BUFFALO Engineer

2021

AT THE FOREFRONT OF THE PANDEMIC

University at Buffalo
School of Engineering and Applied Sciences

MESSAGE FROM THE DEAN

Kemper Lewis, PhD, MBA
Dean, School of Engineering and Applied Sciences

Photo: Onion Studio, Inc.

Dear Friends of the School of Engineering and Applied Sciences,

The past year has brought significant challenges for each of us individually and as a community. I have heard many stories from our students, staff, faculty and alumni, collectively marked by a wide range of emotions including grief, anger, frustration, gratitude, encouragement and hope. These conversations have also revealed the resilience, creativity, collegiality, brilliance and selflessness of our community.

In this year's issue of Buffalo Engineer magazine, you will read about how we have come together during these times of uncertainty. Right from the start of the pandemic, our faculty quickly pivoted their expertise to ease the shortage of PPE, develop vaccines and health monitoring equipment, and partner with community organizations to help keep the public safe (page 14).

The UB Engineering and Applied Sciences Alumni Association remained active and developed creative ways to continue growing and deepening their interactions with students (page 18).

Other alums pivoted their businesses or started new ones to address pandemic-related needs. On page 26 you will read about a local distillery that provided free hand sanitizer to the community, and on page 28, a new wellness app for sleep and focus.

And, in response to racial unrest, we formed a working group to create opportunities to address deficiencies in critical areas so that we can grow, improve, and increase our success, significance and impact. Our efforts related to racial equity are now known as SEAS for JEDI (Justice, Equity, Diversity, and Inclusion – see back cover).

As we approach the one-year mark since the coronavirus changed all of our lives, we are looking ahead to a brighter future. But challenges remain. In the coming weeks, you will hear about our Student Emergency Campaign to help our students in need.

I am extremely proud of our SEAS community, which has risen to the challenges we face with integrity and innovation, and thank you for your continued support.

Together, let's lead, and in our leading, bring positive change.

Kemper Lewis, PhD, MBA
Dean, School of Engineering and Applied Sciences

BUFFALO Engineer 2021

Buffalo Engineer is published by the UB School of Engineering and Applied Sciences to showcase the excellence of our faculty, staff, alumni and students.

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Support Our School

Your philanthropic support helps to fund a variety of student programs. Please visit **buffalo.edu/campaign/seas** to make your contribution. Your participation at any level is appreciated.

Address Changes

UB Alumni can update their address through UB Connect: **ub-connect.com**

All others should email **seascomm@buffalo.edu** or clip the address label and return it with the correct address to: Buffalo Engineer, School of Engineering and Applied Sciences, University at Buffalo, 438 Bell Hall, Buffalo, NY 14260.

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At the Forefront of the Pandemic

From vaccine development to mental health apps, learn how our faculty, staff and students are pushing ahead to combat COVID-19.

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Making an Impact on Students

The UB Engineering and Applied Sciences Alumni Association is working to improve school spaces and create more opportunities to connect with students.

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Some photos that appear in this magazine were taken prior to the COVID-19 pandemic and therefore may not accurately reflect current operations or adherence to UB's Health and Safety Guidelines.

The 24,000-square-foot research facility, SOAR (Structure for Outdoor Autonomy Research), is believed to be the third-largest outdoor, enclosed drone-testing facility in the nation.

Photo: Douglas Levere

UB BUILDS MASSIVE OUTDOOR DRONE TESTING FACILITY

A new outdoor research facility, dubbed SOAR (Structure for Outdoor Autonomy Research), is nearing completion on UB's North Campus.

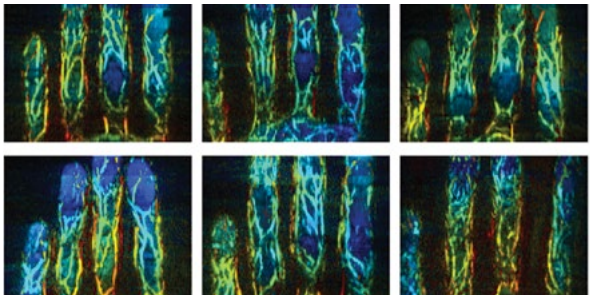
The enclosed netted complex will allow faculty, students and industry partners to conduct experiments on uncrewed aerial vehicles (UAVs), which are more commonly known as unmanned aerial vehicles or drones.

Chase Murray, assistant professor of industrial and systems engineering, secured a $393,000 grant from the Office of Naval Research's Defense University Research Instrumentation Program to support the facility's construction. At slightly more than half an acre and 86 feet tall, SOAR is believed to be the third-largest outdoor, enclosed drone-testing facility in the nation.

Because it is enclosed, and thus considered an indoor flight facility, researchers will not be subject to Federal Aviation Administration rules when testing UAVs. Researchers will use the facility to explore unmanned vehicle research focused on drone deployment optimization, autonomous vehicle fleet management, and prototype testing research to support applications in agriculture, homeland security, product service delivery, wildfire monitoring, and bridge/building inspections.

The facility will also be a resource for undergraduate and graduate students who study robotics and computer vision. Additionally, it will benefit Western New York companies interested in using the complex to test UAV hardware. For more information, contact Chase Murray at **cmurray3@buffalo.edu**.

