

NEWS/RESEARCH

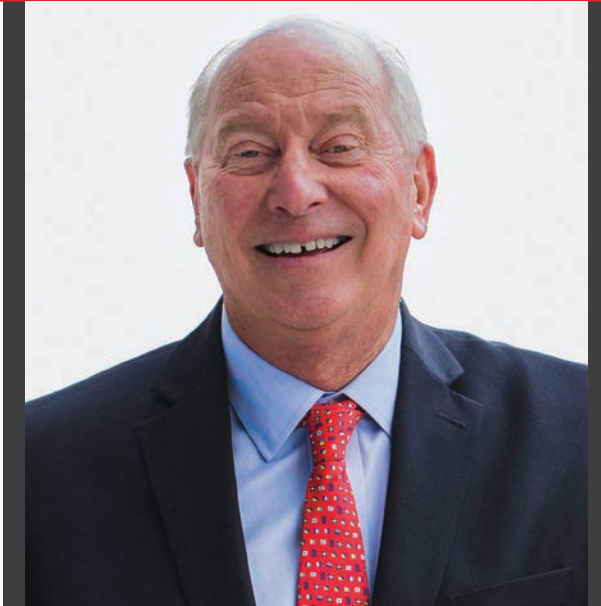


Kenneth Wynne, Ph.D., named Distinguished Career Professor

Kenneth Wynne, Ph.D., professor emeritus in the Department of Chemical and Life Science Engineering, has been named a Distinguished Career Professor by the Office of the Provost of VCU.

The Distinguished Career Professor program was created to honor VCU's tenured, long-term faculty members with sustained records of excellence in teaching, research and/or service and outstanding contributions to the university and college.

Wynne, an American Chemical Society Fellow whose research focus includes soft surface science, founded his own business, WynnVision LLC, in 2016.



B. Frank Gupton, Ph.D.

Floyd D. Gottwald Junior Chair in Pharmaceutical Engineering Chair, Department of Chemical and Life Science Engineering

FROM THE CHAIR

The COVID-19 pandemic created new challenges and highlighted an existing vulnerability in the U.S. pharmaceutical supply chain.

Faculty researchers in the department of Chemical and Life Science Engineering have responded by testing possible treatments for the novel coronavirus that causes COVID-19, investigating its "spike" protein — and even making hand sanitizer.

The Medicines for All Institute and startup Phlow Corp. are seeking to reinvent how drugs are produced by using advanced manufacturing processes to produce active pharmaceutical ingredients for critical and short-supply medications. Researchers are also developing a new methodology to facilitate production of active pharmaceutical ingredients in the U.S., instead of overseas.

Bringing together the premier disciplines of chemical engineering and life sciences, we are training the next generation to create solutions to these challenges of the 21st century.



VCU College of Engineering

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CHEMICAL & LIFE SCIENCE ENGINEERING

GROWTH

New Engineering Research Building topped off

The college marked a milestone in the construction of its new \$93 million, 133,000-square-foot Engineering Research Building with a topping-off ceremony Oct. 15, 2019. Approximately 150 spectators cheered as a final beam — signed by students, faculty and members of the community — was hoisted into the air and placed atop the building, which is set to open in late 2020.

Barbara D. Boyan, Ph.D., the Alice T. and William H. Goodwin, Jr. Dean of the college, said that the future of engineering was built into the design of the state-of-the-art research hub.

"This building speaks to the future," she said. "It's full of modern concepts, with a first-floor makerspace, labs for the way computer science is going to be, and for advanced, collaborative engineering."



FACULTY INITIATIVES

Medicines for All Institute

VCU's Center for Rational Catalyst Synthesis (CeRCaS)

VCU Center for Pharmaceutical Engineering and Sciences

\$9+

MILLION IN RESEARCH EXPENDITURES

AREAS OF RESEARCH

Nanotechnology

Pharmaceutical engineering

Materials science

Systems biology

Energy technology

65

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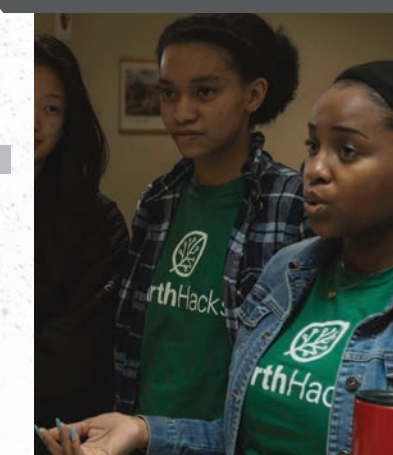


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2019 - 2020 Annual Review

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NEWS/RESEARCH

Securing the drug supply chain

To prevent domestic shortages of critical medications, the Medicines for All Institute (M4ALL), based at VCU Engineering, has joined forces with pharmaceutical industry leaders to bring manufacturing of vulnerable pharmaceuticals and their ingredients back to the United States.

