



SPRING 2020

COLUMNS NEWSLETTER

Department of Chemical and Biomolecular Engineering

A. James Clark School of Engineering

ChBE Researchers Mobilize Aid Amid Health Crisis



Photo: PG County Deputy Sheriff Corporal Talmadge Jackson, III, receiving Terpsanitizer.

On March 18, 2020, UMD began shifting to an online environment due to COVID-19. Despite this fact, a few faculty members and students remained on campus to meet the urgent needs of first responders and medical professionals fighting the virus on the front lines.

ChBE Professors **Dongxia Liu** and **Chen Zhang** shifted their facilities and equipment to the production of hand sanitizer, while **Peter Kofinas**, ChBE Professor and Department Chair, began manufacturing surgical masks for doctors at Children's National Hospital in Washington, D.C.

"Hand sanitizers are (sold) out on shelves, so there's a need, and it's very easy to make," said Kofinas. Using a

recipe from the World Health Organization (WHO) website, Liu and Zhang, along with ChBE Graduate Students from the Liu, Zhang and Kofinas laboratories created *Terpsanitizer* out of isopropyl alcohol, hydrogen peroxide and glycerol gel for free distribution.

"Isopropyl alcohol is the active ingredient to kill the germs, and the gel reduces skin dryness and irritation," said Zhang. Though the product is not officially FDA-approved, it follows the agency's guidelines. On March 25, Kofinas delivered 100 bottles of the product to firefighters with the Gaithersburg-Washington Grove Volunteer Fire Department. Aided by a \$10,000 gift from Northrop Grumman to support production costs, *TerpSanitizer* has also been delivered to the UMD Animal Facility, the UMD Police Department, PG County Sheriff headquarters, Branchville and College Park Laurel and Bowie Police Departments, and the USO of Metropolitan Washington-Baltimore.

After seeing a news clip about UMD Engineers dedicating their efforts to producing hand sanitizers, Russell Hamill - Chief of Police in Laurel, Md. - contacted ChBE faculty members Liu and Zhang, and asked for help. Hamill relayed via email that he didn't expect a response for quite some time, and

was floored when Kofinas arrived to the station only two hours later with a delivery of sanitizer.

"This is an amazing story about folks wanting to do good, offering acts of kindness during some tough times," said Hamill. "What they didn't know is that due to a positive test, I had 12 of my people put in COVID-19 protocols for testing and quarantine. People are concerned - so to have our friends in the Clark School ride in to provide relief and comfort during a tough time was a blessing. I really can't express in words what that does for your spirit, for your hope."

Over 1500 bottles have been donated thus far and the department will continue offering the product to first responders and essential UMD staff, as well as students.

ChBE Student, **Lu Liu**, volunteered to help make *Terpsanitizer*. "We have a team devoted to working on this project - I like assisting in this crisis, especially knowing these sanitizers will be utilized by the local community and first responders," she said. "It's also good experience to have a deeper understanding of the role of engineers play in problem-solving."

Kofinas, who works with polymers, is also collaborating with Dr. Anthony Sandler, surgeon-in-chief at Children's National Hospital, to spin the polymers into fiber and create surgical masks.

Department Recognizes Outstanding Undergraduates

In a typical spring semester, the A. James Clark School of Engineering holds an **Annual Honors and Awards Ceremony** designed to recognize undergraduate students for their excellence in academics, leadership and service. Alas, the ceremony was canceled this year due to the current health crisis, but that does not mean the efforts of our outstanding students have gone unnoticed. To that end, the University of Maryland Department of Chemical and Biomolecular Engineering (ChBE) recognizes the following students:



Noah Eckman, a chemical engineering senior, received the Chair's Award for excellence in academics, outstanding service and/or leadership. For three years, Noah served on the University Student Government Association (SGA), where he represented Clark School students, including a year as the Speaker of the Legislature. He now serves as the Chief of Staff of the SGA and also served as the founder and first chair of the UMD Student Facilities Fund. Noah has worked in the research groups of Professors Michael Zachariah and Ryan Sochol, performing research on advanced manufacturing of nanocomposite materials. He has also served as a teaching assistant for the CHEM 242 and CHBE 426 courses. Noah will continue on to Stanford University in California to begin his Ph.D. studies in the fall.



Joshua Fernandes, a ChBE junior seeking a double degree in chemical engineering and mathematics, received the Outstanding Junior Award for academic excellence. Josh is a member of the Honors Humanities program within the Honors College and the RISE Leadership Academy in the Clark School. Joshua works in the Laboratory of Molecular and Thermodynamic Modeling, where he conducts research on the properties of lipid membranes. In his free time, he enjoys writing and solving puzzles for the UMD puzzle club.

