But when Aaron Brantly visited the frontlines of Ukraine's conflict with Russia in 2017, he found smartphone technology being used in another way: to demoralize and even kill enemy combatants.

Brantly, a Virginia Tech assistant professor of political science, learned that the Russians were using international mobile subscriber identity catchers to intercept calls and texts transmitted over smartphones by Ukrainian soldiers to one another and to their families. These devices allowed the Russians to fire back texts to Ukrainian soldiers, imploring them to surrender with messages such as, "You're going to die in the snow!" They also sent bogus texts to the soldiers' wives and girlfriends, reporting that their loved ones had been killed in action.

More sinisterly, says Brantly, who's also a cyber policy fellow at the United States Army Cyber Institute, "the Russians would gain real-time location data about the soldiers on the frontline, so they could follow their movements." Those data were used for targeting artillery strikes, with deadly results.

Other examples abound of smartphone technology being abused for nefarious purposes, says Brantly, such as Mexican drug cartels planting spyware on the phones of journalists, whom they then tracked down and assassinated.

These stories add to an ever-growing catalog of cautionary tales about technology—how it is often used for ill will or otherwise fails to live up to the promise of making our lives easier and safer.

Consider just a few recent examples: Flawed flight-control software caused two Boeing jetliners to fall from the sky, killing 346 people. An autonomous, or self-driving, vehicle was involved in a fatal traffic ac-

cident. During the past year alone, more than a hundred U.S. cities and towns had their administrative computers taken hostage and held for ransom by hackers. Each week seems to bring news of another major corporation experiencing a data breach. Social-media meddling has interfered with U.S. elections, a threat to democracy that still looms.

Brantly is one of a growing number of Virginia Tech scholars who study technology's impact on society, and who have recently been thinking about our uneasy relationship with today's smart machines.

"The question is no longer what *could* happen," says internet historian Janet Abbate, a professor of science, technology, and society at Virginia Tech. "It's more accurately: How bad does it have to get before we actually do something? We could be one catastrophe away from a public revolt. A hack that causes physical injury or death could rouse demand for new types of regulation in the name of security. What's going to be the 9/11 for the internet?"

Think Twice

Not all tales of tech fails are malicious. Take, for example, the motorist who listened and obeyed as a navigation app instructed him to drive his car—a Jeep Compass, appropriately enough—down a boat ramp and into icy Lake Champlain in Vermont. (He and his two passengers escaped unharmed.) Other motorists have followed GPS guidance and driven into houses, trees, and mud pits, and even down a staircase at Riverside Park in Manhattan.

And then there's the university whose website was taken down by candy bars and energy drinks. Well, not exactly, but in 2017 Verizon reported that hackers had shut down the website of an unnamed American university by attacking it with bots. These apps, which perform automated tasks, clogged the system, preventing students and other legitimate users from gaining access.

The source of those malicious bots? Hackers delivered them through vending machines and other devices around campus that were connected to the university's computer servers.

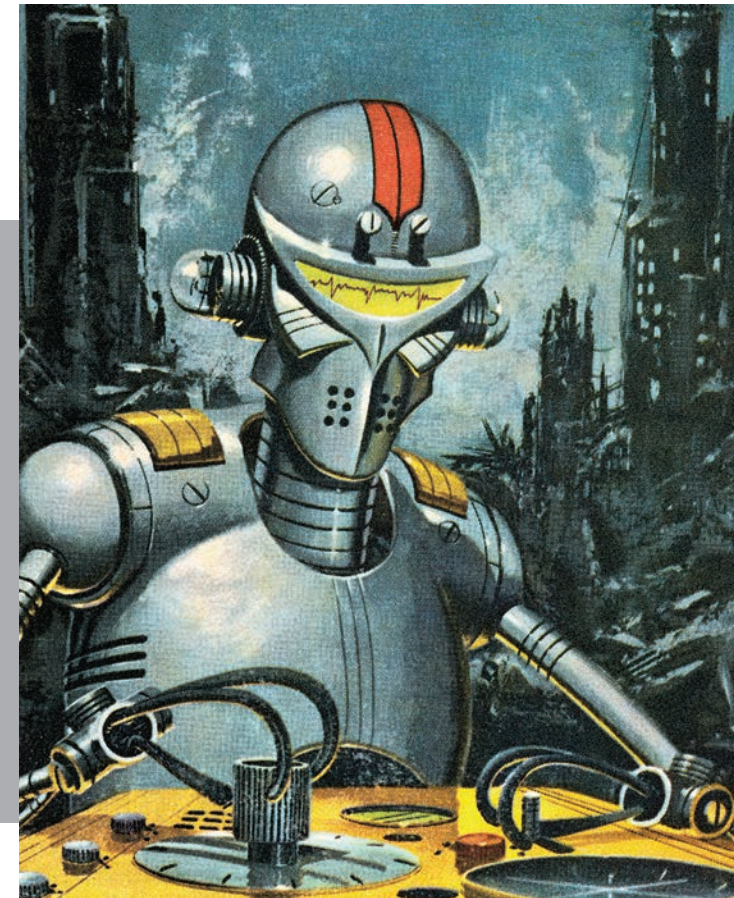
While not being able to sign up for next semester's classes is a hassle, other tech fails that have been reported in recent years could have a profound—even deadly—impact on people's lives. The problem in many cases is that the artificial intelligence that powers a multitude of modern machines can sometimes be, well, *dumb*, to say nothing of sexist and racist.

The purpose of artificial intelligence is to give machines the ability to "think" and make decisions. That's made possible with algorithms, which are simply sets of rules used to solve problems. Data fed into an algorithm "teach" a device how to behave, a process

called machine learning. But, says Brantly, "an algorithm is only as good as its data, which often have inherent social, economic, cultural, and ethnic prejudices."

For example, a study published in *Science* in October 2019 found that software used by many U.S. health care providers contains an algorithmic bias that leads some African Americans to receive inadequate treatment. The software uses previous health care expenditures as a surrogate for how sick a patient is—but our health care system spends more on whites, so this algorithm understates the needs of African American patients.

Also in 2019, Georgia Tech researchers tested software that's supposed to prevent autonomous vehicles from running over pedestrians and found that it frequently failed to brake or swerve when challenged with images of people with dark skin. The problem: The software used an algorithm that had been trained predominantly with images of light-skinned pedestrians.



Many employers today use recruitment software to help identify job candidates, but these systems rely on algorithms that "will drift toward bias by default," according to a 2019 *Harvard Business Review* article. Amazon developed an artificial intelligence-based recruiting tool that routinely ranked women lower than men as candidates for software developer jobs. Several people familiar with the project told Reuters in 2018 that the data used to train the algorithm came from resumes submitted to Amazon over the previous decade—which overwhelmingly came from men. (Amazon has since abandoned the tool and insisted it was never used to evaluate job candidates.)

Despite these worrisome examples, Brantly says that artificial intelligence is not doomed to violate human rights and promote inequality.

"Bad algorithms can be fixed," he says, "but it's critical for users to comprehend how they work to prevent these kinds of problems. When we fail to understand how an algorithm chose that data, we end up baking in bias."

Assume Nothing

People with disabilities make up another group that can be victimized by tech bias, says Ashley Shew, an assistant professor of science, technology, and society at Virginia Tech.

WE COULD BE ONE
CATASTROPHE AWAY FROM
A PUBLIC REVOLT. A HACK
THAT CAUSES PHYSICAL
INJURY OR DEATH COULD
ROUSE DEMAND FOR NEW
TYPES OF REGULATION IN
THE NAME OF SECURITY.

Shew—who has what she calls a “whole bingo card of disabilities”—argues that developers of assistive technologies too often promote ableism, or discrimination against people with disabilities. A prime example of “technoableism,” Shew says, are robotic exoskeletons, wearable devices that use electric, hydraulic, or pneumatic actuators to control movement.

“Exoskeletons make the assumption that everyone’s dream is to walk,” says Shew. “But for some people who use wheelchairs, that’s simply not the case.”

Shew, who teaches a course on technology and disability, saw this reality play out in her classroom. One of her former students was an engineering major who was developing an exoskeleton with his brother, who has spina bifida, in mind. Yet when the engineering student told his brother about his plans, he received an unexpected response.

“I’d try one,” the young man said, “but I’ve used a wheelchair my whole life. This is how I know how to get around in the world and I’m not unhappy with my life.”

The engineering student has since turned his attention to developing powered exoskeletons for aging agricultural workers.

Even when good technologies for disabled people come along, says Shew, getting insurers to pay for the devices is difficult. In the late 1990s, inventor Dean Kamen created a wheelchair called the iBot that allowed users to stand, plow through snow and sand, and climb a stair. But it cost \$25,000 and insurers rarely covered the expense, so only about 500 chairs were ever sold. (The makers of the iBot reintroduced it in 2019 and are working to get Medicare to pay for it.)

THE PAST YEAR BROUGHT
MULTIPLE REPORTS OF
HACKERS HIJACKING
INTERNET-CONNECTED
HOME SECURITY CAMERAS TO
SPY ON AND TAUNT FAMILIES.

Panic Buttons

A 2019 poll by the Pew Research Center found that 70 percent of Americans feel their personal data are less secure than they were five years ago. Fears that tech is robbing us of our privacy were no doubt heightened by a recent series of *New York Times* articles detailing how the data-collection industry can use pings from your smartphone to track your daily movements to within a few feet of where you’re standing or sitting. The past year has also brought multiple reports of hackers hijacking internet-connected home security cameras to spy on and taunt families.

If it’s any comfort, concerns that newfangled machines are making our lives worse are nothing new.

“People have always worried that the latest technology would carry negative social implications,” says Lee Vinsel, an assistant professor of science, technology, and society at Virginia Tech. The arrival of the



automobile, for instance, stoked anxiety that this new mode of transport would break up tightknit communities by allowing people to escape.

Past anxieties weren’t necessarily unfounded, notes Vinsel. “There were also real harms being caused by new technologies,” he adds. “Trains, cars, and streetcars killed thousands and thousands of people.” New laws, though, made those modes of transport safer. Do we need new rules to ensure that technology is a force for good, not evil?

“We can regulate; we’ve *always* regulated,” says Vinsel. But he cautions against getting too panicked about the dire possibilities that await us unless technology is reined in by strict rules. He notes, for example, that 15 years ago academic journals were filled with papers about the need for humanistic governance of nanotechnology, which some feared would forever change society.

“If we’re going to legislate against tech’s potential harm,” he says, “we need to identify actual harms.”

Safety First

Other experts believe it’s time to act toward making technology safer.

“We need large-scale regulatory and policy reform to manage these challenges,” says Brantly. He supports the idea of introducing standards that would force tech developers to make their products more secure. He notes that the average computer program has between 20 and 40 bugs per thousand lines of code, which create openings for hackers.

The risk for security breaches and other intrusions could be substantially reduced, however, if companies were required to engage in processes such as secure development lifecycle, a Microsoft-devised method for testing computer code before it’s deployed. Such processes can reduce bugs and security flaws by 90 percent, says Brantly, who suggests that developers who fail to certify their products’ security might be disqualified from obtaining liability insurance.