Phlow Corp., a Richmond-based public benefit corporation focused on the research, development and manufacturing of essential pharmaceuticals, leads the partnership and will incorporate M4ALL's advanced manufacturing technologies to produce active pharmaceutical ingredients for critical and short-supply medications. Civica Rx, a leading nonprofit pharmaceutical company and national supplier of affordable, generic medications, and AMPAC Fine Chemicals, with its Virginia-based pharmaceutical ingredient manufacturing operation, complete this new end-to-end pharmaceutical supply chain consortium to help reduce U.S. dependence on overseas drug manufacturers.



Photo courtesy of Phlow Corp.

The U.S. Department of Health and Human Services announced a four-year contract with Phlow Corp. for \$354 million to accelerate this initiative. The total contract value awarded to Phlow is up to \$812 million, which includes a four-year base award of \$354 million with an additional \$458 million included as potential options for long-term sustainability. Phlow Corp. was co-founded by M4ALL CEO **B. Frank Gupton, Ph.D.**, and **Eric Edwards, M.D., Ph.D.**, both VCU alumni.



NEWS/RESEARCH

'Alexa of chemistry': a fast track to build an open network

D. Tyler McQuade, Ph.D., and **James K. Ferri, Ph.D.**, both professors in the Department of Chemical and Life Science Engineering, have been leading a multi-university project seeking to use artificial intelligence to help scientists come up with the perfect molecule.

The project was one of the first in the U.S. to be selected for nearly \$995,000 in funding as part of a new pilot project of the National Science Foundation (NSF) called the Convergence Accelerator (C-Accel).

Just as Amazon, Google and Netflix use data algorithms to suggest customized predictions, the team sought to build a platform and open knowledge network that can combine and help users make sense of molecular sciences data pulled from a wide range of sources including academia, industry and government.

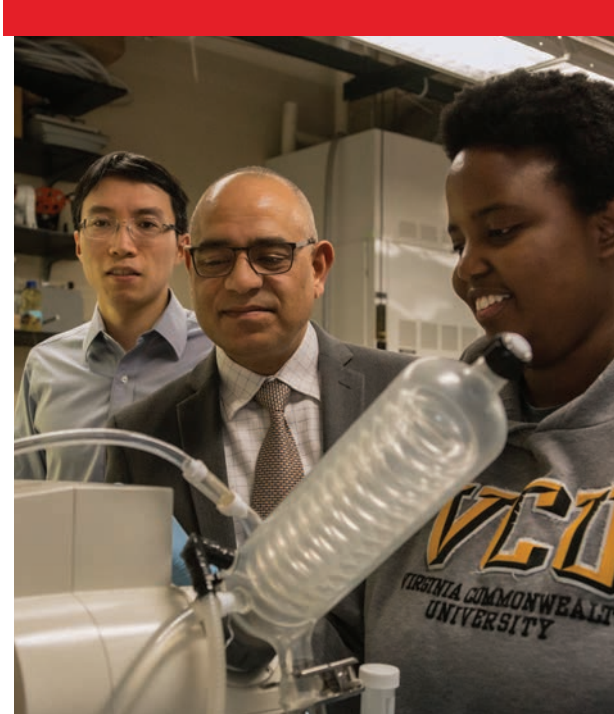


Developing next-generation, long-lasting batteries

Ram B. Gupta, Ph.D., professor and associate dean for faculty research development, and **Mo Jiang, Ph.D.**, assistant professor, both in the Department of Chemical and Life Science Engineering, are developing next-generation rechargeable batteries.

They have received a \$2.5 million grant from the U.S. Department of Energy to redesign the materials inside lithium-ion batteries, which power everything from smartphones to electric vehicles. The researchers believe they can significantly extend battery life, drive down costs and reduce safety risks for consumers. They are collaborating with Oak Ridge National Laboratory and Zenlabs Energy Inc.

Jiang and Gupta have also received a \$529,011 grant from the National Science Foundation to support fundamental work on the concept.



NEWS/RESEARCH

Saving the cities under the sea

Coral reefs, known as the "rainforests of the sea," are important to the ocean environment because they reduce shoreline erosion, provide habitats and food for marine life and support fishing and tourism industries.

Nastassja Lewinski, Ph.D., associate professor in the Department of Chemical and Life Science Engineering, is part of a multi-university team researching ways to help coral survive.

