2018 - 2019 Annual Review

VCU engineering

Engineers Make It Real.

VCU College of Engineering

CONTENT

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FROM THE DEAN

VCU Engineering's ever-growing campus evokes ziggurats, pyramids, Renaissance garrets and other milestones of engineering and design. What you won't see are ivory towers. This has been a big year of building connections — even for a college as collaborative as ours.

Our research faculty members are household names in their specialties. They're also working shoulder-to-shoulder with other top scholars, plus government and industry partners, to expand the economy with solutions to real needs. VCU's Center for Analytics and Smart Technologies, our bold, new smart cities initiative, is just one example. The new Center for Pharmaceutical Engineering and Sciences is another.

At the center of it all is our exciting Engineering Research Building, only a year away from opening. You can already see how this advanced research facility connects multiple industry-responsive VCU entities and strengthens links to the medical campus and the city's business center.

VCU Engineering has always given the workforce superior computer scientists and engineers. We also know today's digital economy isn't just for tech workers, but for all workers. To meet this expanding need, we have a new computing specialization that cross-trains students from the arts, humanities and other majors to take their place in the emerging marketplace.

There's no question: VCU Engineering loves to break down silos. That's how we bring the right thinkers and doers to the table. You're reading this because we value having you at this table. Let's keep building tomorrow, together.

GO RAMS!

BARBARA D. BOYAN, PH.D.
NAE, NAI, FAIMBE, FAAS, ASBMR
Alice T. and William H. Goodwin Jr. Dean
VCU College of Engineering

RESEARCH

BIOMEDICAL ENGINEERING

Advancing novel additive technologies

Barbara D. Boyan, Ph.D., has received a National Institute of Health (NIH) R01 grant from the National Institute of Arthritis and Musculoskeletal and Skin Diseases to develop novel additive manufacturing technologies for dental and orthopaedic implants. As one of very few NIH-funded projects involving additive manufacturing for biomedical uses, this study seeks to improve the integration of implants with bone for the fabrication of 3D-printed personalized implants.

Investigating cell-matrix mechanobiology

In two projects funded by National Institute of Health R01 grants, **Christopher Lemmon, Ph.D.**, is developing hybrid computational-experimental approaches with collaborator **Seth H. Weinberg, Ph.D.**, to investigate interactions between cells and their surrounding extracellular matrix in pathologies including fibrotic diseases and cancer. A $1.6 million study examines the biophysics of the provisional matrix. The other project, funded by a $1.2 million grant, is focused on mechanical and biochemical signaling in epithelial-mesenchymal transition.

Teaming up with cardiovascular medicine

Jennifer Jordan, Ph.D., and collaborators from the VCU Health Pauley Heart Center will receive a 2019 Collaborative Sciences Award from the American Heart Association to investigate a new treatment for cardiac sarcoidosis. Sarcoidosis is an inflammatory condition that can lead to cardiac failure. Jordan will evaluate cardiac inflammation using novel cardiac magnetic resonance techniques.

CHEMICAL & LIFE SCIENCE ENGINEERING

New silk material for biomedical uses

In a collaboration with the University of Trento, Italy, **Vamsi Yadavalli, Ph.D.**, has created fully degradable, flexible, silk-protein films that could be used for biomedical purposes including tissue regeneration, biosensors and drug delivery. The researchers demonstrated the fabrication of micropatterned silk-derived substrates using Yadavalli's invention of creating photoactive silk and fabrication of silk protein structures using photolithography.

Optimization in business and science

By combining optimization approaches from business with biochemical knowledge from biology, **Stephen S. Fong, Ph.D.**, and business professor **J. Paul Brooks, Ph.D.**, were awarded a patent for a novel approach to designing cellular bioprocesses for chemical production. The developed approach facilitates cellular engineering by identifying modifications that would lead to desired functional changes.

Developing an advanced drug delivery system

A team of researchers led by **Hu Yang, Ph.D.**, has designed a new drug delivery platform using nanoparticles that shows promise for improved outcomes and reduced side effects for cancer patients undergoing chemotherapy. The platform, a composite of nanoparticles from both leukocytes (white blood cells) and tumor cells, significantly outperformed the tumor-targeting abilities of its predecessors.

COMPUTER SCIENCE

Cryptography for secure computing

Hong-Sheng Zhou, Ph.D., is developing new methods to protect data and codes from hackers seeking to enter computer systems through backdoors in software or hardware and steal without detection. Called kleptographic attacks, these quiet offensives are a major threat, even when traditional protections are in place. Recently, Zhou received a Google Faculty Research Award to develop secure interactive protocols against kleptographic attacks.

Securing the risk-prone edges

To keep pace with the explosion of smart devices, **Tamer Nadeem, Ph.D.**, has received funding from the National Science Foundation to help improve visibility and control of smart-device traffic. His project addresses the risk-prone wireless edges between user and network-edge devices by extending Software Defined Networks to both types for better end-to-end management and greater security and privacy for all users.

Helping users with visual impairments grasp objects

With funding from the National Institutes of Health's National Eye Institute, **Cang Ye, Ph.D.**, is developing technology for a wearable robotic device that helps people living with visual impairments locate and grasp objects. This novel technology will let a traveler with visual impairments identify obstacles and move them out of the way. It will also allow its user to grasp objects for non-navigational purposes.

ELECTRICAL & COMPUTER ENGINEERING

Improving solar cell light harvesting

Ümit Özgür, Ph.D., and researchers from VCU's departments of Chemistry and Physics, have developed a new material they believe could deliver solar energy at a lower cost. Their patent-pending technology for solar cell light harvesting uses a more affordable material that could address a long-standing barrier to solar power's viability as a cost-efficient energy source.

Better continuous glucose monitoring

Continuous Glucose Monitors (CGMs) improve life for patients with diabetes, but current models have flaws including inaccurate readings and short lifespans. To remedy this, **Erdem Topsakal, Ph.D.**, and an interdisciplinary team have designed a novel subcutaneous CGM that uses zinc oxide nanostructures to improve sensitivity, longevity and response time.

Activating metals to enhance optical technologies

A team led by **Nathaniel Kinsey, Ph.D.**, has received National Science Foundation funding for research to increase the efficiency of light-based optical technologies including fiber optic communications. The proposed method optimizes photonic modulators, small switches that convert electrical signals into optical pulses, by engaging and disengaging the "metallic nature" of a material to enhance the interaction of light and matter for signal processing.

MECHANICAL & NUCLEAR ENGINEERING

Uncovering insights into droplets

Hooman Tafreshi, Ph.D., and researchers in VCU's Department of Chemistry have discovered new insights into the physics of how liquid droplets separate from fibers. In a study, the team answered two important questions: the amount of force needed for detachment and the volume of the drop residue left behind after the detachment.

Aerosols for targeted drug delivery

In three projects funded by National Institutes of Health R01 grants, **P. Worth Longest, Ph.D.**, is developing next-generation aerosol systems for targeted delivery of pharmaceuticals to the lungs. In collaboration with VCU's Department of Pharmaceutics, a $2.5 million study will prototype a device that generates and administers medicinal aerosols whose particles grow as they travel through nasal airways. Other projects are optimizing inhalation delivery of tobramycin to children with cystic fibrosis, and developing an alternative to intubation for delivering surfactant aerosols to infants.

Nasal spray characterization metrics

In a study sponsored by the U.S. Food and Drug Administration (FDA), **Laleh Golshahi, Ph.D.**, and an interdisciplinary team are evaluating test metrics for nasal spray characterization to facilitate development of generic active pharmaceutical ingredients for nasal spray products. Her work with the FDA examines the local deposition of different preparations of nasal spray products in anatomically correct nasal airway geometries.

HIGHLIGHTS

OUT-OF-THIS WORLD RESEARCH

VCU research advanced on International Space Station

Henry J. Donahue, Ph.D., Alice T. and William H. Goodwin Jr. Professor and Distinguished Chair of the Department of Biomedical Engineering, was able to further his research into space travel health impacts when one of his experiments was transported to the International Space Station in December 2018.