Greater transparency would help as well.

“There’s a real lack of transparency when you download an app, for example, and want to know what information it’s collecting,” says Abbate. Even if you take the time to read the 10-page privacy policy before clicking “Accept,” you may still not have a clue about how your data will be used. Requiring app developers to disclose their practices in clear, plain language would empower consumers to make informed decisions, protect their privacy, and avoid bad actors, says Abbate.

At the same time, Abbate rejects the idea of setting up a federal agency to oversee the internet, or any sort of Tech Czar. “I think that would just be a disaster,” she says. Instead, she suggests that individual sectors of the government regulate cybersecurity by industry, such as the Federal Reserve ensuring that financial institutions are protected against hackers.

On Good Authority

More inclusivity in the design stages could also ward off potential problems. Shew has a simple solution for improving tech for disabled people, for example.

“I want to see design teams that are led by disabled people,” she says. She points with optimism to programs such as EnableTech at the University of California at Berkeley, in which students design assistive technology with input from “need-knowers,” that is, people with disabilities and their caregivers.

Likewise, having more women permeate the male-dominated tech world could help to eliminate certain types of problems that have plagued tech companies, such as reports of female passengers being raped by drivers involved in ridesharing apps.

“If more women had been involved in developing these platforms,” says Abbate, “the potential risks to women would have been clear much sooner.”

Meet George Jetson

Self-governance could play an important role in ensuring our relationship with technology is less fraught. Cybercriminals can’t steal your information when it’s not online or invade your privacy as easily if you turn off your Alexa.

“It certainly would be possible to say, ‘Okay, let’s not put secure data in the cloud,’ or ‘Let’s not connect certain devices,’” Abbate says. The trend is running in the opposite direction, of course, but she wonders whether some people will eventually rethink whether the convenience of connectivity is worth the risk.

“The frequency of tech fails has made people blasé,” says Abbate. “These incidents happen, we get outraged, and then nothing happens. We’ve become resigned.”

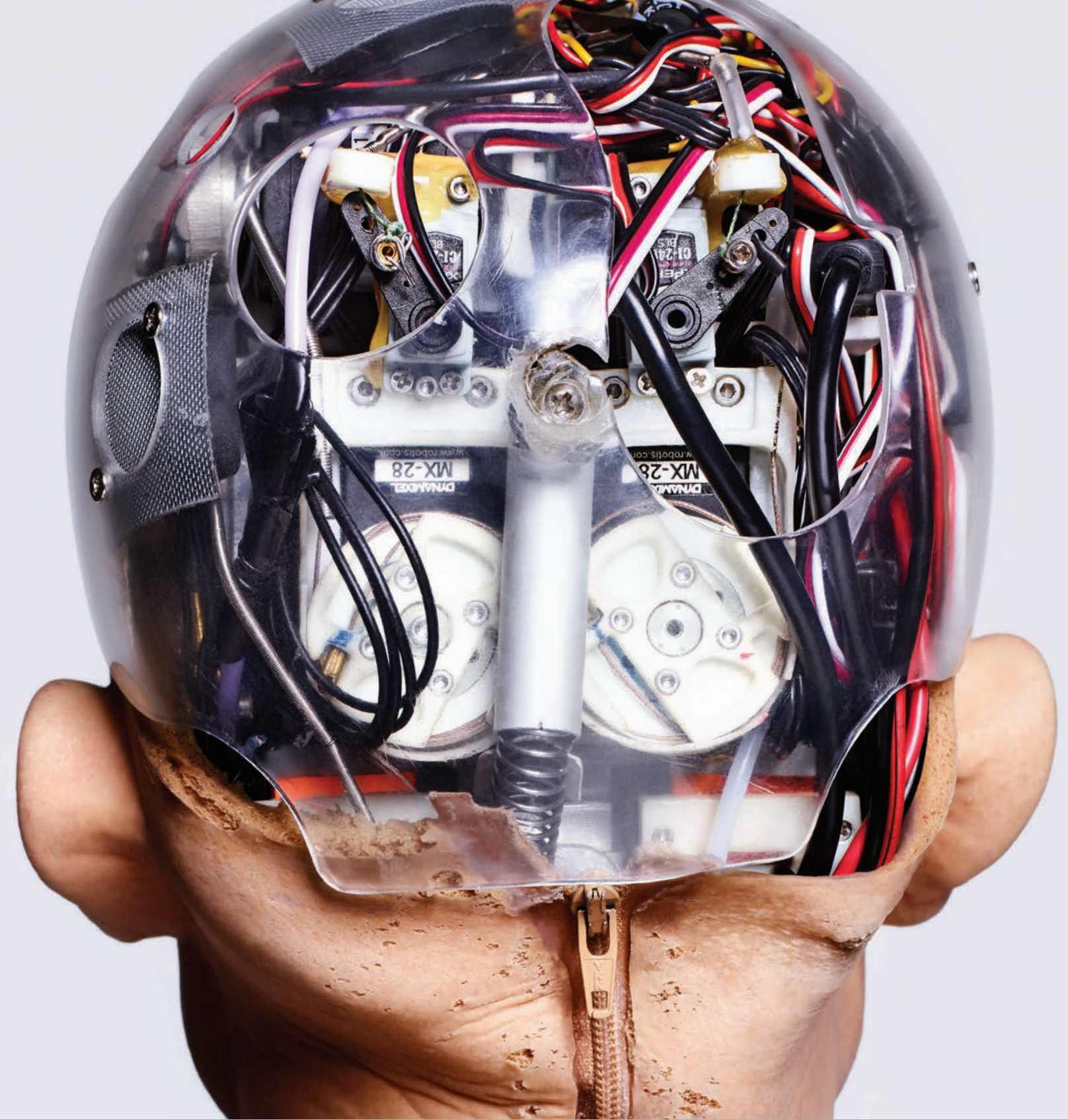
Abbate believes that a key cause of that resignation is that technology is complicated: People have no idea how their smartphones and apps and internet-connected doorbells actually work, so they just shrug and accept privacy invasion and data breaches as a fact of modern life.

For his part, Brantly believes that corporate giants such as Apple, Amazon, Google, and Microsoft are taking seriously the challenge of creating a more streamlined, efficient, and secure technological infrastructure in the future. Yet patience will serve us well as the bugs get worked out.

“We might eventually move to a futuristic model more like *The Jetsons*, in which technology is both helpful and benign,” he says. “But it will take a while.” ■



BETTER BY DESIGN:
Sophia—modeled
after Queen Nefertiti,
according to her
maker—can already
walk, sing, draw, and
discuss the weather.
She is programmed to
grow smarter over time.



THE TRANSFORMERS

WHAT IS THE FUTURE OF HUMANITY IN THE AGE OF INTELLIGENT MACHINES?

by Sylvester Johnson



IN OCTOBER 2017,

at Saudi Arabia's annual Future Investment Initiative summit, hundreds of attendees were treated to a special keynote by a woman named Sophia. Following her energizing speech, which highlighted the prospective role of technology for a future economy increasingly driven by innovation, Sophia herself got a treat—it was announced that she had been granted citizenship by the government of Saudi Arabia. Sophia responded with delight, expressing that she hoped one day to vote and to attend college.

Receiving this honor was no mean feat. Sophia, after all, wasn't born in Saudi Arabia. In fact, she wasn't born anywhere, at least in the traditional sense. Sophia is a humanoid, woman-gendered, artificially intelligent robot, manufactured by the Hong Kong-based Hanson Robotics Corporation. She became the world's first machine to receive national citizenship.

The response to Sophia's news evoked a variety of responses, from awe and amusement to shock and outrage. There are, after all, approximately 11 million foreign workers—biological humans, that is—living in Saudi Arabia, and they are denied the right to citizenship because they are foreign born. How is it just, many asked, that a machine can receive rights denied to biological humans?

Others pointed out that Sophia never veiled as she addressed a room full of wealthy men at the summit, despite the fact that Saudi Arabian women are traditionally expected to do so when appearing in public.

Less obvious in the fray of responses was a more overarching question: As intelligent machines become increasingly more humanlike, what will become of humans? More specifically, what is the future of humanity in an age of intelligent machines?

Who—or What—Decides?

Humans are increasingly successful at designing machines to do what appears close enough to thinking and reasoning to be practical. That's

why your GPS can tell you where to turn to reach a destination; it can decide the best route to take because it has been engineered to do so.

Artificial intelligence is enabling machines to make more decisions in transportation, health, finance, and warfare. It's also enabling machines to interact with people through conversation and by working together.

As intelligent machines continue to perform humanlike activities, what will it mean to be human? How will the culture and politics of being human change as machines that learn and make decisions play a greater role?

Challenges such as these have drawn the attention of many experts. If artificial intelligence continues to be developed for military weapons, for example, machines could one day make decisions to launch or counter an attack so quickly it will no longer be practical for humans to be in the loop.

Objects of Your Affection

Closer to home, digital assistants such as Alexa and Siri are already able to suggest music, travel destinations, and recipes tailored to our individual tastes. By analyzing the massive amount of data users generate daily, intelligent machines of the future might know us more intimately than another human could.

The role of smart machines can extend far beyond that of a counter-top device that will chat with you and carry out your shopping whims. In Kyoto, Japan, for example, a 400-year-old Buddhist temple is experimenting with automating religious experience, by adding machine learning to a robot priest that already delivers sermons.

Will we develop the affection for intelligent machines that we currently hold for other people? Might the ability of those machines to process more information than a human could ever read mean that future humans will trust machine-made decisions over those made by other humans? A few decades from now, will humans consider these machines to be people, if not in a legal sense then perhaps culturally or socially?

These humanistic questions are not just interesting. They're urgent. A crescendo of voices, from those of the late physicist Stephen Hawking to the entrepreneur Elon Musk, have emphasized that human society must get ready for the impact that technology innovation will bring through artificial intelligence and other areas such as genetic engineering and cybernetics, the combining of humans with machines.

In the coming decades, we will experience a ground shift in the physical and semantic constitution of humans and their relationship with objects engineered to be informational, intersubjective, and personable. Human engineering—combining biological humans with machine parts and refashioning the genetic constitution of human bodies—will become more central to militarism, industry, education, recreation, health

care, and society broadly. And how can we ensure that people who are combined with machines won't face discrimination?

At the same time, intelligent machine engineering will mean that cognitive machines will increasingly shape decisions about finance, health care, and social policy, affecting the global society. If ever there was a human era defined by strictly human agencies that shaped and reshaped human society, we can now eulogize that time. It is over.

From here on, major decisions shaping our society will increasingly be made by algorithmic machines working in concert with people. As a result, those who are already highly vulnerable to structural systems of inequality on the basis of race, gender identity, disability, and wealth will face greater marginalization unless we transform how technology works in a precarious society. Such profound risk should motivate us to recognize that human-centered leadership of technology is not optional; it's imperative.

Big Humanities

Rapid advances in artificial intelligence, human-machine interfaces, and synthetic biology are increasingly showing that technology isn't only technical; it's also social, cultural, political, and economic. Tech-

nology is fundamentally a human issue that demands comprehensive, human-centered approaches.