Lewinski is receiving \$333,352 over two years as part of a larger National Science Foundation grant to develop a line of similar coral cells and to investigate changes at the cellular level in coral biomineralization, symbiosis and wound healing in response to various chemicals.

In addition, she and her students are working toward developing materials that will arrange coral cells and polyps into integrated networks.

"Corals have primarily been studied at the organism level, both in nature and in aquaria," Lewinski said. "In this project, we will study coral at the cellular and polyp levels in order to better capture molecular changes. In addition, we will arrange the coral cells and polyps into networks to also interrogate how perturbing one node, or location, affects the network as a whole. Coral lives as a colony of connected polyps, which we model as a network."

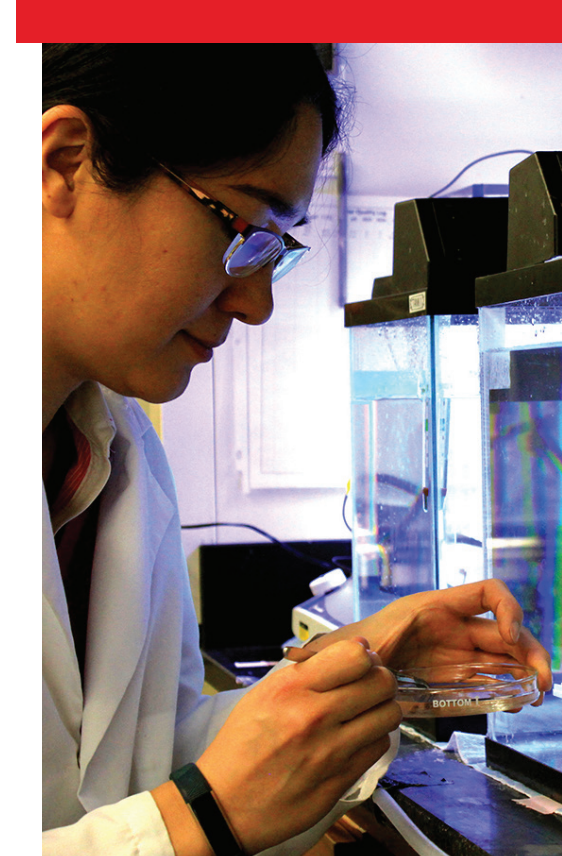


Photo courtesy of Nastassja Lewinski, Ph.D.

Ram B. Gupta, Ph.D., elected AIChE Fellow

Ram B. Gupta, Ph.D., associate dean for faculty research development and professor in the Department of Chemical and Life Science Engineering, has been elected a Fellow of the American Institute of Chemical Engineers (AIChE).

Gupta, whose research focus areas include batteries, sustainable energy and materials, is the first faculty member at Virginia Commonwealth University to reach AIChE's highest grade of membership. The honor reflects a member's distinctive professional achievements and accomplishments.



Photo courtesy of Ram B. Gupta, Ph.D.

STUDENTS/ALUMNI

Alumnus Nathaniel Cain, Ph.D., on advisory board

Nathaniel Cain, Ph.D. (B.S.'04), research and development manager for physical and engineering sciences in Afon Chemical Corporation's Technology Development group, serves on the advisory board for the Department of Chemical and Life Science Engineering. Cain said, "I know I wouldn't be where I am today without the VCU (College) of Engineering."



Photo courtesy of Nathaniel Cain, Ph.D.

Cain Scholarship winner gains experience, gives back

Samuel Adu-Gyamfi (B.S.'20), who was accepted into a graduate program in chemical engineering at Columbia University, served in leadership positions while working in research labs at VCU. He became the first recipient of the college's first alumni-endowed scholarship established by **Julia Cain (B.S.'01)** and **Nicholas Cain (B.S.'01)**.



Photo courtesy of Samuel Adu-Gyamfi

VCU students receive AIChE awards

Three chemical and life science engineering students have won awards from the American Institute of Chemical Engineers (AIChE).

Kimberly Cox, a senior, was selected for a Donald F. & Mildred Topp Othmer Scholarship Award for academic achievement and involvement in student chapter activities. **Tara McIntosh**, a junior, won the Donald F. Othmer Sophomore Academic Excellence Award.

Ashley Tyson, a first-year student, won the 2018-19 Freshman Recognition Award.

Honors in NSF graduate fellowship program

Campbell McColley (B.S.'16) was selected as a National Science Foundation (NSF) Graduate Research Fellow.

McColley earned an undergraduate degree in chemical engineering from VCU and is currently an environmental engineering Ph.D. student at Oregon State University.

Shuyu Tian, a current graduate student in VCU's Department of Chemical and Life Science Engineering, received honorable mention recognition.