"It's a unique opportunity to look at microgravity in space," Donahue said. He is analyzing age-related changes in muscle and bone function and the impacts of microgravity on various genes within bone and muscle.

In the reduced gravity of space, astronauts lose bone and muscle from their legs, hips and lower backs. Identifying preventive measures that help them maintain bone and muscle health during spaceflight may also help people with age-related bone loss.

Examining meteorites

A Capstone Design team is supporting NASA's efforts to better understand Psyche, a metal asteroid orbiting the sun between Mars and Jupiter that may yield new insights into Earth's mysterious core.

Working with experts at the NASA Psyche Mission, the VCU team developed an Iron Meteorite Imaging System that can analyze an iron meteorite sample and visually determine its bulk chemical compositions.

'New horizon' in hypersonic flight

Sudden heat spikes make hypersonic travel — aircraft and weapons flying at least five times the speed of sound — impractical for many applications. Researchers previously thought these spikes occurred when air flows reach maximum turbulence.

However, Mohamed Gad-el-Hak, Ph.D., professor emeritus in VCU's Department of Mechanical and Nuclear Engineering, and researchers at the University of Peking, China, have demonstrated that temperatures actually jump just before turbulence sets in.

The American Institute of Physics said the investigation marks "a new horizon" in hypersonic research. The current study is expected to accelerate research for future spacecraft and intercontinental ballistic missiles.

Doctoral students working with NASA

Forrest Baber
Department: Mechanical and Nuclear Engineering
Faculty adviser: Ibrahim Guven, Ph.D.

Baber has been working periodically at NASA Langley Research Center in Hampton, Virginia, as part of a NASA Space Technology Research Institute that is developing aerospace structural material.

Daniel Bond
Department: Mechanical and Nuclear Engineering
Faculty adviser: Braden Goddard, Ph.D.

Bond is working with Goddard and an adviser from NASA Langley to determine the shielding needed to protect astronauts and equipment from absorbed radiation during a round-trip mission to Mars.

Rebecca Walker
Department: Chemical and Life Science Engineering
Faculty adviser: James Ferri, Ph.D.

Through a NASA Fellowship Activity award, Walker, with Ferri and a NASA technical advisor, is investigating aerogels that can be used in spaceflight applications as thermal barriers.

Population and urban resource records are found on clay tablets, papyrus, medieval memoranda — and file cabinets in city hall. For centuries, these data have been tallied and entered by hand.

What if automation could overhaul this process? That's the idea behind so-called smart cities worldwide. In this model, data-gathering sensors are placed in traffic, water, sewers, energy systems and other infrastructure. Real-time data are aggregated and analyzed, and results are translated into actionable information for citizens and policy makers.

Here are some of the ways VCU Engineering is helping create cities that are both **smart — and intelligent.**

From data to decision: VCAST

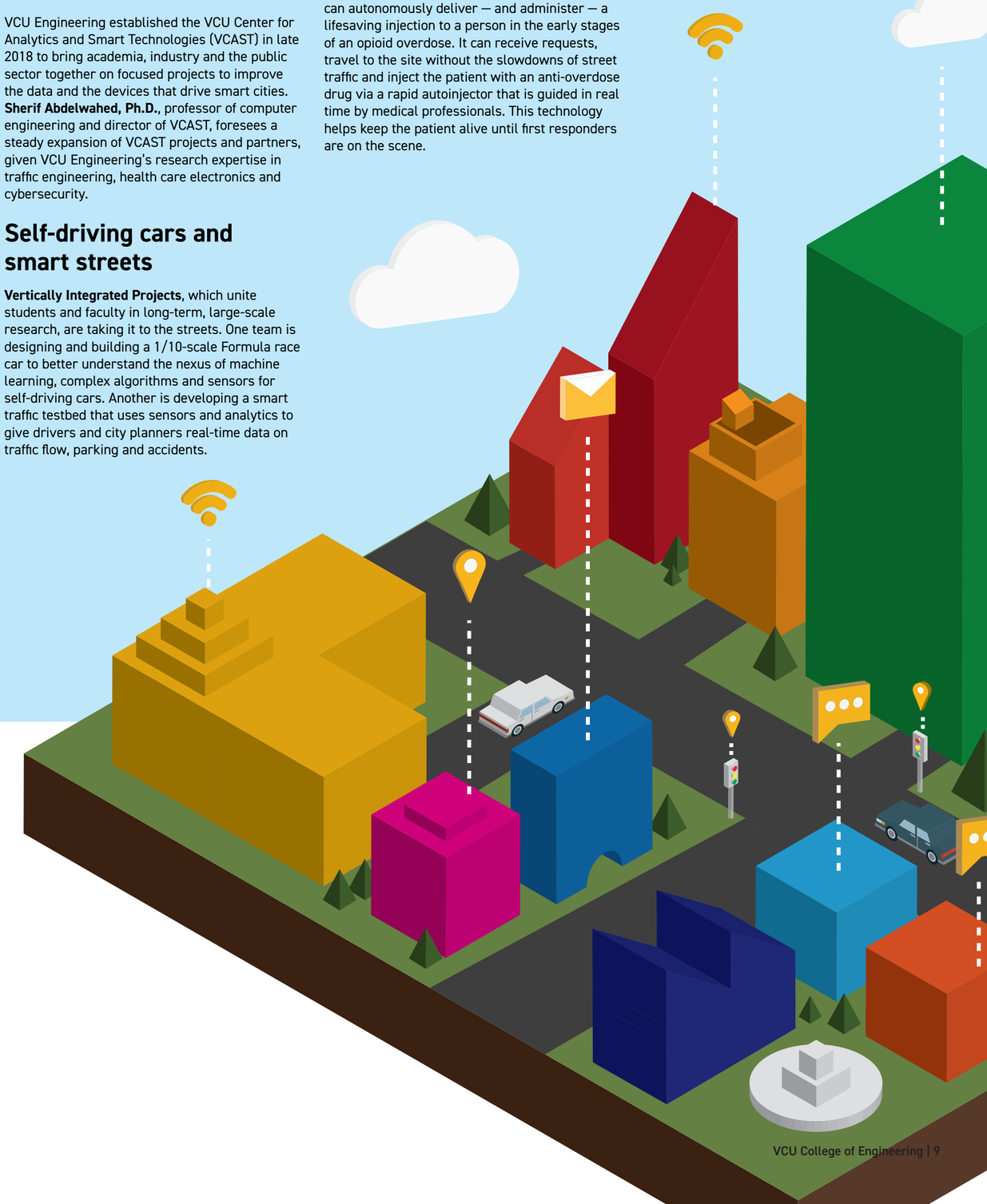
VCU Engineering established the VCU Center for Analytics and Smart Technologies (VCAST) in late 2018 to bring academia, industry and the public sector together on focused projects to improve the data and the devices that drive smart cities. **Sherif Abdelwahed, Ph.D.**, professor of computer engineering and director of VCAST, foresees a steady expansion of VCAST projects and partners, given VCU Engineering's research expertise in traffic engineering, health care electronics and cybersecurity.

Self-driving cars and smart streets

Vertically Integrated Projects, which unite students and faculty in long-term, large-scale research, are taking it to the streets. One team is designing and building a 1/10-scale Formula race car to better understand the nexus of machine learning, complex algorithms and sensors for self-driving cars. Another is developing a smart traffic testbed that uses sensors and analytics to give drivers and city planners real-time data on traffic flow, parking and accidents.

Ambulance drones

Capstone students have designed a drone that can autonomously deliver — and administer — a lifesaving injection to a person in the early stages of an opioid overdose. It can receive requests, travel to the site without the slowdowns of street traffic and inject the patient with an anti-overdose drug via a rapid autoinjector that is guided in real time by medical professionals. This technology helps keep the patient alive until first responders are on the scene.



Greening the food desert

The trend toward fresh, local food has inspired healthier lifestyles. But many families with limited resources are in neighborhoods whose isolated markets and corner stores offer a diet high in salt, fat and sugar — and low in nutrients. With data analytics from VCAST, engineering researchers are identifying Virginia's current (and future) food deserts and partnering with experts in life sciences, social work, government and public policy to connect those communities with local sources of affordable, high-quality food.