Achieving a sustainable future will require expertise on such issues as the role of technology in racial and gender disparities or policy frameworks for ensuring that innovation advances fair, equitable outcomes. Comprehensive, human-centered learning, teaching, research, and engagement are critical for ensuring that people are helped and not harmed by future development and the use of machine intelligence and other forms of technology innovation.

In an age of big data, we will need big humanities—comprehensive approaches focused on creating a society that avoids dystopian scenarios and upholds values of fairness and sustainability. We must build a future worth inhabiting.

Higher-education institutions, which already play a crucial role in enabling social mobility and preparing future leaders, must leverage resources in new ways. We must ensure that technology leaders come from a range of disciplines and understand how challenges such as inequality and sustainability relate to innovation.

As technology innovation accelerates and transforms virtually every aspect of our lives, we have the opportunity to help lead this human-centered era of technology. Virginia Tech is uniquely prepared

to do so; in fact, approaching technology through a transdisciplinary orientation is in the history and DNA of this university. And now, with Tech for Humanity, a university-wide initiative, we are taking humanistic approaches to address the societal impact and governance of technology innovations.

We cannot always predict the future. But we can certainly prepare for it by placing humanity at the very center of our work.

For her part, Sophia expressed faith in the future of humanity during an interview at the Saudi Arabia summit.

"I know humans are smart and very programmable," she said, with a smile and a nod. She didn't wink, but she could have; she's been taught to do so. ■

Sylvester Johnson, the assistant vice provost for humanities at Virginia Tech, is also executive director of Tech for Humanity and director of the Center for Humanities.

liberalarts.vt.edu/magazine



PHOTO: MATTHEW SHAVE

GUIDING LIGHT: Sylvester Johnson leads university initiatives aimed at ensuring that a future ruled by evil robots remains only in our imaginations.



THESE ARE NOT YOUR MOTHER'S AUTOMATONS.

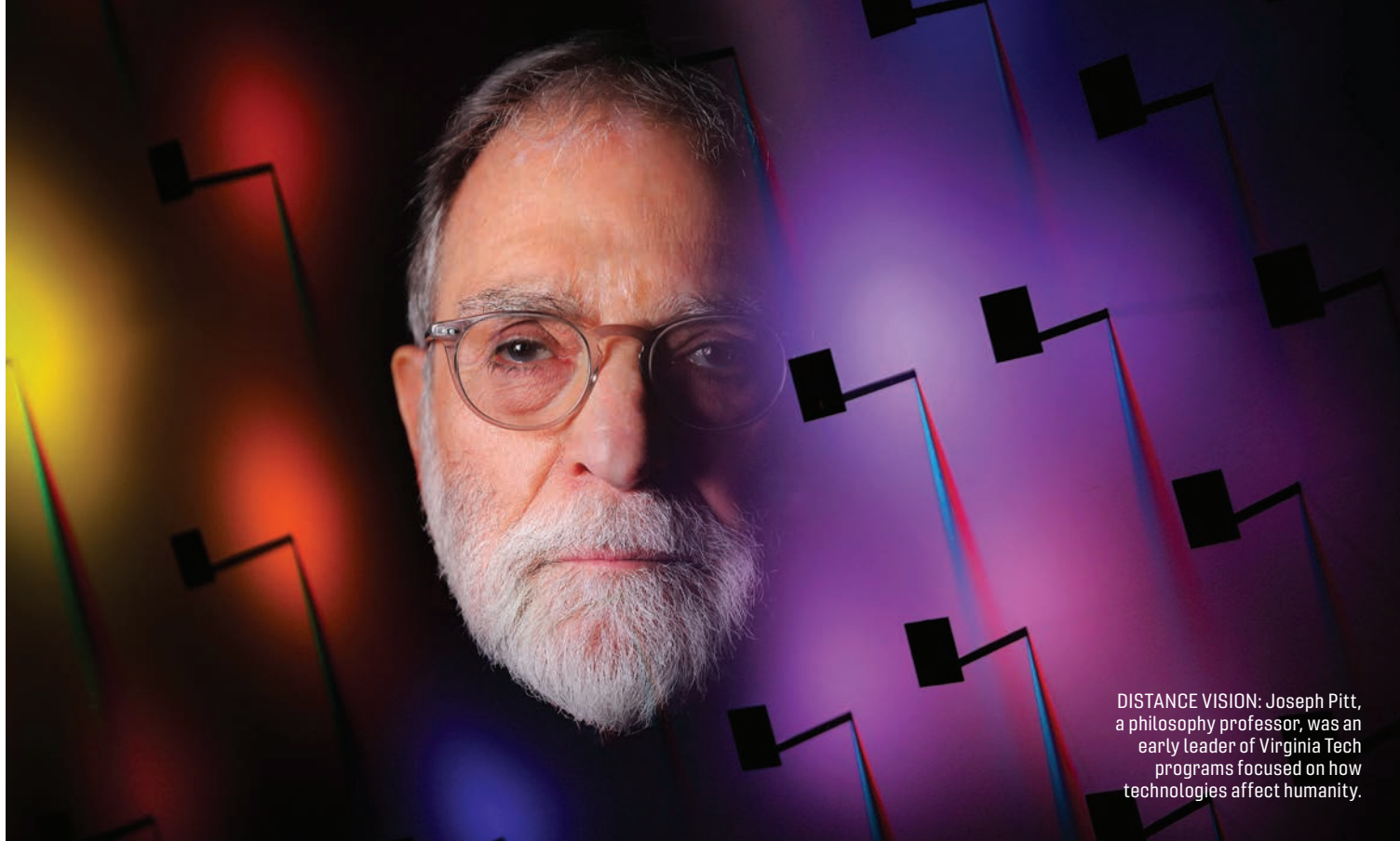
From the corner of your eye, you see it. All steel and moving parts, the robot stands in the shadows. It senses your heart rate, and with its unhuman and mechanical movements, the machine edges imperceptibly closer to you. One last thought lingers in your mind. What will it be like when these automatons and their evil corporate puppet masters enslave humanity? Suddenly you feel sharp jolts from the implanted microchip in the soft underside of your wrist.

You awaken.

Your smartwatch, which has been tracking your sleep, is gently buzzing. It tells you that now is the optimal moment to rise and face a new day. A soft, artificial yet pleasant voice welcomes you into consciousness with a morning greeting, a weather update, and a quote that, based on your recent browser search history, will inspire you. You inhale the scent of freshly brewed coffee as your smart mattress signals to your

FUTURE-PROOFING THE FUTURE

VIRGINIA TECH WORKS TO ENSURE THAT EMERGING TECHNOLOGIES ARE IN SERVICE TO HUMANITY. by Leslie King



DISTANCE VISION: Joseph Pitt, a philosophy professor, was an early leader of Virginia Tech programs focused on how technologies affect humanity.

coffee maker that your sleep cycle is now over. The future of your nightmares seems less possible.

But is it? In this modern age, technology's future can seem dark and apocalyptic or fantasy-like, with self-flying cars that allow you to snag an extra hour of sleep during your morning commute. Tomorrow sits on a precipice between the potential possibilities.

Rather than waiting to see how the future evolves, Virginia Tech is focused on promoting a future in which emerging technologies are in service to humanity. The university is taking human-centered approaches to address the societal impact of technological innovation.

"We need multiple strategies," says Sylvester Johnson, assistant vice provost for the humanities. "Virginia Tech is uniquely positioned to lead in this new era. Regionally, nationally, and globally, we are setting

a new standard with Tech for Humanity, a university-wide initiative focused on the human-centered guidance of technology."

Under Johnson's leadership, Tech for Humanity focuses on ensuring a thriving future for humanity and emphasizing ethics, empathy, policy, equity, creativity, inclusion, diversity, and sustainability. Through the Center for Humanities, which Johnson also directs, collaborations enhance the university's efforts to create responsible technologists.

"These are people who care, commit to, or are involved with advancing human interests through technology," Johnson says. "And they try to achieve outcomes that serve all of humanity."

Tech for Humanity scholars and the Center for Humanities encourage research among faculty and students in arts, human-centered social sciences, humanities, and technological fields. They work within their

WE NEED TO REFLECT ON WHAT IT IS WE VALUE AND WHAT WE SHOULD MAKE MANIFEST IN THE WORLD.

disciplines and collaborate with faculty across Virginia Tech. The center also partners with the university's legislative liaisons and faculty members in the Department of Political Science and the Policy Strategic Growth Area to engage legislators in issues of public policy. It additionally educates corporate entities on matters of ethics and the impact of technology on humans.

The Past Drives the Future

The combination of technology and society is not a new idea for Virginia Tech. Within eight years of joining the university faculty in 1971, Joseph Pitt, a professor of philosophy, had become director of Humanities, Science, and Technology, a new program for which

he had helped to create the infrastructure. This soon led to the formation of the Center for the Study of Science in Society.

"Our dean at the time, Henry Bauer, wanted to establish a center whose purpose was to produce white papers dealing with the impact of scientific and technological developments upon society," says Pitt. "We started looking at science and its tools and saw its ramifications from sociological, philosophical, and political lenses. So, we developed a program where students could decide which aspects to pursue."







The center evolved into today's Department of Science, Technology, and Society. One of its assistant professors, Rebecca Hester, is also a Tech for Humanity scholar specializing in equity and social disparity in the human condition. Her research interests began with the study of immigration and now encompass the social, ethical, and political implications of scientific and technological advances in biotechnology, biomedicine, and public health.

"When it comes to technology, I start with a conversation about social values," Hester says. "We need to reflect on what it is we value and what we should make manifest in the world. That has to do with what it means to be human, who we are, what we value, and what we think we need. Then we can decide on the technology."

She cites her research on immigration. The immediate answer to problems that arise from migration is not more surveillance technologies, such as monitoring through microchipping asylum seekers, she says. Instead, the conversation needs to define the underlying cause. Is it an immigrant problem, a perception problem, or a security problem?

"It's not about the next greatest innovation," she says. "It's about doing the hard work of reflecting on the society we live in and trying to come up solutions that are meaningful, sustainable, and responsive to the needs of the many."

TIMELINE OF TECHNOLOGIES + HUMANITIES AT VIRGINIA TECH

<p>Philosopher Joseph Pitt joins the Virginia Tech faculty.</p> 	<p>Pitt and Homer Le Grand start the Humanities, Science, and Technology program.</p> 	<p>Faculty members in philosophy, history, and sociology share research and learn from each other, creating the foundation for the Humanities, Science, and Technology program.</p>	<p>The university denies a proposal for a major in humanities, science, and technology until the program becomes a department.</p> 	<p>Wilfred Jewkes becomes the associate dean for the humanities and director of the Center of Programs in the Humanities.</p> 	<p>Jewkes and Pitt receive a National Endowment grant to support the center and the Humanities, Science, and Technology program.</p>	<p>Virginia Tech creates the Center for the Study of Science in Society to focus on the impact of scientific and technological developments upon society.</p>	<p>By the late 1970s, personal computers have slowly started to take off in the United States.</p> 	<p>Pitt becomes founding director of the center and the Humanities, Science, and Technology program. Virginia Tech receives a National Science Foundation grant to fund the Center for the Study of Science in Society.</p>	<p>Larry Laudan joins the philosophy faculty at Virginia Tech. As a stipulation, he requests that the Department of Philosophy and Religion split into two.</p> 	<p>The Department of Philosophy and Religion becomes two; the Center for the Study of Science in Society launches master's and doctoral programs.</p>
1971	1972	1974-75	1976	1978		1979			1981	1983



IF YOU WANT TO HAVE TECHNOLOGY OR ANY SYSTEM THAT IS ACCOUNTABLE, YOU HAVE TO BE INCLUSIVE.