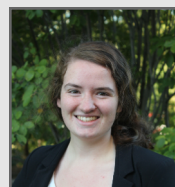


Megan Forte, a chemical engineering senior, received the ChBE Student Service Award for outstanding service. She is a member of Engineers Without Borders where she has had roles as project steward, subteam leader and technical leader. Megan led an assessment trip to a community in Ghana and led the design of a water storage system for a community in Nicaragua. She is the volunteer coordinator for the honor society Omega Chi Epsilon and a member of the RISE leadership program. Megan is currently an intern at the Maryland Clean Energy Center and plans to pursue a career in sustainability and clean energy.



Jeremy Rosenblatt, a ChBE Junior, is the recipient of the David Arthur Berman Memorial Award for

the highest cumulative scholastic average in the Department at the end of the first semester of his junior year. He is a member of University Honors, the QUEST program and Tau Beta Pi. Jeremy has served on the board of UMD's chapter of the American Institute for Chemical Engineers (AIChE) for the past three years. For nearly two years, he worked as a lab technician in the UMD Bioprocess Scale Up Facility (BSF). Last summer, Jeremy interned at Merck & Co and will be returning this summer. Upon graduation, Jeremy plans to pursue employment in the biopharmaceutical industry and possibly graduate studies in chemical engineering as well.



Katherine Snizek, a ChBE Senior, is the recipient of the Outstanding Senior Award for scholarship, leadership and service to the department. She is a member of University Honors and the Omega Chi Epsilon Honors Society. Katherine is also a graduate from the Flexus living and learning program and has volunteered for many Women in Engineering events, including the WIE DREAM conference. She has also served as a teaching fellow for several ChBE courses, and is an undergraduate researcher in the Karlsson Lab. After graduation, Katherine plans to pursue a Ph.D. in Chemical Engineering with research interests in drug delivery and bioengineering-biotechnology.

-- Congratulations to all!

Chunsheng Wang Named 'Battery Researcher to Watch'



ChBE

Professor, **Chunsheng Wang**, was cited by Research Interfaces as one of the "10 Lithium-ion battery researchers to watch." Research Interfaces hosts a monthly review -- Keeping Up With Batteries -- which generates discussion on research

published in hundreds of prestigious journals.

According to the post, Wang is "one of the most creative scientists out there. Pick any important area of battery research and his team will have contributed to it - we like their work on high-voltage electrolytes and electrode/electrolyte interfaces. [Their team is] challenging the limits of battery operation via, for example, extreme temperatures or mechanical deformation. Whatever the topic, whatever the collaboration, they get interesting results."

Wang has made headlines over the past few years with a plethora of battery research, including a high

performance electrolyte made of silicon nanoparticles (*Nature Energy*), efficient chemistry for water-based batteries (*Nature*), a polymer cathode for sodium-ion batteries, and electrolytes capable of performing in extreme environments (*Nature Energy*).

This week, Wang's team will publish a study in *Nature Communications* on an 'open' water-based battery, and another study on lithium-sulfur chemistry for battery technology in the Proceedings of the National Academy of Sciences (PNAS).

Wang is also the director of the Center for Research in Extreme Batteries (CREB) at UMD.

Department Announcements

Several of our students will continue on to prestigious chemical engineering doctoral programs. **Pablo Dean** will attend MIT, **Noah Eckman** will start at Stanford University in the fall, **Chris Louzon** at Brown University, **David Greenboldt** to CU Boulder, **Spencer Grissonto** will attend the University of Delaware, and **Katherine Sniezek** to Princeton University.

Four Terps, including ChBE Junior, **Jesse Matthews**, who is also a dual-degree mathematics student, have received scholarships offered by the Barry Goldwater

Scholarship and Excellence in Education Foundation, which encourages further study in STEM subjects. Matthews, advised by ChBE Chair, **Peter Kofinas**, is a member of the University Honors Program. Follow this link to learn more. Jesse is also the recipient of a 2020 Dean's Award, the Dinah Berman Memorial Award, presented to a 3rd year engineering student with a 4.0 grade point average who has combined academic excellence with demonstrated leadership or service to the James Clark School of Engineering. To learn more: <https://go.umd.edu/5ok>

The Maryland Energy Innovation Institute (MEI2) has been selected to lead the U.S. side of a \$18.4M, five-year program, awarded by the U.S. - Israel Energy Center, to conduct research, development and commercialization initiatives of innovative technology in the fossil energy, energy storage and energy-water nexus sectors. UMD Professors **Paul Albertus** (ChBE, Lead PI), **Eric Wachsman** (ChBE/MSE), **Gary Rubloff** (MSE) and **Sang Bok Lee** (Chem/Biochem) will lead the effort. Follow this link to learn more about the project.