Smarter data security

For hackers, smart cities are treasure troves of data for profit and mayhem. **Milos Manic, Ph.D.**, professor of computer science and director of VCU's Cybersecurity Center, has developed an R&D Award-winning power grid protection system that improves its own effectiveness as it watches its own would-be hackers. **Carl Elks, Ph.D.**, assistant professor of electrical engineering, is developing novel, safe, secure and trustworthy architectures that address the verification gap between embedded computers and cyber-physical systems. These new architectures are applicable to nuclear energy, smart cities, manufacturing and transportation.

No ordinary dollhouse

The front of the colorful 4-foot tall plastic house in VCU's Smart Technologies lab looks like a cool toy. Turn it around, and a network of wires and circuit boards tells the rest of the story. This smart home testbed lets researchers design innovations that will help full-size buildings monitor (and reduce) their own operating costs and provide data so cities can allocate resources proactively. By adapting to occupants' needs via machine learning, these homes will make it easier for people to age in place or leave the hospital earlier after a procedure.

BUILDING THE TECH TALENT PIPELINE

Ram engineers are ready to take their place in today's digital economy — and **75 percent** of them make their careers in Virginia. Companies looking to hire the next generation of tech innovators line up to hire our graduates. That line gets longer all the time. Here's how we're meeting the demand.

Offering non-tech students a tech specialization

Students from any academic discipline complete a suite of four computer science courses to earn a VCU Fundamentals of Computing specialization and a digital technology credential from the Greater Washington Partnership.

Helping professionals gain graduate-level knowledge while they're in the workforce

Technology professionals choose four advanced computing courses to stay current and gain fluency in cybersecurity or data science, two of the most in-demand specialties.

Advancing Virginia's Commonwealth Cyber Initiative

VCU's Cybersecurity Center, along with our smart cities-focused VCU Center for Analytics and Smart Technologies (VCAST), make the college a leader in the Commonwealth Cyber Initiative (CyberX), the statewide push to promote cybersecurity research, training and commercialization.

Keeping it real

VCU Engineering's robust co-op and internship programs give students real-world technology experience with partners such as Altria, CoStar, Micron and many more.

nuclear is _____.

VCU Engineering hosts American Nuclear Society National Student Conference

The American Nuclear Society held its 2019 national student conference at VCU Engineering April 4-6, 2019. It was the first time a Virginia university was selected to host this event. More than 450 students, researchers and professionals from across the U.S. attended the conference, which featured 22 research tracks and excursions to sites throughout Virginia.

The conference's theme was "Nuclear is_____." Its mission was to fill in the blank as accurately and completely as possible.

Dominion Energy, Newport News Shipbuilding, Framatome, the Norfolk Naval Station and the Hampton University Proton Therapy Institute are just a few of the organizations that jumped at the chance to be part of the conference. The U.S. Department of Energy Nuclear Science User Facilities also held a one-day meeting at VCU Engineering timed to coincide with the event.

Here are five takeaways:

1. Nuclear is ... everywhere.
Sessions and site visits presented nuclear engineering applications in clean energy generation, military defense, medical proton therapy, mining, artificial intelligence, food safety — even craft beer making.

2. College students don't see themselves as the "next" generation of nuclear innovators.
Undergraduates are focused on bringing younger students into the field. To support the early pipeline, the 2019 ANS student conference included a nuclear science fair for high school students and a career fair aimed at showing them the wide range of opportunities available.

3. As a nuclear engineer, you must be a good communicator.
Nuclear science is poorly understood and often politicized, so nuclear engineers face challenges in presenting their work. A workshop from the Alan Alda Center for Communicating Science gave students new tools to connect with audiences and present their research in a clear and meaningful way.

4. Every panel was a diversity panel.
"We wanted to put together the strongest panelists and presenters we could find," said conference co-organizer Sarah Morgan, a Ph.D. student in VCU's Department of Mechanical and Nuclear Engineering. "Then we looked at our roster and saw ethnic diversity, gender diversity, diversity of sexual orientation, different nationalities across the board. I'm happy about that and think it speaks well of this field."

5. Virginia is a nuclear powerhouse.
Supathorn Phongikaroon, Ph.D., associate professor and director of nuclear engineering programs at VCU, said there's a good reason for the conference's hefty statewide presence. "Virginia runs on nuclear. After all, 33 percent of our energy comes from nuclear sources," he said. "You saw that at this conference. The whole state showed up. Virginia is a powerhouse."

Photo credit: Jasmyn Moore Photography

IVORY COAST

VCU forms partnership to improve access to lifesaving medicines

Officials representing VCU and the government of Ivory Coast have signed an agreement to train researchers in the West African country to develop high-quality pharmaceutical manufacturing capabilities.

The **Medicines for All Institute (M4ALL)**, established by the VCU College of Engineering in 2017, is dedicated to improving access to lifesaving medications for HIV/AIDS, malaria, tuberculosis and other diseases around the world. M4ALL has already successfully developed cost-saving syntheses for two key anti-HIV drugs and is in the process of developing others.

Under the three-year agreement, the university will help Ivorian students and postdoctoral fellows gain the necessary expertise to produce medicines in their home country.

"Students will come from Ivory Coast and learn the techniques … and take them back to Africa to improve the production of these drugs in a place where they really are needed," said **Barbara D. Boyan, Ph.D.,** the Alice T. and William H. Goodwin Jr. Dean of VCU Engineering.

The university will also help the government create a new research institute on the campus of the Institut National Polytechnique Félix Houphouët-Boigny in Ivory Coast, and consult in the development of a drug research facility. Planning is under way for building renovations to host the institute.

Abdallah Albert Toikeusse Mabri, M.D., Ivory Coast's minister of higher education and scientific research, said the impact of its relationship with VCU would ripple far beyond the nation's borders to greater Western Africa and beyond. Patients with malaria take up half of the hospital beds in Ivory Coast, he said, and HIV is also a major problem because of the high local cost of medication.

"We are working together to build a better world," he said.

"As a research institute within the university, Medicines for All is preparing the next generation of chemists and engineers to face one of the grand challenges of the 21st century: **mastery of the principles that drive accessibility to affordable, high-quality medicines.**"

— B. Frank Gupton, Ph.D.
Chief Executive Officer,
Medicines for All Institute

STUDENT

BIOMEDICAL ENGINEERING

Helping abroad and at home

Through a service learning course, biomedical engineering undergraduate students are repairing medical equipment to help patients in Richmond as well as in St. Vincent and the Grenadines. Part of the program includes learning how to fix wheelchairs for local people in need. Another involves traveling to the Milton Cato Memorial Hospital in St. Vincent to fix medical equipment there. The hospital on the southern Caribbean island faces challenges because of low resources.

Grad student who gives back wins fellowship

Brooke Danielsson, a biomedical engineering doctoral student researching the structure of DNA, has been selected for the prestigious National Science Foundation Graduate Research Fellowship Program. Danielsson teaches nontraditional studying tools to middle school children living with dyslexia. How does she know the hands-on techniques work? Danielsson, who has been living with dyslexia since she was young, developed them herself.

Gaining a wealth of research experience

Madeline Hays is headed off to a biomedical engineering doctoral program at Stanford University after taking advantage of the college's research opportunities for undergraduate students. She worked as a researcher for the Department of Electrical and Computer Engineering, joined a Vertically Integrated Project team and was a Dean's Undergraduate Research Initiative fellow. The Honors College student, who graduated in May 2019, earned minors in electrical engineering, math and physics — all while following her passion for biomedical engineering.

CHEMICAL & LIFE SCIENCE ENGINEERING

Thinking globally, measuring locally

Students in the departments of Chemical and Life Science Engineering, Electrical and Computer Engineering and Mechanical and Nuclear Engineering teamed up with biology majors to obtain more accurate measurements of air quality in Richmond, Virginia. With a VCU Service-Learning Partnership Grant, they designed their own devices and used other air quality measurement systems. The goal: provide the city with individualized air quality reports to help guide planning decisions.