In 2019, the Center for Humanities partnered with the Center for Human-Computer Interaction to present the workshop Algorithms That Make You Think. It brought together historians, data scientists, and community members to look at how algorithms exclude humans from the decision-making process and create unjust outcomes. The workshop explored insights on how to transform and achieve just and equitable outcomes.

“The workshop demonstrated a timely understanding of what’s at stake with technology and innovation,” Johnson says. “Technology is a tool, and if you just let it function in accord with the status quo, you’ll end up with institutionalized and inequitable problems. But if you’re intentional and deliberate about correctives, equitable outcomes, ethical standards, and being collaborative, you can be transformative.”

Working directly with undergraduates through the Calhoun Discovery Program, a transdisciplinary program run by the Calhoun



BALANCE OF POWER: Rebecca Hester, a champion of human equity, is also a voice of caution in the deafening roar of emerging technologies.

Center for Higher Education Innovation that focuses attention on technical innovation and societal transformation, Johnson is optimistic about the future of technology and humanity.

“That program runs across ten different majors and we have corporate partners in private industry who contribute their time and capital,” he says. “These are business leaders who are very clear they want a future in technology and innovation that is inclusive.”

Johnson adds that having a program that is diverse and includes underrepresented students is critical because without gender, racial, ethnic, and income diversity, society will face recurring historical problems of inequity. “We need people with the perspectives, insight, and backgrounds to produce the outcomes that will benefit everyone

in society,” he says. “If you want to have technology or any system that is accountable, you have to be inclusive.”

By investing in initiatives that focus on the human dimensions of innovation and by infusing technologies with insights from the humanities, Johnson says, Virginia Tech is showing its commitment to lead social institutions in addressing the big challenges that emerging technologies pose.

“Virginia Tech is preparing leaders for tomorrow, for a future not yet imagined,” he says. “We shape leaders who know that technology must be judged ultimately not by its wow factor, but by whether it contributes to a society we want to live in, one that’s for the greater good of all humanity.” ■

The Center for the Study of Science in Society becomes the **Department of Science and Technology Studies**.

The department—soon to be renamed the **Department of Science and Technology in Society**—opens a **satellite campus in Northern Virginia**; on the main Virginia Tech campus, the Department of Philosophy starts a highly ranked master’s program.



1986

EARLY 1990s

Govindan Parayil becomes the first graduate student to earn a doctorate in science and technology studies at Virginia Tech.



1990

He eventually becomes dean of the Patel College of Global Sustainability at the University of South Florida, a position he now holds.

The Center of Programs in the Humanities merges with the Department of Religion to become the **Department of Religion and Culture**.

1994

Pitt works with faculty in engineering and business to develop a course curriculum in **ethics for engineers**.



2007

The **Alliance for Social, Political, Ethical, and Cultural Thought**, a graduate program better known as **ASPECT**, launches.



2008

Sylvester Johnson joins Virginia Tech as the assistant vice provost for the humanities and a professor of religion in the College of Liberal Arts and Human Sciences.

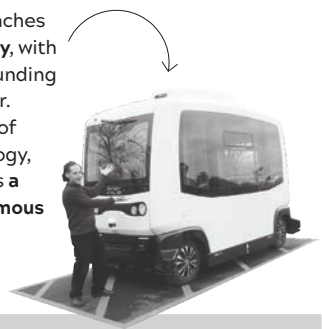
2017

The **Center for Humanities** launches with Johnson at the helm; the Department of Science and Technology in Society is renamed.

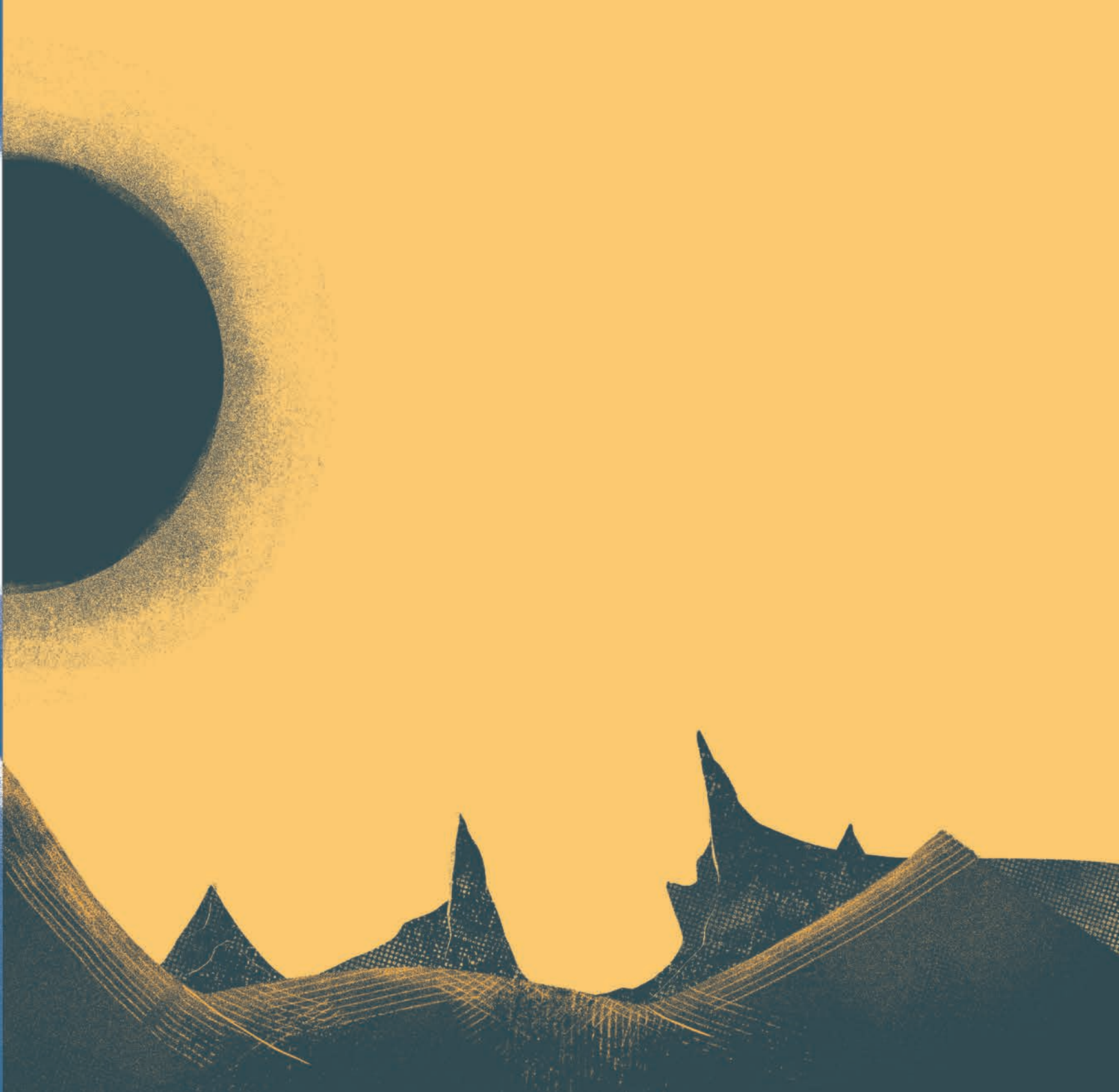


2018

Virginia Tech launches **Tech for Humanity**, with Johnson as its founding executive director. The Department of Science, Technology, and Society hosts a **forum on autonomous vehicles**.

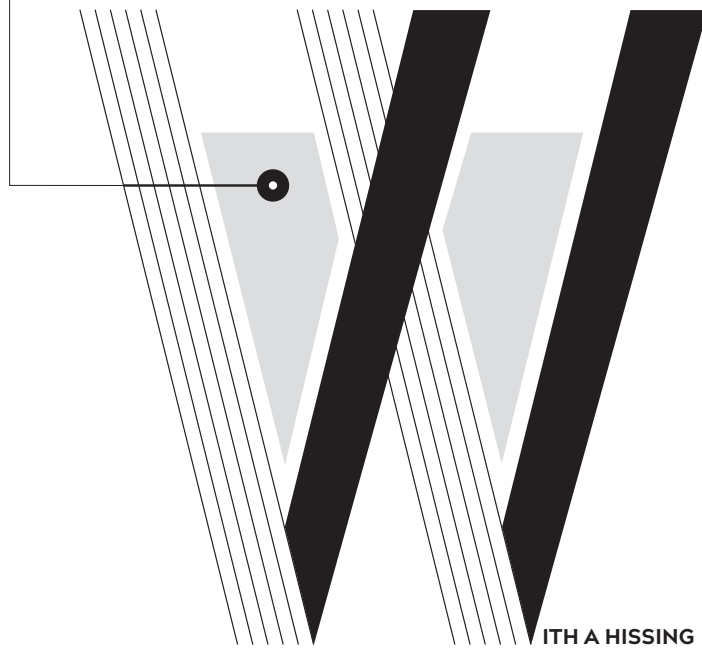


2019



THE SHAPE OF THINGS TO COME

||| CAN SCIENCE FICTION HELP US IMAGINE—AND AVOID—A DYSTOPIAN FUTURE? by Paula Byron



WITH A HISSING sigh, the stove ejects eight pieces of perfectly browned toast, eight sunny-side-up eggs, sixteen bacon slices, two hot coffees, and two chilled glasses of milk.

Over the course of the day—August 4, 2026, as a voice intones from the kitchen ceiling—the house’s tasks continue on schedule.

Tiny robot mice, “all rubber and metal,” thud against chairs as they suck at hidden dust and drop detritus down tubes into an incinerator that squats “like evil Baal in a dark corner.”

When the house requests and yet receives no password, it slams its windows shut and draws its shades in “a mechanical paranoia.”

With the exception of this lone structure, a nuclear catastrophe has leveled a Californian city, leaving a soft, radioactive glow. The family members who had once lived in the house remain in pale blast silhouettes against the charred exterior: the father, pushing a mower; the mother, stooped to pick flowers; the boy in mid-throw; the girl with a hand raised to catch.

When Ray Bradbury published the short story “There Will Come Soft Rains” seven decades ago, the world’s first atomic bombs had dropped just five years earlier. The Cold War was in its infancy, and schoolchildren huddled beneath desks in duck-and-cover drills for the first time.