VCU journey lands undergrad offer

Myles Boyd found his element working in a pharmaceutical engineering lab that was using photochemistry to make biological molecules more detectable for clinicians. An internship at the British pharmaceutical company GlaxoSmithKline led him — along with about 1,000 others — to apply for a graduate training experience at GSK. Boyd, who graduated in May 2019, was offered a position in pharmaceutical sciences there to help manufacture medication for critical-needs patients.

Getting a grad degree in style

Finding outlets for her creativity such as crafting and fashion has helped doctoral student **Shani Levit** maintain balance in her life — something that can be hard for a busy graduate student. Her grad school survival guide blog, called The Graduate Perspective, includes everything from Dior-inspired outfits (for those on a student's budget) to making the most of your Ph.D. (by joining professional organizations and taking professional development classes).

COMPUTER SCIENCE

Protecting systems from external threats

Ian Cooper, Nicholas Copi, Zephyr Headley, Seth Jansen, Erwin Karincic, Jonathan Lundquist, Mohammad Malik, John Naylor, Gabriel Odachowski, Tobias Schneider, Peter Tran and Pillai Yadunandan, all members of the **Cybersecurity Club @ VCU**, placed second in the 2019 Mid-Atlantic Collegiate Cyber Defense Competition. In a simulated business environment, they ran systems, supported projects and helped users while also protecting IT from a barrage of external threats.

Student wins fellowship for IoT work

Steven Hernandez, a graduate student designing systems for the Internet of Things (IoT), was selected for the 2018 National Science Foundation Graduate Research Fellowship Program. Currently, IoT devices send data to central computers for storage and processing. With support from this highly selective award, Hernandez is working to develop a more reliable and agile alternative that lets networked devices interact with and learn from one another.

A better ride through virtual reality

Moving through virtual reality often causes motion sickness, so **Megan Charity** developed a virtual skateboard that lets users glide through simulated worlds nausea-free. The skateboard is more intuitive and user-directed than current methods of virtual transport such as joysticks or point-and-click teleportation, so it is less likely to cause cybersickness. VCU President Michael Rao, Ph.D., highlighted Charity and her work in his State of the University Address.

ELECTRICAL & COMPUTER ENGINEERING

A young Ram engineer-in-training

Being too young to apply for the Dean's Early Research Initiative program didn't stop high school sophomore **Alexandra Wright**, 14, from getting a jump on her engineering studies at VCU. She worked with a mentor in a Department of Electrical and Computer Engineering lab to develop a sensor to continuously monitor temperature for infants or young children. Her inspiration? Her sister, who had febrile seizures.

Meeting the next challenge

Jonathan Lundquist was a nuclear power mechanic with the U.S. Navy and a metrology laboratory technician at the Calibration Laboratories — then he started his undergraduate studies. He chaired the college's IEEE student branch this past year, where he organized a panel on automation security featuring industry experts on this critical topic. Lundquist is active in the Cybersecurity Club @ VCU, volunteers with the HackRVA makerspace and interns with the Naval Surface Warfare Center, all while maintaining a 4.0 GPA.

Making connections (literally) at NIST

Doctoral student **Justine Drobitch** worked with the National Institute of Standards and Technology (NIST) through an internship funded by the National Science Foundation's Non-Academic Research Internships for Graduate Students program. As part of NIST's Functional Nanostructured Materials Group, she grew and characterized magnetic materials for use as highly spin-polarized contacts for novel spintronic photodetectors.

MECHANICAL & NUCLEAR ENGINEERING

Ph.D. student's research makes journal cover

Research by Ph.D. student **Noor M. Farhan** was featured on the cover of the Journal of Applied Physics. Her study "Universal expression for droplet-fiber detachment force" investigates the force required to detach a droplet from a fiber. It proposes a mathematical correlation that can be used for droplet detachment force prediction that could replace experiments or computer simulations.

Advanced research made clear — and entertaining

Doctoral student **Sarah Morgan** knows the importance of educating the public, so she shared her research at one of Richmond's hippest events: Science Pub RVA, a lecture series that takes place in restaurants, bars and other non-academic venues. Before a standing-room-only audience, she explained a computational tool to model and analyze changes in fluid density in nuclear reactors — and even got laughs.

Staying and leading at VCU

Sarah Strickler earned her B.S. with highest honors in May 2019 and is staying on to begin her Ph.D. in VCU's unique mechanical and nuclear engineering doctoral program. As a graduate student, she will focus on pediatric aerosol drug delivery. She will also be president of VCU's American Nuclear Society chapter, where she hopes to expand membership to include students from all engineering disciplines.

HIGHLIGHTS

DESIGN-A-THONS

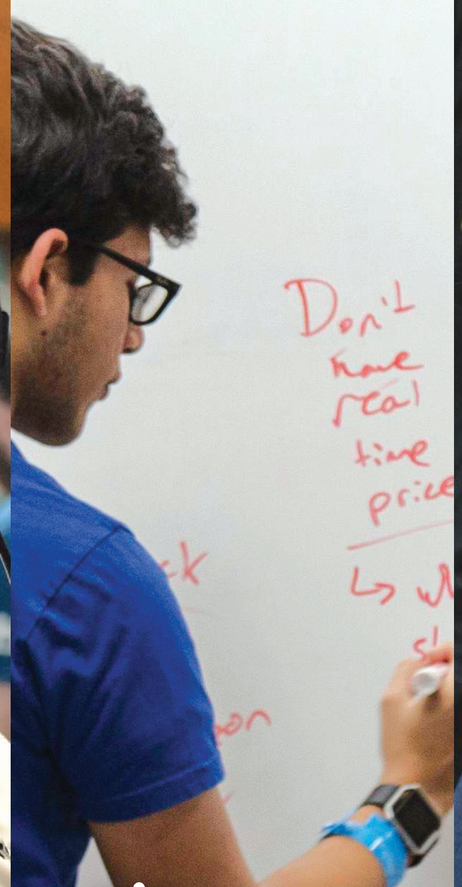
RAM HACKS

Sept. 22-23, 2018
Department of Computer Science

The fifth annual RamHacks brought together 320 students from universities across the region for an adrenaline-fueled all-nighter of designing and coding.

Twenty-four hours later, 60 high-tech innovations — including a cane that detects obstacles for the visually impaired and a program that reads hand gestures so screens can be manipulated by users wearing gloves — were presented to a panel of industry judges.

RamHacks wasn't all work and no play, though. Specialists from industry and academia shared the latest programming tips and techniques at Tech Talk sessions. Richmond restaurants were also on hand with meals and midnight snacks.



power the future

Oct. 20-21, 2018
Department of Mechanical and Nuclear Engineering

VCU students won the top awards at Dominion Energy's first-ever Power the Future design-a-thon.

The specific mission: develop an app for Dominion Energy. The assignment was broad for a reason. Dominion Energy, one of the nation's largest producers and transporters of energy, have just one mobile app, an interface linking directly to a website.

Teams were briefed on a Dominion Energy-related scenario. Then they brainstormed, prototyped and presented their innovative solutions to a panel of industry experts.

HEALTH HACKS

Nov. 3-4, 2018
Department of Biomedical Engineering

Just days before the national observance of Veterans Day, VCU Engineering teamed up with the Hunter Holmes McGuire Veterans Affairs Medical Center to present the third annual HealthHacks design-a-thon. More than 130 students from VCU and other universities worked over the weekend to address needs faced by veterans at the 24-hour problem-solving marathon.

Several veterans attended the opening ceremony in person to pitch needs for teams of student innovators to address.

Projects for assistive technology and prosthetics ranged from a footwear insert to aid in balance to a wearable stress monitor for non-verbal veterans and children.

EarthHacks

Jan. 26-27, 2019
Department of Chemical and Life Science Engineering

At the second annual EarthHacks environmental hackathon, projects ranged from social/behavioral policies to a mushroom spore sticker for decomposing cardboard.

The 24-hour event drew plenty of students outside engineering majors, including first-time hackathon participants.

Teams submitted projects in three areas: public health, biotechnology and medical waste; energy efficiency and corporate sustainability.

M2M

MACHINE TO MACHINE
CAPTURE THE FLAG

March 30, 2019
Department of Electrical and Computer Engineering

"No School Like Old School." "Telling the Truth." "Borg Invasion." They may sound like titles of summer blockbuster movies, but they're not. They're three of the 25 machine-to-machine challenges at VCU's second annual M2M competition, a daylong showdown of cyber- and cyber-physical security skills.

Teams from VCU, Old Dominion University and Radford University tackled challenges in cryptography, circuitry, wireless communications, web security and network security.

DEAN'S EARLY RESEARCH INITIATIVE

From DERI to Ram Engineer

The Dean's Early Research Initiative (DERI) brings high-achieving high school students into VCU Engineering labs to work on research projects with faculty mentors and graduate student mentors. Meet some recent DERI participants who went on to become Ram engineers:

- **Hajar Afilal**
  Electrical engineering
- **Philip Daire**
  Biomedical engineering
- **Anastasios Karles**
  Computer engineering
- **Anju Mathew**
  Biomedical engineering
- **Lokesh Narayanan**
  Biomedical engineering
- **Tri Nguyen**
  Biomedical engineering
- **Paxton O'Bryen**
  Mechanical and nuclear engineering
- **McKenzie Piper**
  Biomedical engineering
- **Kavya Puthuveetil**
  Biomedical engineering
- **Tara Ram-Mohan**
  Computer science
- **Joshua Rasure**
  Mechanical and nuclear engineering
- **Chloe Tenembaum**
  Biomedical engineering
- **Amaya White**
  Biomedical engineering
- **Benjamin Widener**
  Biomedical engineering

"The graduate students and faculty were so amazing and helpful during the DERI program that **I fell in love with the culture at VCU**. Everyone was excited to have me in the lab and genuinely wanted me to succeed."

– Paxton O'Bryen

"The opportunity to do exciting research at VCU as a high-schooler **reaffirmed that I would have the same opportunities as an undergraduate.** Ultimately, the experience and research skills I gained from DERI also helped me earn a Goldwater scholarship."

– Anastasios Karles

DEAN'S UNDERGRADUATE RESEARCH INITIATIVE

"The VCU College of Engineering DURI program presented me the opportunity to **pursue my passions in computer science** and develop specialized skills unattainable through coursework."

– Andriy Mulyar

Going beyond coursework

Andriy Mulyar, a sophomore computer science major in the Dean's Undergraduate Research Initiative (DURI) program, won first place at the 2018 Dean's Undergraduate Research Symposium.

He presented a novel data mining algorithm for working with a class of data from which it is difficult to extract patterns. For instance, traditional machine learning algorithms have trouble identifying spam emails because they encounter so many more examples of email that are not spam.

Working with faculty mentor **Bartosz Krawczyk, Ph.D.**, assistant professor in the Department of Computer Science, Mulyar said, "I explored and used state-of-the-art machine learning techniques, which equipped me with the tools and knowledge required to engage in scientific research." He added that he succeeded in presenting at an international conference.

DURI, a one-year program, gives undergraduates a long-term, immersive research experience alongside faculty, graduate student and postdoctoral fellow mentors. The challenging projects demand commitment and spark critical thinking and creativity. For their part, the mentors are able to develop managerial and coaching skills.

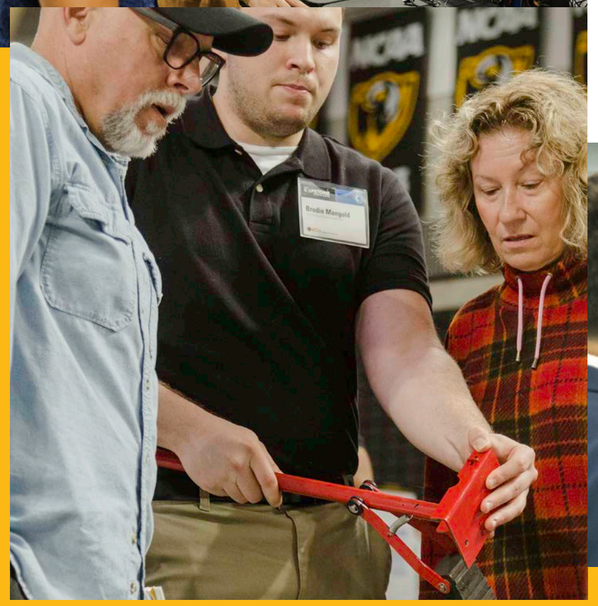
2019 CAPSTONE DESIGN EXPO

From athletes with disabilities to overdose patients in remote areas, a wide range of people will benefit from the Capstone Design projects developed by VCU Engineering students this past year.

Student design teams presented their prototypes and projects at the annual Capstone Design Expo on Friday, April 26, 2019. The college's annual "battle of the brains" — its largest to date — took place on the floor of the Stuart C. Siegel Center. The event attracted hundreds of visitors, including industry leaders, alumni and dozens of students from John B. Cary Elementary School.

BY THE NUMBERS

- ► **108** Capstone Design projects.
- ► **8 months** of student work on each Capstone Design project.
- ► **77** judges.
- ► **9** Vertically Integrated Projects, long-term multidisciplinary collaborations.
- ► **8** Projects with VCU School of Business entrepreneurship students.
- ► **7** Winners of the Sternheimer Awards, which provide extra funding.



WINNERS

Grand Prize:
1st place:
- Objective Quantification of the Universal Parkinson's Disease Rating Scale

2nd place:
- Process Optimization of Dickies Seafood Processing Plant

Department of Biomedical Engineering:
- Objective Quantification of the Universal Parkinson's Disease Rating Scale

Department of Chemical and Life Science Engineering:
- Reduction of Biological Oxygen Demand in Industrial Wastewater

Department of Computer Science:
- Drone-borne Narcan in Richmond
- Data Extraction from Web Sites

Department of Electrical and Computer Engineering:
- Proto-tonics: Rapid Prototyping for Electronics and Photonics

Department of Mechanical and Nuclear Engineering:
- Optimization of an Autonomous Radiation Detection Platform and Measurement Algorithm
- Process Optimization of Dickies Seafood Processing Plant

Multi-departmental:
- Filtration Effects on Additive Removal from Lubricant

Photo credit: Kjellstrom + Lee Construction

BUILDING CAPACITY

A little more than a year ago, university and city leaders broke ground for VCU's new Engineering Research Building (ERB).

"I look forward to celebrating the opening of the ERB and the amazing things that will be accomplished within its walls," said **Michael Rao, Ph.D., president of VCU**, as he, the mayor of Richmond and the dean of engineering plunged shovels into the grassy expanse at the corner of Cary and Belvidere streets.

Now many of those walls are in place. Its four-story skeleton hints at the impact of the building that will stand on one of Richmond's most prominent intersections. Let's flesh out that skeleton and see what to expect when the ERB opens its doors in 2020.

Location, location, location

As the building takes shape, the significance of its setting becomes ever more apparent.

"You can now see how the ERB will solidify this part of campus. We're creating a real commercialization core here," said **Barbara D. Boyan, Ph.D., the Alice T. and William H. Goodwin Jr. Dean of VCU Engineering**.

"A five-block corridor along Main and Cary will have major VCU Engineering buildings — plus the new Maker Garage — and the School of Business and the Brandcenter. It's what we're about: commercializing innovation, interdisciplinary work and public-private partnership."

'A whole-brain building'

Peer inside the first floor and it may look like walls are missing. They're not. That open area is the Innovation Maker Facility (IMF), the 9,000-square-foot makerspace that brings old-school and cutting-edge tools together for build-it-yourself prototyping. The makerspace's most important asset? Engineers who know how to build things.

"Experienced makers don't design things that can't be built," said **L. Franklin Bost, M.B.A., IDSA, FAIMBE**, the college's executive associate dean for innovation and outreach and director of the VCU Institute for Engineering and Medicine. The IMF, he said, is rooted in design thinking, which starts with unmet needs and ends with tangible solutions. ▸

“It brings the left and right sides of the brain together and creates problem solvers for industry. The IMF sets the tone. This is a whole-brain building.”