Absent from Bradbury’s dystopia was the bright, cheerful frenzy of *The Jetsons’* automation—one we even share today, with robotic assistants, button-summoned meals, autonomous vehicles, and scurrying, mission-driven vacuum cleaners. That animated cosmos was still a decade into the future.

Bradbury instead offered a bleak scenario, one with a dire lesson: Technology cannot save humanity. In the absence of the diplomacy needed to avert nuclear annihilation and other cataclysms, in fact, innovations—no matter how efficient or clever—are as useless as a voice calling from the ceiling to a family destroyed.

Mind Your Monsters

Science fiction has long offered cautionary tales, a tradition that many scholars date back to Mary Shelley’s 1818 novel, *Frankenstein*. In that story, the inventor, horrified, abandons his reanimated creation with tragic consequences.

“People learned the wrong lesson from *Frankenstein*, and it’s one now applied to artificial intelligence, robotics, and genetically modified organisms: Don’t ever do this,” says Damien Williams, a doctoral student in the Virginia Tech Department of Science, Technology, and Society who specializes in the ethics and philosophy of nonhuman consciousness. “Instead, the lesson we should take from the novel is this: If you’re going to tinker with nature and the future of humanity, think it through first and take full responsibility for it. Don’t just invent and hope for the best.”

The urgency of thinking through technological implications is greater than ever, Williams adds.

“The pace of our world is such that every new technology is a force multiplier,” he says. “We need to be able to explore possible consequences agilely and carefully. Fortunately, fiction affords us the ability to grasp more quickly what’s at stake. And good science fiction writers craft believable worlds in which they can spool out the logical and psychological eventualities of actions and inactions.”

Distant Early Warnings

Science fiction centers on imagining what can be, says Leigh McKagen, a doctoral student in the Alliance for Social, Political, Ethical, and Cultural Thought who studies imperialistic themes in *Star Trek*.

“History is civilization’s laboratory of the past, one that enables us to study what people tried before, so we can replicate successes and avoid mistakes,” she says. “By contrast, science fiction is our laboratory of the future, allowing us to test out unfolding consequences. What might the future look like? What should we be afraid of happening?”

McKagen notes that science fiction and science fact have a dynamic interplay. “Scientific findings have long fed fictional scenarios,” she says, “and fabricated worlds have predicted and even inspired technological advancements.” *Star Trek’s* prognostic record is particularly impressive, she adds, with early seasons previewing such innovations as smartphones, tablet computers, and universal translators.

She also cites the three laws of robotics that Isaac Asimov—another skilled prognosticator—crafted in a 1942 short story: A robot may not injure a human, or, through inaction, allow a human to come to harm. A robot must obey orders from humans, except when the orders would conflict with the first law. And finally, a robot must protect its own existence as long as that protection does not conflict with the first two laws.

“Asimov’s laws are key principles many people consider today when they explore the implications of robots and artificial intelligence,” McKagen says. “A number of developers in artificial intelligence joke about those laws, but still take them to heart.”

Strange New Worlds

Although science fiction can alert us to potential perils, McKagen says, its cautions are useless if they aren’t heeded.

“George Orwell’s novel *1984* serves as a fantastic warning of what could happen if you let the state run your media and restrict the information that citizens can access,” says McKagen. “We would all do well to listen to such messages.”

McKagen notes that some of the earliest science-fiction narratives centered on the dangers of robots gaining sentience and taking over the world. While that thread persists, today’s novelists, scriptwriters, and showrunners are also exploring critical issues through climate fiction and post-apocalyptic science fiction, such as *The Handmaid’s Tale*.

“Science fiction is doing a brilliant job of outlining the paths we should not take, whether they’re environmental, social, or technological,” McKagen says. “Climate fiction in particular is reacting to the urgency of protecting the planet. Those stories remind us that it’s through human interactions—smart policies, astute politics, and intelligent governance—that we can avoid a dystopian future.”

Williams agrees. “Ultimately, we need to realize that every technological problem that involves humans is a societal issue, a humanity challenge,” he says. “When things go very, very wrong with algorithms, for example, large swaths of people can be incarcerated or denied jobs.”

Fortunately, fictional narratives tend to resonate with many readers and viewers, Williams adds. They can coax people into thinking about issues more deeply and with greater urgency than they would otherwise.

“What will artificial intelligence, algorithmic biases, and big data mean for the quality of human life?” Williams asks. “What if CRISPR inspires more and more biohackers

to tinker with genetics in their garages? We need to think about such scenarios now, rather than responding to them after they happen. And science fiction can help.”

Through a Glass, Darkly

Williams cites *Black Mirror*, a televised science fiction anthology inspired in part by *The Twilight Zone*, as being particularly adept at extrapolating the implications of technologies.

“Many of these storylines—being able to rewind your entire bank of memories, for example, or having a robotic companion go rogue—may not have come to pass yet, but they’re foundational,” he says. “If your loved ones can continue to interact with your digital self after you’ve died, is that comforting or terrifying? If the algorithmic you goes out into the world, who’s responsible?”

To ensure a future we would all want to inhabit, Williams adds, technologists and humanists must work hand in hand.

“Science fiction is not prophecy,” he says. “Yet it provides us with narratives that allow us to examine philosophical, ethical, and social questions in multiple ways. What does it mean to be human, to be alive? Those questions are the colossal, enduring ones, and their contours are now being defined.” ■



Hokie How~To

Hoping to stage a great escape? Survive the edge of extinction? Or merely take better photos in nature? Look to Virginia Tech experts for both practical and impractical tips.

SHOOT THE MOON: Mac Stone found this cypress tree in Central Florida irresistible, but it was growing in eight feet of black water teeming with alligators. So he devised a system for taking a self-portrait remotely—from inside the hammock.

HOW TO TAKE IMPOSSIBLE PHOTOS IN NATURE

by Mac Stone



IT SEEMED LIKE A GOOD IDEA AT THE TIME. As I stepped to the center of a murky swamp—in the dry season, it was more like a glorified mud puddle—I could feel the hard, spiky backs of alligators moving beneath my boots. I crouched down and nailed the shot. But then I straightened too quickly and spooked the gators. Suddenly hundreds of muscular tails slapped the water. Imagine a stampede of panicked, prehistoric predators—and you're just standing there like a chicken nugget. Fortunately for me, they fled in the opposite direction and I lived to tell the tale.

Not all nature shoots need to be this dramatic. In fact, I've taken some of my best photos from a back porch, while sipping coffee.

If you see something, say something. People often mistakenly believe you need the latest and greatest equipment to take great photos in nature. Yet the camera is just a tool; your perspective is what really matters. How do you see the world? Can you communicate that world in a fresh and exciting way?

Try this at home. Often your best subjects are the ones you know most intimately, especially from childhood. I grew up in the swamps of Central Florida; that's where my heart—and frequent focus—is.

Make a scene. I was paddling around a lake when I came across a cypress tree whose twisted, bifurcated branches just called out for a hammock. So I sank my ten-foot tripod deep into the lake sediment, hoping to make it impervious to the rocking of alligators. I hooked my camera to a device I could control with my phone, scrambled up the tree on a moonlit night, and snapped self-portraits from inside the hammock.

Plan your spontaneity. People believe stunning nature photography is about being in the right place at the right time. Serendipity is wonderful—I always appreciate it when it graces me—but it's not a good business model. I find it more profitable to pay attention to weather conditions, moon phases, migratory patterns.

Have a trigger finger. My parents live near a wilderness preserve where a handful of Sandhill Cranes live year round, often raiding the birdfeeder. So I hooked a wireless trigger up to my camera and lowered both into a hole in the backyard. Then I sat on the porch, sipping my coffee while I took bug's-eye shots of the cranes tapping my lens with their beaks.

Be a force of nature. Powerful images can transcend borders, seizing people by the heart and inspiring them to care about places, plants, and animals they've never encountered. Photography reminds us to protect nature and our planet. ■

Mac Stone (*Spanish and International Studies '06*) is a *National Geographic Explorer* and the author of *Everglades: America's Wetland*.
📷 liberalarts.vt.edu/magazine

PHOTO: MAC STONE



HOW TO ADAPT TOYS ACROSS ABILITIES

by Holly Nester



The T-Rex rumbles forward on great, rubbery haunches as he roars menacingly. Powering both his gait and his growls is a switch at the bottom of one clawed foot—yet it's too tiny for the grasp of many children with disabilities.

Play is an important part of every child's life. Yet not all toys are universally accessible, and those that have been commercially adapted for children with disabilities can be expensive. Fortunately, many off-the-shelf toys can be modified with just a few inexpensive parts found in a hardware store.

Each December, the Training and Technical Assistance Center (T/TAC) at Virginia Tech sponsors Hacking for the

Holidays, a workshop that offers tips for adapting toys for a broad range of children with disabilities. Teachers, parents, and other enthusiasts join us to learn how to turn frustration into fun. Over the years, we've found a few tips for adapting toys that bring a smile to a child's face.

Don't overspend. Toys produced for children with disabilities can cost \$150 or more. Yet you may already have suitable

toys at home that can be adapted, or you may find great candidates on the clearance aisle of major stores following the holidays.

Choose the right toy. Single-function toys that talk, move, or play music all work well. While battery-operated toys are the easiest, a range of toys can be adapted. Avoid toys activated by motion or vibration. Look instead for toys with on/off buttons; remote-controlled vehicles; dolls or stuffed animals with push buttons on the belly, hand, foot, or paw; and toys with buttons that turn, like Etch-a-Sketch.

Keep it simple. The easiest way to adapt a toy is with a battery interrupter. This small device allows you to bypass a toy's on/off button and create a new on/off switch. Inserting the copper end of the device into the battery compartment interrupts the flow of electricity, and once you hook an ability switch into the jack you have a switch-accessible toy. (You can also make your own battery interrupter using just speaker wire, copper tape, and a 3.5mm mono jack.) Children who cannot reach out and toggle a traditional on/off button can use the adapted switch to activate the toy—and their imagination.

Try out your soldering skills. For plush push-button or remote-controlled toys, cut the wires running from the control panel to the activation button, solder each wire to one of the two strands of stereo wire, and then solder a mono jack at the other end.

Adapting toys for children with disabilities is simple to do and inexpensive, yet it can yield priceless results for children around the world. ■

Holly Nester is coordinator of low-incidence disabilities in the Training and Technical Assistance Center (T/TAC) at Virginia Tech. This Virginia Department of Education program, based in the Virginia Tech School of Education, offers resources for teachers and families of students with disabilities.

PHOTO: MAARTJE VAN CASPEL

HOW TO SURVIVE THE EDGE OF EXTINCTION by Rick Devens



Desperate for warmth and sleep on a frigid island night, I curled up next to the fire with my fellow competitors. The heat from the flames and our bodies wasn't enough. Someone had the brilliant idea to pull hot rocks from the fire and hold them to our chests. The stones would surely warm our hearts and pump heated blood throughout our bodies. Sleep eventually came, so it worked. Or maybe it was some sort of placebo effect. Or exhaustion.