— L. Franklin Bost, M.B.A., IDSA, FAIMBE
Executive Associate Dean for Innovation and Outreach Director, VCU Institute for Engineering and Medicine

A design change

Makers know change is part of the design process — even when the project is a 133,000 square-foot building. The ERB's original second floor plan was dominated by individual computer science labs. Conversations with digital industry partners prompted a change.

“They encouraged me to rethink that floor and see it in terms of the kinds of spaces our students will encounter when they’re in the workforce,” Boyan said. “Since we’re training tech innovators, we redesigned the whole floor to resemble workspaces you see in the tech business.”

The new concept emphasizes large open areas flanked by “huddle rooms” for small groups and carrels where people can hunker down individually. “People need workspaces that fit them,” she said. “This plan is inclusive and works for a wide range of thinking styles.”

Challenging the divide

The outmoded view of higher education dictated universities had to choose between being serious research institutions or places to commercialize discoveries. The ERB — like VCU Engineering itself — challenges this divide.

Financing the ERB is one example. Funding construction with taxable bonds, less common in university buildings, lets the college partner more closely with businesses for translational research.

“It costs a little more to do it this way, but it’s worth it,” Boyan said. “The payoff is economic growth, more opportunity for faculty research and more relevant experiences for students. This building won’t have classrooms — but a lot of learning will take place here.”

Welcome to the Maker Garage

12 W. Cary Street, known for decades as Grubbs’ Auto Service, is now VCU’s Maker Garage. This old-meets-new makerspace is home to VCU’s Formula SAE, Hyperloop, and other large-scale student projects. It has welding and woodworking stations, the original car lifts, plus flat-screen projectors and 3D printers — all to help students design and build the future of transportation. Watch for the sleek new vehicles that will come from the Maker Garage, but don’t blink. They’ll be moving fast.

A building with a past

For more than a century, 12 W. Cary has been an eyewitness to engineering progress. Richmond’s Union Passenger Railway, the world’s first commercial electric trolley system, ran in front of the brick townhouse that once stood there. The original house was the home of the builder who constructed Richmond’s Cathedral of the Sacred Heart at the turn of the last century. Richmond’s trolley era ended in 1949, and this site and surrounding area became an automotive industrial area. It eventually became Grubbs’ Auto Service and now houses the Maker Garage.

MAXIMUM SPEED

Hyperloop

A year ago, Hyperloop at VCU made the university and college proud as one of just a handful of teams selected internationally for the 2018 Hyperloop Pod Competition Finals at SpaceX headquarters in Hawthorne, California.

The competition challenges university teams to design and build the best transport pod for Hyperloop, a ground transport concept based on electric, pod vehicles that travel at high speeds inside low-pressure tube systems.

This team of students from 10 academic disciplines is now on a two-year design-and-build rotation with plans for a powerful new vehicle to enter in the 2020 Hyperloop competition.

"We've completely redesigned the pod based on knowledge we gained," said **Arthur Chadwick**, a mechanical engineering major and president of Hyperloop at VCU. "SpaceX gave us great critiques — and we've had time to think about them."

VCU's new pod will have four custom-built motors and a propulsion mechanism with a two-speed transmission, something unusual in Hyperloop pod design. It is expected to reach a maximum speed of approximately 280 mph, more than 100 mph faster than the team's previous design.

"This team has a very corporate structure and businesslike approach to this competition. Many of them are doing this for the second, or even third, time. They're on a strict design, build and test timetable and are ahead of the game," said **L. Franklin Bost, M.B.A., I.D.S.A., FAIMBE**, executive associate dean for Innovation and Outreach, director of the VCU Institute for Engineering and Medicine and faculty adviser to the Hyperloop Vertically Integrated Projects team, which unites student education and faculty research through multi-year, team-based projects.

Formula SAE

Formula SAE at VCU has unveiled its new car, VCU02. It sports an optimized engine, fuel intake system and spark timings, all encased in a shell that hugs the ground and zooms faster than 100 mph.

"The team worked through numerous iterations to achieve an optimal design that meets the competition codes and standards defined by the Society of Automotive Engineers," said **Charles Cartin, Ph.D.**, associate professor of mechanical engineering, director of makerspaces and the organization's adviser. "I'm very proud of their work."

Formula SAE at VCU started in 2010 as a multidisciplinary student organization. It is also a Vertically Integrated Project (VIP) project, with students at senior stages in their education mentoring their junior colleagues.

YEARS OF VIP@VCU

More than **120 undergraduate students** — from first-year students to seniors — were engaged in multidisciplinary, long-term, large-scale research projects in 2018-2019 through the Vertically Integrated Projects program, or VIP@VCU.

VCU is a member of the prestigious VIP Consortium, which began with several U.S. universities and is now being expanded abroad.

2014-15

The first VCU team, Collaborative Unmanned Aerial Vehicles (UAVs), forms with 14 undergraduate students. Its adviser, Robert Klenke, Ph.D., is named program director. VCU becomes the only university in Virginia to belong to the VIP Consortium.

2015-16

The program grows to three teams, including one on Engineering Critical Patient Care.

2016-17

One team develops improved clinical biomechanical diagnostics for overactive bladder. The Medical Device Development and Prototyping team works on developing glucose monitoring and delivery systems, such as a long-term implantable biosensor. Another group creates a training app for anesthesiologists and nurse anesthetists.

2017-18

Students develop a device to prevent doctors from leaving a wire inside the body during medical procedures and receive a patent on their invention.

2018-19

Seventeen teams now exist with more than 120 undergraduate students. VCU School of Pharmacy becomes the first unit outside VCU Engineering to launch a team, Development of Augmented and Virtual Reality Applications for Surgical Planning and Training.

ALUMNI HIGHLIGHTS

BIOMEDICAL ENGINEERING

Shawn Joshi, who graduated with dual degrees in biomedical engineering and physics in 2012, was a Fulbright scholar at the Oxford Institute of Nursing, Midwifery and Allied Health Research in England, where he worked on smart wheelchairs and a new portable neuroimaging device for children with a motor learning disability.

For their Capstone Design project in 2018, biomedical engineering students **Kashyap Venuthurupalli, Aniket Kulkarni, Chandana Muktipaty and Joshnamaithili Seelam** developed Brise-solette, an innovation to improve hospital incubators for premature infants. They all went on to the Master of Product Innovation program at VCU's da Vinci Center and formed a company, **Kilo Medical Solutions**, to continue the project. They've been garnering grants and winning competitions such as the 2019 SCORECard Business Pitch competition.

Alexandria Ritchie (B.S.'18), who as a biomedical engineering student led a team seeking to make epidurals safer, has won national and local awards. Founder and CEO of DuraSafe, developer of a pressure-sensing epidural needle device, Ritchie was named one of 10 national OZY Genius Award winners.

CHEMICAL & LIFE SCIENCE ENGINEERING

Oscar L. Martin (Ph.D.'09), global vice president of technology and innovation for Klöckner Pentaplast, serves on the Engineering Foundation Board of Trustees. Martin, founder of Technology Ed, an online training platform for scientists and engineers, said he's been proud to watch VCU Engineering grow over the past decade. "Dean Boyan's done a fantastic job getting the college on the map with rankings and visibility," he said.

Wendy Jiang (B.S.'11) said her training as a chemical engineer has helped her as the co-founder of Tablee, a startup. Tablee, based in Richmond lets a restaurant or bar guest request service via a button on the table and a smartwatch worn by the server. Her experience in product management taught her "how things are made in real life" — handy when working with manufacturers.

Arzan Dotivala (B.S.'18) knew he wanted to be an engineer ever since he tried to build a treehouse. He said his education at VCU and the advice he received helped him become a wire design engineer at The Boeing Co., in Seattle.

COMPUTER SCIENCE

Former software engineer **Rhonda Williams** (A.S.'68), who graduated from the School of Engineering Technology at the Richmond Professional Institute, became a software entrepreneur who designed early PC-based tax preparation and human resources systems. She later came out as transgender and found her voice as an activist for diversity and inclusion.

Brandon Watts (B.S.'18), who became the first in his family to graduate from college, is now a data engineer at CarMax, where he had completed a software developer summer internship.

As a doctoral student, **Janusz Slawek** (Ph.D.'14), contributed to the field of computational analysis of genome, gene expression and DNA expression data. A senior software engineer for Apple for four years, Slawek is now a software development engineer for Amazon in Washington, D.C.

ELECTRICAL & COMPUTER ENGINEERING

Jose Ortiz (B.S.'08; M.S.'10) became the Avionics Technical Lead for Facebook's Aquila project. Aquila, a solar-powered aircraft, sought to bring the internet to remote regions of the world by beaming coverage from the sky. Jose is now a Technical Program Manager working on terrestrial, airborne and space communications systems.

Tamika Murrell (B.S.'04) blazed a trail that helped lead to VCU Engineering's new dual-degree program with Virginia Union University. She earned a B.S. in mathematics with a physics minor from VUU and a B.S. in electrical engineering from VCU. As a senior engineer II with Altria, her focus is equipment design and system automation. She holds two patents.

Shellie Lundquist (B.S.'16) has always been a maker and teacher. As a student, she spent evenings and weekends advancing Richmond's maker culture. Now a senior electrical training instructor at Philip Morris USA, she trains instrument electricians for the manufacturing center's Making Complexes and develops new courses as needed.

MECHANICAL & NUCLEAR ENGINEERING

Thaer Almasri (B.S.'01; M.S.'03) is senior operations manager for the Foxconn Technology Group. He is also an adjunct professor of mechanical engineering at VCU, specializing in lean manufacturing, process optimization and design for Six Sigma theory. Almasri serves on the college's Mechanical Engineering Advisory Board.

As a research investigator with DuPont Safety & Construction, **Jacob Pretko** (B.S.'06; M.S.'14) is a principal investigator working on new product and process development in machine design, polymer processing and applications development. He also leads experiments to generate basic data for commercial processes and earned his professional engineer license in 2017. Pretko serves on the college's Mechanical Engineering Advisory Board.

Anna Plaatje (B.S.'10) has held multiple roles with Afton Chemical Corporation, and even earned her undergraduate degree in mechanical engineering over the course of her almost two-decade career there. Today, she is an engineer for the petroleum additives manufacturing giant's original equipment manufacturing technical support division.

AWARDS & HONORS

FACULTY

Supriyo Bandyopadhyay, Ph.D.
- Elected: Senior Member, National Academy of Inventors
- Visiting Advanced Joint Research faculty
  Department of Science and Technology, Government of India

Barbara D. Boyan, Ph.D.
- Elected: 2018 Fellow, American Society for Bone and Mineral Research

Krzysztof Cios, Ph.D.
- Elected: Member, European Academy of Sciences and Arts

Daniel Conway, Ph.D.
- Rising Star Award
  Biomedical Engineering Society Cellular and Molecular Bioengineering

Henry J. Donahue, Ph.D.
- Elected: Fellow, American Association for the Advancement of Science

Stephen Fong, Ph.D.
- 2019 Smart 50 Award
  Smart Cities Connect
  for an urban heat island community mapping project in Richmond, Virginia

Braden Goddard, Ph.D.
- Young Former Student Award
  Texas A&M University's Department of Nuclear Engineering

B. Frank Gupton, Ph.D.
- 2018 Green Chemistry Challenge Award
- 2018 Award for Affordable Green Chemistry
  American Chemical Society

D. Tyler McQuade, Ph.D.
- 2018 Green Chemistry Challenge Award
- 2018 Award for Affordable Green Chemistry
  American Chemical Society

Milos Manic, Ph.D.
- 2018 R&D 100 award
- Federal Laboratory Consortium Award (Far West Region)
  for an artificial intelligence solution that aims to protect U.S. infrastructure from cyber attack

Bridget McInnes, Ph.D.
- 2018 Outstanding Faculty Mentor
  VCU Undergraduate Research Opportunities Program

Yuichi Motai, Ph.D.
- U.S. Air Force Research Lab Summer Faculty Fellowship Program 2018

Jennifer Puetzer, Ph.D.
- Appointed: Member, Meniscus Section Board
  Orthopaedic Research Society

Brian A. Taylor, Ph.D.
- Council of Early Career Investigators in Imaging
  Academy for Radiology & Biomedical Imaging Research

Jennifer Wayne, Ph.D.
- 2019 H.R. Lissner Medal American Society of Mechanical Engineers

Bennett Ward, Ph.D.
- Elected: Senior Member, National Academy of Inventors

Hong-Sheng Zhou, Ph.D.
- Google Faculty Research Award
- U.S. Air Force Research Lab Summer Faculty Fellowship Program 2018

STUDENTS, POSTDOCTORAL FELLOWS AND ALUMNI

Karam Al-Milaji
- Graduate Research Assistantship Award

Linda Alexander; Mahira Ali
- First place, Caring for the Caregiver Hack
  Lindsay Institute for Innovations in Caregiving

Hunter Andrews
- John D. Randall Scholarship
  American Nuclear Society's Fuel Cycle and Waste Management Division
- 2018 Innovations in Nuclear Technology R&D Award
  U.S. Department of Energy
- Best poster in Fuel Cycle and Waste Management
  2018 American Nuclear Society Winter Meeting and Nuclear Technology Expo

Justin Bresson
- 2018 Innovations in Nuclear Technology R&D Award
  U.S. Department of Energy

Michael Cartwright
- U.S. Department of Energy Integrated University Program Scholarship

Rami Dahman
- Gold Scholar Award
  Virginia Microelectronics Consortium (VMEC) Summer Scholars Program

Brooke Danielsson
- 2019 National Science Foundation Graduate Research Fellowship Program

Cydney Dennis
- Institutional Award
  Southern Regional Education Board (SREB) Doctoral Scholars Program

Rachel Dorn
- Best poster
  2019 Capital Region Celebration of Women in Computing (CAPWIC) Conference

Justine Drobitch
- National Science Foundation's Non-Academic Research Internships for Graduate Students

Meredith Eaheart
- U.S. Department of Energy Integrated University Program Scholarship

Michael Friedman, Ph.D.
- Translational Research Institute for Space Health (TRISH) Fellowship

Lauren Griggs (Ph.D.'18)
- VCU's Presidential Award for Community Multicultural Enrichment (PACME)

Xiang He
- Chinese Government Award for Outstanding Self-Financed Students Abroad

Steven Hernandez
- 2018 National Science Foundation Graduate Research Fellowship Program

Andrew "Andy" Hobson (B.S.'12)
- VCU Alumni GOLD Award

Mohammad Jamali
- Best student poster
  American Filtration and Separations Society annual meeting

Shawn Joshi (B.S.'12)
- Fulbright U.S. Student Program

Anastasios Karles
- 2019 Goldwater Scholar

Dimitris Killinger
- Best poster in Materials Science and Technology
  2018 American Nuclear Society Winter Meeting and Nuclear Technology Expo

Shani Levit
- Graduate Service Award

Patrick Link
- Graduate Service Award

Kilo Medical Solutions
Kashyap Venuthurupalli (B.S.'18), Aniket Kulkarni (B.S.'18), Chandana Muktipaty (B.S.'18) and Joshnamaithili Seelam (B.S.'18)
- 2019 SCORECard Business Pitch competition
- Biggest Social Impact Award, SPLASH! pitch competition

Mary Beth (Bird) Knipper (B.S.'10)
- VCU Alumni 10 Under 10 Award

Amanda Pham
- Donald F. Othmer Sophomore Academic Excellence Award
  American Institute of Chemical Engineers (AIChE)

Alexandria Ritchie (B.S.'18)
- OZY Genius Award
- rvAwesome Founder Student Award

Angelica Sunga
- Gold Scholar Award
  Virginia Microelectronics Consortium (VMEC) Summer Scholars Program

Rebecca Walker
- NASA Fellowship Activity award

Ammon Williams (Ph.D.'16)
- Best paper award published in Applied Spectroscopy in 2018

Liang Xu
- Graduate Teaching Assistantship Award

Bethany Young
- 2019 Alexander Mallory Clarke Outstanding Biomedical Engineering Graduate Student award

TEAM AWARDS

Hyperloop at VCU
- Student Organization of the Year Award
  University Student Commons and Activities

Cybersecurity Club @ VCU
- 2nd place, 2019 Mid-Atlantic Collegiate Cyber Defense Competition

College of Engineering Marketing and Communications
- Virginia Public Relations Awards
  (2 Awards of Excellence; 1 Award of Merit)
  Public Relations Society of America (PRSA)
- 2018 MarCom Awards
  (3 Platinum, 3 Gold, 4 Honorable Mentions)
  Association of Marketing and Communication Professionals
- 2019 Hermes Creative Awards (1 Platinum, 3 Gold)

AWARDS & HONORS

NEWS

Center for Pharmaceutical Engineering and Sciences

VCU has opened a Center for Pharmaceutical Engineering and Sciences. The new interdisciplinary center, one of few in the country and the only one of its kind in Virginia, is a collaboration between the College of Engineering and the VCU School of Pharmacy. It will focus on researching, creating and patenting drug products and pharmaceutical processes that can address future health needs of society.