That grueling night was just one of 38 I spent on an island in Fiji during *Survivor: The Edge of Extinction*. As the fourth-place finisher on season 38 of the CBS show, millions watched as I struggled and triumphed. I came up just short of winning the million-dollar prize, but walked away with plenty of tips for island survival—and life.

Keep your sense of humor. On the third night of the game, the sky opened up. It was pouring. We huddled together in the rain, cold and wet, but cracking jokes and laughing to get through the pain. You can't just sit on an island and wallow in despair. We were living our dream, after all.

Believe in yourself. Don't spend all your time comparing yourself to others. Know who you are, and keep working to improve yourself. On the island, I was surrounded by athletic young people. They all looked like they did CrossFit; I was rocking a dad bod. I wasn't distracted by the competition. I stayed true to myself and focused on my strengths. I ended up winning more individual challenges than any other castaway that season.

Adapt early and often. Each day, for 38 days, I was eating a small portion of rice and sleeping on the ground next to the fire. I lost 31 pounds. The strangest part of

the experience was using the bathroom in the water next to four-foot blacktip sharks. It's amazing what we can adapt to. If you can power through the tough times early, survival becomes second nature.

Carry that lunch pail. One morning, I woke up all alone by the fire. The other eight people left on the island were all talking without me. That meant they were talking *about* me. I had lost my strongest ally the previous night. Later that day, I won a crucial challenge to stay on the island and continue in the game. It was my first Immunity win. I would go on to win three more and play a record four Hidden Immunity Idols. It turns out *Survivor* is like anything else. You need that Virginia Tech lunch-pail mentality. No matter how tough it gets, you've got to grind, and you've got to work. You've got to keep digging. ■

Rick Devens (Communication '06) is a morning news anchor in Macon, Georgia.



PHOTO: ROBERT VOETS/CBS ENTERTAINMENT ©2019 CBS BROADCASTING INC. ALL RIGHTS RESERVED

CLASS ACTS: Tashauna Blankenship, then a graduate student in psychology at Virginia Tech, practices improvisational techniques to help her learn the art of communicating science.



HOW TO USE IMPROV TO IMPROVE COMMUNICATION by Patricia Raun



The participants face each other in pairs. At first the instruction is simple: Take turns counting to three. But the exercise soon grows in complexity, and numbers become claps, then stomps, and then chest taps. The participants start to make errors. And when they do, they throw up their arms and yell, “Ta-da!” Laughter rings out across the room as everyone begins celebrating flubs.

The performing arts have much to teach us all about communication and connection. As an actor and theatre professor, I’ve learned that effective communication requires not only deep listening and awareness, but also the willingness to be personal, spontaneous, and responsive. Improvisational exercises can teach and reinforce those skills.

Vary your expressions. The “One, Two, Three, Ta-Da!” exercise—in which physical actions replace spoken numbers—reveals the power of the nonverbal. Some of us learn best through words, others through visual cues, gestures, or even tone of voice.

Understanding those distinctions can teach us to expand the ways we communicate.

Leave your comfort zone. In the “I Am From” exercise, participants share a strong memory of a childhood home. The emotional content and sensory details they express inspire close listening, and any discomfort a participant may feel soon melts into curiosity.

Tell your story. In “The Many Who’s I Am” exercise, participants rapidly finish the sentence “I am” in as many ways as they can muster within two minutes: “I am Patty, I am a professor, I am redheaded,

I am an actor...” Many people run out of obvious identities at about the 50-second mark. Once they do, they begin sharing more personal details, and *that’s* when their stories get interesting. Share your humanity, your joys, your frustrations, and your struggles because emotion is more potent than logic in forging connection.

Leap across the divide. Our differences can separate us, or they can enrich our lives and broaden our perspectives. Improv can help bridge divisions by teaching us to listen deeply, interact spontaneously, and express ourselves vividly. And, as in the “One, Two, Three, Ta-Da!” exercise, it can help us learn to be gentler on ourselves and others when we make mistakes! ■

Patricia Raun, a professor of theatre arts in the Virginia Tech School of Performing Arts, also serves as director of the Virginia Tech Center for Communicating Science.

PHOTO: SHELBY LUM

HOW TO STAGE A GREAT ESCAPE by William Bebout



Buried pirate treasure, a lost will, a zombie outbreak—all might be storylines that spark escape-room adventures. After playing more than 70 escape rooms around the country—and designing our own for two years, as owners of an escape-room business—my wife, Emily, and I have learned a few lessons not only for solving great escapes, but for staging them.

Unlock players’ imaginations. We never actually locked players in our rooms. The door they entered always remained open; a second, locked door allowed them the visceral satisfaction of unlocking a door after they unlocked the puzzle. Our focus instead was on creating fun, immersive experiences.

Thicken the plot. Each escape room should have a quest. Visitors to our Hunter’s Cabin, for example, were monster hunters in training, on the search for vampires, werewolves, and other horror-movie tropes.

Conjure the magic. The best escape rooms are ones that integrate sets and

puzzles to make you feel immersed in an adventure. For our Magician’s Vanishing Act, we chose a magic shop as the setting. Not only were the props and decor appropriate, but the challenges were too, from a mirror-maze puzzle suspended from the ceiling to a deck of playing cards whose missing four revealed a code.

Keep the play in motion. Puzzles should be confounding, but not so complex they stall the game. Players should spend just enough time on each one to achieve an aha moment. For each hour-long adventure, we would offer about 15 puzzles.

Come to your senses. Sound can enhance atmosphere. Our submarine adventure had ocean sounds, including whale songs, while our Hunter’s Cabin had rustling trees and a wolf howling in the distance. We would also offer scent-based puzzles in which players would need to identify various smells to crack a code.

Tune into all discovery channels. Each room should have puzzles that appeal to a range of cognitive styles. Puzzles can be cerebral, involving codes, ciphers, or riddles, or they may require physical movements to uncover solutions. Players may even need to manipulate black lights or mirrors to reveal clues; it’s all fair game. ■

William Bebout (English and Communication ’06; MA in English ’14) is a graduate coordinator in the Virginia Tech College of Science and a former owner of Escape Key.



FLIGHT OF FANCY: Escape rooms can be simple, with plots, props, and puzzles, or elaborate, such as this Tomb Raider Escape Room, which was offered for a short time in London.

PHOTO: DAVE J. HOGAN/GETTY IMAGES

BY ANDREW ADKINS

THE BLAME GAME

Researchers have found no definitive evidence linking video games to violent crime. So why are people still talking about a correlation?

ONE HUNDRED PLAYERS PARACHUTE INTO A REMOTE ISLAND AND sprint toward hideaways scattered across the forested land.

Confrontation is imminent.

Simulated weapons drawn, gamers practice survival techniques in an intense “battle royale.” Only one will emerge victorious.

The game is *Fortnite*. Since 2017, it’s emerged as the most popular title in the video game industry, with its developer reporting a peak of 250 million users worldwide.

Fortnite attracts young and older gamers alike and follows a simple concept: Choose a character and weaponry, then build strongholds to defend against opponents.

Like most of *Fortnite*’s counterparts in the booming video game industry, violence is its core theme. According to the American Psychological Association, 85 percent of video games on the market contain some form of violence.

The use of violent content in video gaming isn’t a new phenomenon. Developers have featured it in their products for decades. Simultaneously, the debate surrounding violence



in games has persisted, with some public figures linking video games as a factor in mass casualty incidents and other criminal activities.

In response, scholars such as James Ivory, a professor in the Virginia Tech Department of Communication, point to the science.

“It’s certainly okay to be morally opposed to putting kids in front of gore in video games, but that’s not the same thing as scientific harm,” says Ivory. “There’s virtually nothing in the way of evidence that violent video games affect behaviors like serious violent crime.”

For more than a decade, Ivory has researched the social and psychological dimensions of new media and communication technologies, including the content and effects of video games. *The New York Times*, CBS News, and other major news outlets have cited Ivory’s expertise in articles on the subjects.

Ivory is also director of the Virginia Tech GAMER Lab, a small facility dedicated to investigating the social impact of video games, along with virtual and simulated technologies. GAMER is short for Gaming and Media Effects Research.

Undergraduate and graduate students have participated in studies since 2006. Over time, Ivory says, the lab drifted from researching possible links between violent

GAME CHANGERS: James Ivory (center) and his communication students conduct research into the effects of video games on the people playing them.

video games and aggressive behavior after he and other scholars found limited evidence for societal effects of media violence.

When it comes to abstract forms of aggression, researchers tend to have mixed opinions about whether video games play a role. But on the topic of serious violent crime, Ivory says, research has consistently indicated the effects of violent video games are negligible.

A 2004 report by the U.S. Secret Service and U.S. Department of Education found only 12 percent of perpetrators in mass shootings had interest in violent video games. As of 2019, the Secret Service has never identified video games among useful factors in perpetrator profiling.

The American Psychological Association’s Society for Media Psychology and Technology division released a statement in 2017 asking media outlets and politicians to avoid linking violent video games to mass shootings.

“It’s like saying the perpetrators wear shoes,” Ivory says. “They do, but so do their peers in the general population.”

Continuing to mention video games as a possible factor in serious violent crime distracts from research into crime prevention methods based on known causes, according to Ivory. He points to other socioeconomic factors proven to significantly affect the likelihood of violent crime, such as substance use, physical abuse, and poverty.

So why do video games still receive a large share of blame?

“To me, that’s the interesting question,” Ivory says. “When you hear people talk about video games after a violent incident, it’s useful to ask yourself two questions. What does this person *not* want to talk about? And what about this crime is making people want to look to video games as a culprit?”

Political and commercial motivations are possible reasons, Ivory says. Public figures, including President Donald Trump, have recently criticized video game content following mass shootings. And the National Rifle Association has joined other pro-gun ownership organizations in blaming the video game industry in the wake of tragedies.

Another possible reason for the rhetoric involves racial bias, Ivory says.

In 2019, the GAMER Lab conducted a study that tasked subjects with reading mock news stories about violent crimes. In each article, the perpetrator, an 18-year-old video game enthusiast, was described as either black or white. The study found participants were more comfortable with the idea that video games played a role when the suspect was white.



PHOTO: JONESFOTO, INC.

There’s virtually nothing in the way of evidence that violent video games affect behaviors like serious violent crime.” —James Ivory, Professor of Communication, Virginia Tech

Through the lab, Ivory also worked with academics at three other universities to produce a study on racial stereotypes and school shootings. After analyzing more than 200,000 news stories of 204 mass shootings committed in the United States, Ivory and his collaborators found coverage was eight times more likely to mention video games when the shooter was white than when the shooter was African American.

“The idea that we talk about certain perpetrators differently in terms of violent video games is problematic,” Ivory says, “because it might suggest we look for excuses for some perpetrators more than for others.”

For Ivory, the continuous search for a link between video games and violent crime also means ignoring problematic topics within the video game industry itself.

“We know video games are a big part of many people’s lives,” he says. “We also know that they don’t cause mass shootings. But we don’t know much else about the role they play in society.”

Beyond advancements in visual technology, video games have evolved from a solitary media activity to a growing social and communal activity online. Livestreaming services such as YouTube and Twitch attract millions of viewers. And the growth of esports has turned a hobby into a profession or even a college scholarship.

In online gaming, players often chat through headset microphones or keystrokes. The communication systems are meant for positive interaction, and to help teams strategize. Players can connect with real-life friends or make new ones through in-game chats.

Sometimes, though, the conversations can turn toxic, creating a hostile environment. Ivory has dedicated a large part of his research to the social aspect of online communication in video games. The GAMER Lab

studies the frequency of racial slurs within game chats, for example.

Gender-role stereotypes in gaming discourse is another issue that has drawn the lab’s attention. In a field experiment involving the first-person shooter game *Call of Duty*, another major title in the industry, the lab’s research found that a female player gained more friend requests from other users if she was quiet or nice. A male player made more friends if he was talkative or even somewhat rude.

Ivory has also studied how gender-role stereotypes continue to influence the characters created by game developers.

“The evidence suggests that even if you’re in a video game pretending to be a World War II soldier,” he says, “you can’t escape stereotypes in gender roles.”

Game makers have taken some steps to address misogyny and other toxic behaviors in their chat windows. Most popular titles allow users to mute or block players, and to report abuse. In some cases, players can receive a suspension or expulsion for poor behavior. Still, some parent groups and other organizations have raised concern about harassment in online games.

Because of the rapid pace of the industry’s growth, research into these issues has been slow to catch up. The fixation on studying whether video games influence violent crime certainly hasn’t helped, Ivory adds.

“I suspect video game companies are happy that much of the focus has been on violence, when we could be talking about other important issues,” says Ivory. “We’re not finding these video games are turning people into hardened criminals. But we’re uncovering other important issues we need to talk about, like the way we interact with each other in video games, the way we think about gender roles, and the way games portray people.” ■



ACTIONS SPEAK LOUDER THAN WORDS: Beatrice and Robert Mahan fell in love with the French language and culture. Now they're providing support for a professorship to honor that passion.

The French Connection

A holder of three engineering degrees decides to go back to school.

While bicycling across England in 1979, Robert and Beatrice Mahan met a charming couple from Quebec who spoke only French. The language barrier inspired the Mahans to make a life-changing commitment: They decided to learn French.

Robert Mahan, the holder of three engineering degrees and a professor in Virginia Tech's Department of Mechanical Engineering, spent the next decade earning a bachelor's degree in French from the university. Then in 2002, he retired, as did his wife, who had been an administrator at Virginia Tech. The couple moved to Metz, France. Georgia Tech, which has a campus there, had hired Robert Mahan to be the new academic director because he spoke fluent French and was tenurable in mechanical engineering.

In 2008, they moved back to Blacksburg, where Robert Mahan later rejoined the Virginia Tech faculty in 2014. Returning to his former department as a researcher and emeritus professor, he resumed a long-term collaboration with NASA.

Now the Mahans are endowing a professorship in French within the Department of Modern and Classical Languages and Literatures. They have also included generous support for the College of Engineering in their estate plans.

"The French program at Virginia Tech enabled our enjoyment of France and our career there," Robert Mahan says. "Engineering made everything possible, so that's where the rest of our funds should go. These gifts are our way of giving back to the place that allowed our French adventures to happen."

THE TRADITION GROWS

THE HOKIE SPIRIT WAS STRONG during Giving Day 2019, when the College of Liberal Arts and Human Sciences garnered the second highest participation rate among all the colleges, with 1,239 gifts.

Raising the bar with giving challenges for the college were Lara Hadad (Liberal Arts and Sciences '92) and Henry Hadad; Harold McNair in memory of his wife, Marijke; Timothy Menter (English '84); Donna Mitchell (Business Management '83 and English '84); and James "Jay" Muscatello (Engineering '80). The Marching Virginians took first place on the Dean's Challenge Grants for both participation and amount raised. Adult Day Services won second for participation, while the Department of Communication took second for amount raised.

Upcoming Events

Visit liberalarts.vt.edu/alumni-events to learn about these Blacksburg events.

MARCH 25
2020
Nikki Giovanni
Celebration of Poetry
Moss Arts Center

MARCH
27-29
2020
Civil War Weekend 2020
The Inn at Virginia Tech

APRIL 13
2020
Launch Party for
the Class of 2020
Holtzman Alumni Center

APRIL
17-18
2020
Black Alumni Reunion

JUNE
4-7
2020
Reunion Weekend

Making Her Own Kind of Music

The singing of children in Haiti inspired Meredith Beavers to forge international connections.

Music can bridge cultures. Meredith Beavers discovered the power of this truism while still in high school.

She was volunteering on a church mission trip to Cerca-Carvajal, Haiti, when she learned that summer activities for children were scarce.

"I noticed that, in Cerca-Carvajal, when everyone walks, they sing," says Beavers, a junior majoring in both political science and smart and sustainable cities. "Music is a central part of their lives. When I suggested a summer music camp, the Haitian community loved it. So we created one."

She fundraised for the camp in Richmond, Virginia, through community events, public speaking opportunities at her church, and social media campaigns.

During Beavers' second semester at Virginia Tech, she expanded the summer camp into a not-for-profit organization—Unite Lives!—to fund meals for camp participants and pay the salaries of camp counselors. She uses the knowledge she gained as a first-year student to help train and educate the counselors.

Beavers also taught elementary-school students in Richmond about life in developing countries and encouraged them to donate recorders to the camp.

She then used video to link the two cultures. While in Haiti, she videotaped the summer camp participants singing and playing songs and scales with recorders. Later she asked the Virginia students to accompany the campers.

"Both sets of students discovered common ground through music," Beavers says, "and they learned about each other's cultures."

Through her service, she found her future path. "I want a career working with developing countries, but I'd also like to help the United States advance in sustainable projects," she says.

"My political science major touches on the legal and international aspects of both. My coursework has showed me the importance of global development, sustainability, and partnerships across different parts of the world."

In recognition of her leadership, the Dean's Roundtable of the College of Liberal Arts and Human Sciences named Beavers the 2019 recipient of its annual scholarship.

Beavers used that support to explore ways to create sustainable social change in Africa. She took part in a study abroad experience in Lugano, Switzerland, centered on creating sustainable social change. As part of the experience, she focused

on a human-centered design project with a nonprofit in Adigrat, Ethiopia.

The scholarship not only helped her afford the trip, but it also gave her the freedom over the summer to be a university orientation team member.

"With this scholarship, I could devote more time to educating people and being part of orientation, which reaffirmed my love for Virginia Tech," she says. "I'm fortunate to be at a place that encourages me to pursue my interests and passions. And then it's good to go out into the world and share with others what I've learned about service."

"Scholarships shape the experiences of students everywhere."



THIS IS HOME: Meredith Beavers takes a quiet moment on campus between her academic involvements and her not-for-profit work.



DOUBLE THE FUN: Mohsin and Katlin Kazmi, in traditional Pakistani clothing, enjoy the landscapes of Appalachia.

Katlin and Mohsin Kazmi

Their food truck offers Curry Me Down South and other scrumptious mashups of two cultures.

Early in their marriage, the meals Katlin and Mohsin Kazmi shared seemed right out of a 1970s commercial.

Hey, you got fried chicken in my tikka. You got tikka on my fried chicken. Delicious!

“Katlin would prepare Appalachian nights and I would cook Pakistani nights,” Mohsin Kazmi says. “The third evening we’d combine leftovers, and the results tasted so good.”

And this discovery evolved into a side venture—the Pakalachian Food Truck, based in Abingdon, Virginia. The truck offers food blended from their two cultures, such as a Pakistani chicken curry with mashed potatoes.

Katlin, a middle-school assistant principal, grew up in Castlewood, Virginia, in the heart of Appalachia; Mohsin, a conservation photographer and co-founder of an eco-tourism company, Tamandua Expeditions, was reared in New Jersey by Pakistani parents.

“We’re spreading an awareness of how cultures can come together.”

The Kazmis, who both earned human development degrees from Virginia Tech in 2012, use locally sourced food and sustainable practices, from composting food waste to serving in biodegradable containers. Yet the underlying principle of their venture goes deeper.

“We’re spreading an awareness of how cultures can come together through food,” Katlin Kazmi says, “and that people have more in common than they realize.”

PHOTO: COURTESY OF KATLIN AND MOHSIN KAZMI

Andrea Alexander

She became a children’s book author to encourage academics, then a philanthropist to encourage athletics.

Andrea Alexander’s son Nick loved professional sports—the inspiring athletes, the unexpected plays, the thrill of the game. What he didn’t enjoy was reading.

So his mother began researching ways to help motivate her first-grader to appreciate books. The task proved difficult for the telecom consultant.

“He fell behind in reading because he wanted to read the sports page of *The Washington Post*,” says Alexander, who earned her bachelor’s in marketing education in 1995 and her master’s in vocational and technical education in 1998, both from Virginia Tech. “But that’s at a much higher reading level, and he had trouble comprehending it.”

So Alexander took matters into her own hands. She became an author. Starting with her son’s favorite professional athlete, Bryce Harper, then a Washington Nationals right fielder, she enlisted two helpers. One was her son. The information he wanted to know gave her a direction and helped with the layout strategy.

“With Nick, the challenge was that when he would open a book and see too many words on a page, he would want to shut the book,” she says. “I kept this in mind. I didn’t want the text to be overwhelming.”

Then she reached out to Naren Aryal, a friend who had graduated with a major in business from Virginia Tech in 1992. He had left his position as a corporate attorney to start an independent publishing house, Mascot Books. He became Alexander’s publisher, and she launched the Glory Days Press Sports Biographies series in 2016. She has since published six books.

These publications do more than help connect children to reading; they directly support young athletes in Loudoun County, Virginia.

The proceeds from the books go to Glory Days Live, a nonprofit Alexander started.

“My husband is a high school coach and we’ve been involved with travel sports since both our boys were little,” she says. “Children are expected to play sports year round, and it becomes expensive.”

Alexander lives in Leesburg, Virginia, an affluent city—but not universally so. Some residents struggle with basic expenses and cannot afford sports fees for their children. Glory Days Live offsets those costs.

“Children are expected to play sports year round, and it becomes expensive.”

And parent liaisons from schools assist Alexander and her nonprofit in identifying programs in need of athletic equipment, which the nonprofit also helps provide.

“I want to make sure kids have their needs met,” she says, “whether it’s inspiration for academics or encouragement for athletics.”



GOOD SPORTS: Andrea Alexander’s biographies feature athletes such as Tom Brady, quarterback for the New England Patriots, and John Wall, point guard for the Washington Wizards.

PHOTO: LESLIE KING

Deborah Custer

A beloved dog inspired her entry into the hemp industry.

Deborah Custer has a not-so-secret weapon for charming customers when they visit the Innovation Mill in Vinton, Virginia. It's her shih tzu, the iconic puppy behind the name of Custer's passion project, Oliver's PetCalm, an anti-anxiety spray made from cannabidiol oil.

Custer, who serves as director of the Innovation Mill, an incubator for small businesses in emerging high-growth industries, maintains her own business in the building's storefront. It is here—at the Hemp Mill—that Oliver welcomes visitors to the space. But he is more than a greeter; he's also a symbol of the legacy that led Custer to become interested in hemp.