New chemical and life science engineering Ph.D. program

The State Council of Higher Education for Virginia has approved a doctoral degree in chemical and life science engineering to be offered by the Department of Chemical and Life Science Engineering beginning in the fall of 2019. Students will be trained to conduct basic and applied research in this cross-disciplinary field.

IEEE Magnetics Society Summer School

VCU Engineering hosted the IEEE Magnetics Society Summer School June 2-7, 2019. The event, which is held on a different continent each year, brought about 100 of the world's top doctoral candidates in magnetics research to Richmond for a series of lectures on advanced topics in magnetism by international experts. The conference was funded by IEEE Magnetics Society, the National Science Foundation and VCU Engineering.

Expanding female faculty in STEM

The National Science Foundation has awarded a $2.99 million grant to an interdisciplinary team of faculty women leaders at VCU that will increase the recruitment, retention and advancement of female faculty in STEM. **Barbara D. Boyan, Ph.D.**, and **Rosalyn Hobson Hargraves, Ph.D.**, are among the co-principal investigators.

New dual degrees with VUU

Under a new agreement between VCU and Virginia Union University, VUU students will have the opportunity to pursue **three different dual-degree programs** while benefiting from the resources at both institutions. The program will allow students to earn two degrees concurrently in less time than it would take to complete them sequentially.

Promoting science for transfer students

VCU will receive a $1 million grant over five years as a participant in the **Howard Hughes Medical Institute 2018 Inclusive Excellence** initiative. The university will partner with John Tyler and J. Sargeant Reynolds community colleges to engage more students in science, especially those from underrepresented groups.

Reaching out to early engineers

In partnership with the VCU School of Education, VCU Engineering hosted **Rams Go Solar**, a solar car design and construction competition for Richmond-area middle schoolers, on April 13, 2019. This is just one example of the many ways VCU Engineering faculty, students and staff volunteered last year to spark an interest in STEM fields among K-12 educators and students.

New faculty

The VCU College of Engineering has added 12 new faculty members who bring expertise in bioimaging, cybersecurity, pharmaceutical engineering and alternative energy.

Irfan Ahmed, Ph.D.
Assistant Professor
Department of Computer Science

Radhika Barua, Ph.D.
Assistant Professor
Department of Mechanical and Nuclear Engineering

Jennifer Jordan, Ph.D.
Assistant Professor
Department of Biomedical Engineering and the Pauley Heart Center

Dean Krusienski, Ph.D.
Professor
Department of Biomedical Engineering

Changqing Luo, Ph.D.
Assistant Professor
Department of Computer Science

Gennady Miloshevsky, Ph.D.
Associate Professor
Department of Mechanical and Nuclear Engineering

Bradley M. Nichols, Ph.D.
Assistant Professor
Department of Mechanical and Nuclear Engineering

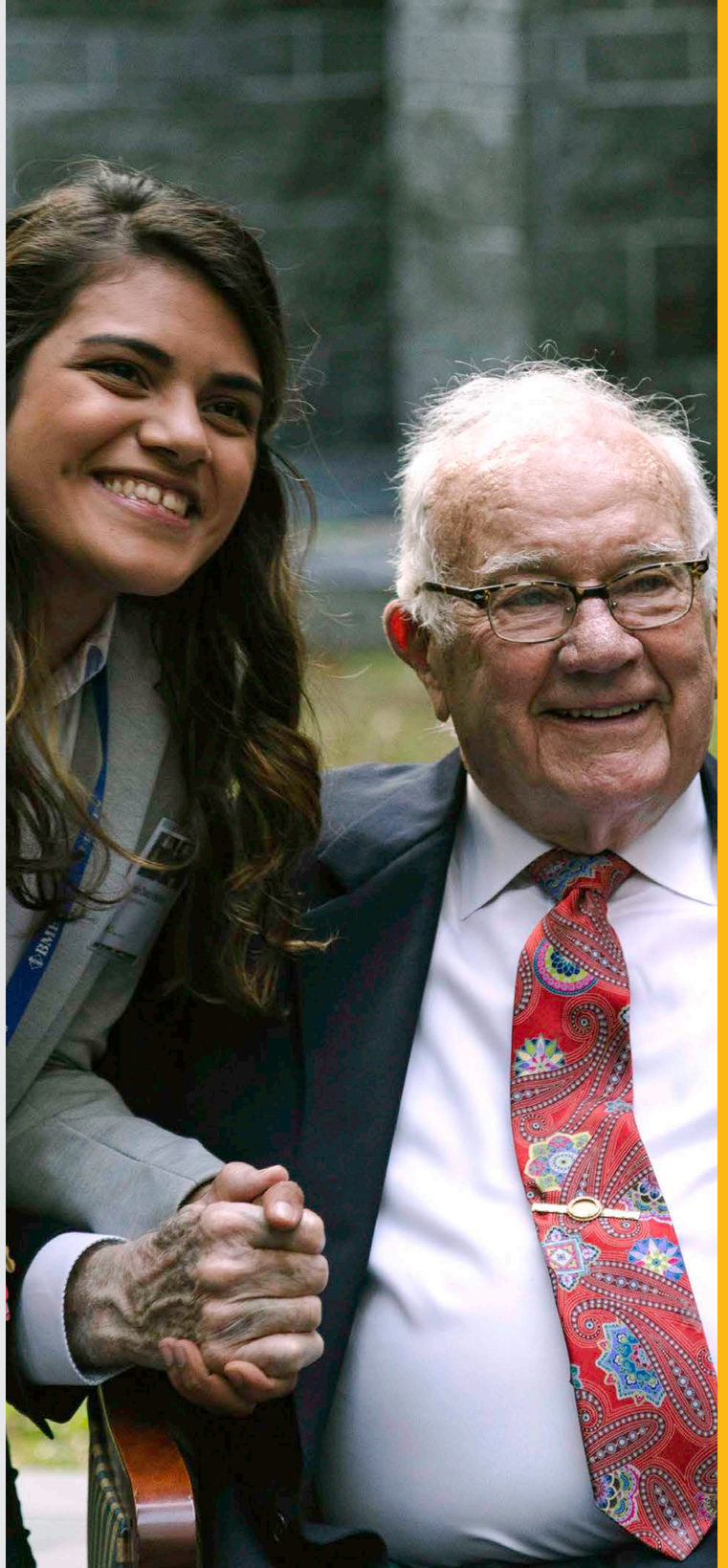
Ashraf Tantawy, Ph.D.
Research Assistant Professor
Department of Electrical and Computer Engineering

Zachary Whitten, M.S.
Instructor
Department of Computer Science

John S. Wilson, M.D., Ph.D.
Assistant Professor
Department of Biomedical Engineering and the Pauley Heart Center

Tarynn M. Witten, Ph.D., FGSA
Professor
Department of Computer Science

Yanxiao Zhao, Ph.D.
Assistant Professor
Department of Electrical and Computer Engineering



VCU College of Engineering

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Biomedical Engineering

Chemical & Life Science Engineering

Computer Science

Electrical & Computer Engineering

Mechanical & Nuclear Engineering