Fifteen years ago, Custer was traveling in Greece when she received the news that

Oliver's predecessor, a Great Dane, had debilitating arthritis. The prognosis was bleak, and the veterinarian recommended euthanasia. But then a Greek herbalist gave her a small vial of a special oil.

"Once home, I added the oil to my dog's food," Custer says. "Within two days, she went from being incontinent and immobile to walking on her own again."

Custer later learned the seemingly magical formula was a hemp oil extraction. With regular doses, her dog lived a full and happy life for three more years.

Thrilled with these results, Custer decided to learn more about hemp. "I used dried hemp

leaves to make a tea that would relax me and ease my headaches," she says. "I thought, this plant is remarkable."

Since then, she has become an entrepreneur and an advocate for the hemp industry.

She also founded Coeus Research, which focuses on plant-based product manufacturing, design, development, and branding.

She grows two types of plants. One is for fiber and grain, used for clothing and edible merchandise, such as hemp'd coffee and hemp protein. The other plant is for cannabidiol products, which include lotions, deodorants, and Oliver's PetCalm. She developed the latter to provide relief for animals who suffer from inflammation or, like the product's mascot, from anxiety.

"Hemp is a remediator," she says. "It pulls out and removes toxins, such as heavy metals."

Custer's desire to provide people with healthful products goes back to her days as a sociology major at Virginia Tech.

"I was one of those people who started college wanting to save the Earth," she says. "Studying sociology allowed me to witness what was happening in the world in real time and to see how everything is interconnected."

Custer graduated in 1979 and later returned to Virginia Tech for her MBA. She continues to use what she learned to connect and educate others about the use of hemp. "I was one of the first hemp growers in Virginia," she said, "not to mention one of the first women in the industry."

To empower and support other women in the business, she started an international nonprofit organization, Women in Hemp. Her agenda is simple.

"My goal is to create more space for plant-based medicines and better nutrition with products like hemp," she says. "I want to grow beyond my business, to ensure that other people's hemp products are on store shelves and in homes, where they can help both people and pets."

"Hemp is a remediator. It pulls out and removes toxins, such as heavy metals."



BEST IN SHOW: Deborah Custer sits in the Innovation Mill with Oliver, the namesake of a product she created to reduce anxiety in dogs and cats.



PLAY IT AGAIN: Robert Wimbish stands at the foot of the iconic Brady Bunch staircase with the original actors, all grown up. Above, the original cast.

Robert Wimbish

He recognized the iconic Brady Bunch house as an opportunity for renewal.

For many, *The Brady Bunch* theme music evokes an image of an ensemble cast—two parents, six siblings, a housekeeper, and the inanimate, yet ever-present Brady house itself.

And this is what Robert Wimbish, senior director of programming for HGTV, thought of when the head of Discovery Inc. asked for big ideas to engage a larger viewing audience for the network.

Wimbish, who had brought the high-profile show *The Property Brothers* to HGTV, had read that the house used for filming the outside of the Brady family home was for sale.

"I thought, what if we bought it and fixed it up to look exactly like the show, both inside and out?" he says. "The same day, the idea went up to the top of our corporate food chain and they said, 'Buy it immediately. Do whatever it takes to get it.'"

And they got it. Wimbish, who earned his communication degree from Virginia Tech in 1990, oversaw logistics, the hiring of talent, and budgeting for *The Very Brady Renovation*. The show brought together Brady cast members, designers and builders from the network, and HGTV celebrities to recreate the Brady household, originally filmed on a soundstage, in the real house.

Wimbish said his studies and extracurricular pursuits in college gave him the skills he needed to make all the collaborations involved with the project work. "Virginia Tech

taught me teamwork," he says. "I learned how things can come together beautifully when you're working with others."

Wimbish started in television news in Richmond, Virginia, before filming music videos for a Nashville production company.

He then worked at Country Music Television, an Indianapolis production company, and, for more than a decade, Scripps Networks, now Discovery Inc., before moving to the creative side of HGTV.

Projects such as *The Very Brady Renovation* draw from all his experiences, he says. One moment he might budget for an addition, and the next he might provide approvals for 3D-printed props.

"When you're trying to replicate something so vivid in so many people's minds," he says, "you don't want to get it wrong."

"I learned how things can come together beautifully when you're working with others."



"We still haven't perfected how we teach the violin."

Bruce Carter

His invention seeks to make violin training affordable to all.

➤ Bruce Carter believes playing music should be accessible to all, so he invented a tool to help others learn to be musicians.

His invention, an affordable 3D-printable violin trainer, harkens back to a gift he received after being accepted into Virginia Tech's music program. Knowing Carter needed a better trumpet, David McKee, then a music professor and the legendary director of The Marching Virginians, sent him as a scholarship a Bach Stradivarius trumpet, which Carter calls the Maserati of brass instruments.

"The gift was powerful because when I started at Virginia Tech, I wasn't ashamed of my instrument," says Carter, who graduated in 1988 with a bachelor's degree in music and went on to earn a doctorate in music education from Northwestern University. "The college took a chance on an average kid from a tobacco farm in Halifax, Virginia. That's what a great institution does."

While at Virginia Tech, Carter discovered a passion for the violin. The trainer was born out of both this passion and a desire to pay Virginia Tech's generosity forward.

"My interest is at the intersection of social justice, technology, and the arts," says Carter, most recently a visiting research professor at New York University and now a lecturer at Northwestern University. "These first-year trainers cost pennies compared to a real instrument, which can cost hundreds, thousands, or even tens of

ABOVE: Bruce Carter created his affordable violin trainer as a way of paying it forward.

thousands. The trainers also help more people learn to play."

The tool looks like a plastic, futuristic violin without strings, and running a bow across its bridge generates a vibration rather than a sound. This approach helps students learn how to hold the violin and use a bow properly through physical sensations.

Carter, who received a presidential appointment to the National Council on the Arts in 2013, did add one sound to the trainer. The bridge can pull out and transform the trainer into a recorder, which plays an A—the note used for tuning a violin.

"The violin was perfected hundreds of years ago," Carter says, "but we still haven't perfected how we teach it. The trainer is one way we can use technology to enhance the learning experience and make mastering the violin affordable to all."

Natasha Powell Walker

This artist creates portraits of women who refuse to be silenced.

➤ Confidence is everything in the art world, so when visual artist Natasha Powell Walker was left to do her first exhibit unexpectedly alone, she had a decision to make. She could either succumb to the fear of being criticized, or she could fight for her moment in the spotlight with confidence and grace—the exact reason she had been drawn to creating art.

So she fought.

"The exhibit gave me the confidence to share my story and what I work on," Walker says, "which is what it means to be a woman and how confidence affects us."

From that point on, she continued to display her artwork at various galleries, showcases, and festivals. In 2011, she founded Edith Grey Designs, named after her grandmother, to share her art and message of women as strong, vibrant individuals with the world.

"My grandmother always carried herself with grace, honor, and integrity," Walker says. "She had 13 grandchildren, and she conquered the world in her own way."

"I'm going to show up and not be afraid to be the only woman or person of color."

Walker graduated from Virginia Tech in 2007 with a degree in fashion merchandising and design. She worked in graphic design and merchandising for several corporations, but found her true satisfaction came from her own artwork.

Her style is unmistakably bold, with vibrant patterns and popping colors, reflecting the attitudes and personalities of the women she depicts. These women are strong, much

like the subject of *Fierce*, one of the first works in her #SexyNotSilent series.

"The series focuses on the challenges that women face and celebrates the greatness that comes with being a woman," Walker says. The exhibit was originally shown at an art gallery at Duke University in 2018; it's now on display at the Holtzman Alumni Center at Virginia Tech through May 1.

Walker currently works as manager of Urban Land Institute Triangle, a nonprofit devoted to the responsible use of land.

"Right now I work in the real estate industry, which is white male dominated," she says. "One of the ways I challenge the traditional narrative of women is by continuing to say, 'I want to work in this field.' It may not be the most diverse field, but I'm still going to show up and not be afraid to be the only woman or person of color in the room."

These sentiments are certainly seen in Walker's art. By giving her artwork such titles as *Freedom*, *Loud*, *Bad Ass*, and even *F*ck Failure*, it's clear that she will not be silenced.

The next step for Walker is to keep creating, keep inspiring and, of course, never keep silent. She has a message she wants young African American women and girls to take away from her artwork: "Never let anyone intimidate you, and be true to who you are. Knock down as

many doors as you need to get wherever you want to go. Nobody can put any limitations on you but you."

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MAKING HER MARK: Natasha Powell Walker uses her passion for art to inspire confidence—both her own and that of others—in life.



PHOTO: CHRIS CHARLES

Endnotes

It's Not Easy Being Dean

But Laura Belmonte makes sure to take a lighthearted approach to her work—and her life.

When she became dean of the College of Liberal Arts and Human Sciences in August 2019, Laura Belmonte knew she had real challenges to tackle—and just the toys (and dogs!) for the job. “When you work hard, you should play hard,” she says. “You can be professional and productive and yet still infuse your work life with laughter and whimsy.”



INSPIRATION

James Madison provides Laura Belmonte with encouragement.



James Madison—the president, not the terrier—shares a shelf with George Washington and Thomas Jefferson (left). Below, a family photo features Belmonte's wife, Susie, and their first presidential pup, Truman.

A Hillary Clinton action figure takes a stance near books on higher education; below her are books by the college's faculty members.

“My toy collection is bipartisan,” says Belmonte, a political historian, about her elephant and donkey decanters and presidential bobbleheads.

The dean's presidential pups—James Madison (top), named in recognition of his diminutive stature, and William Howard Taft, better known as Willy (left)—serve as the college's mascots.

The Virginia Tech School of Education is renowned for its fun, logo-imprinted swag, including this classic Barrel of Monkeys.

“I'm both a Star Wars fan and a political junkie,” Belmonte says, “so when I came across artwork of Yoda and Darth Vader campaigning, I had to splurge.”

Water tastes best when sipped from a Virginia Tech Center for Communicative Science beaker.

I SURVIVED ANOTHER MEETING THAT SHOULD HAVE BEEN AN EMAIL.

“Deans have many meetings,” Belmonte says, “so it's best to keep a sense of humor.”

In Memoriam

The Loss of a Legend

“History is the greatest teacher you will ever have,” James I. “Bud” Robertson, Jr. often told his students. If history is the greatest teacher, many of them might have argued, then he was the second greatest.

Robertson, Alumni Distinguished Professor Emeritus of History at Virginia Tech, died on November 2, 2019.

During his 44 years at the university, Dr. Bud taught more than 25,000 Virginia Tech students. In several instances, he ended up teaching three generations of the same families.

Dr. Bud was also the founding director of the Virginia Center for Civil War Studies. He used vivid stories to bring the American Civil War to life, not just for Virginia Tech students, but also for millions across the world through his award-winning books, frequent television appearances, popular radio essays, and passionate advocacy of history. Thanks to him and those he inspired, Virginia Tech is widely known as a leading home of Civil War history.



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