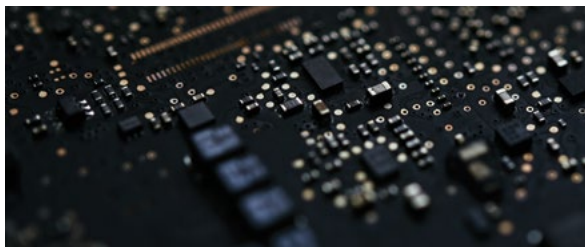
PHOTOACOUSTIC TOMOGRAPHY ENHANCES BIOMETRIC SECURITY



Researchers developed a new biometric approach that uses 3D images of finger veins. Shown are finger vessel images from six different subjects, with colors that represent different depths.

Biometric authentication uses anatomical features such as fingerprints or facial features to verify a person's identity. What's next for this field? The veins in your fingers, according to **Jun Xia**, an associate professor in the Department of Biomedical Engineering. He led a study that described how **3D images of finger veins** could boost digital security, which was published in Applied Optics (Vol. 59, Issue 2).

PAPER-THIN TRANSISTORS



A gallium oxide-based transistor being developed by UB researchers could help improve how far electric cars, airplanes and locomotives can travel.

Transistors crafted from gallium oxide could lead to smaller systems for controlling and converting electric power in electric cars, locomotives and airplanes. A study led by electrical engineer **Uttam Singisetti** found that **paper-thin electronic switches can handle 8,000 volts.** Advances in transistor technology could increase the distance that electronic vehicles can travel. The study was published in IEEE Electron Device Letters (Volume: 41, Issue: 6, June 2020).

ASCE RECOGNIZES CIVIL AND ENVIRONMENTAL ENGINEERING PROGRAMS

The Department of Civil, Structural and Environmental Engineering earned the 2020 Walter Lefevre Award from the American Society of Civil Engineers in recognition of its "outstanding program promoting licensure, ethics and professionalism."

In order to earn this award, CSEE was assessed on a variety of criteria, including more than 60% of students taking the Fundamentals of Engineering (FE) exam, number of faculty licensed in a U.S. jurisdiction, how the department addresses licensure, ethics and professionalism through its curriculum and activities, and other attributes.

NEW CENTER TO FOCUS ON CELL, GENE AND TISSUE ENGINEERING

Stem cell expert and SUNY Distinguished Professor Stelios Andreadis named inaugural director

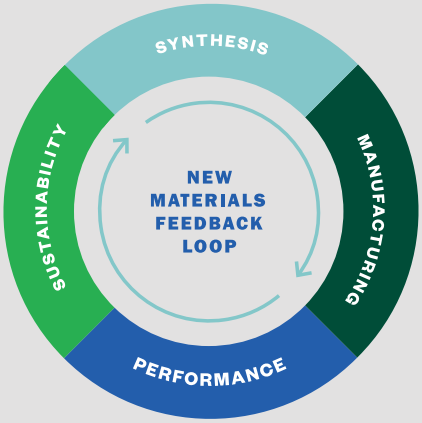
A team of researchers in chemical, biological and biomedical engineering have joined forces to develop innovative technologies for regenerative medicine and educate future leaders in the field.

Funded by the UB Provost, the new Center for Cell, Gene and Tissue Engineering (CGTE) will be led by SUNY Distinguished Professor Stelios Andreadis.

Andreadis is an expert in stem cells, tissue engineering and regenerative medicine, and is the director of UB's Stem Cells in Regenerative Medicine (SCiRM) Training Program, a joint initiative between the UB School of Engineering and Applied Sciences, Jacobs School of Medicine and Biomedical Sciences and Roswell Park Comprehensive Cancer Center Graduate Division and funded by the New York State Stem Cell Science Board (NYSTEM).

The Center will initially focus on several areas of core faculty expertise, including stem cell engineering, tissue engineering and regeneration; biomaterials; cell and tissue biomechanics; gene, protein and drug delivery (including novel vectors, vaccines and CRISPR technologies), novel imaging technologies; high-throughput data acquisition technologies; BioMEMS; and omics (genomics, proteomics, glycomics) and associated systems, computational and big data engineering.

Core faculty are Sriram Neelamegham, Natesh Parashurama, Sheldon Park and Blaine Pfeifer, from the Department of Chemical and Biological Engineering, and B. Rita Alevriadou, Jonathan Lovell, Yun Wu and Ruogang Zhao, from the Department of Biomedical Engineering.



MOVING FORWARD TOGETHER TOWARDS A CLEANER, SAFER FUTURE

The Collaboratory for a Regenerative Economy (CoRE) is a unique research, education and civic entrepreneurship initiative that links materials design with manufacturing technologies in coordination with the needs of industry and front-line communities. Formed in 2017 and led by **Krishna Rajan**, SUNY Distinguished Professor, Erich Bloch Chair and Empire Innovation Professor in the Department of Materials Design and Innovation, CoRE was renewed at $3 million for a second three years. CoRE's innovative collaborations and data-driven tools enable business, government, and nonprofit leaders to identify and select inherently safer chemicals and sustainable materials for a healthier renewable energy economy. Partners include Niagara Share, located in Buffalo, and Clean Production Action, located in Boston.

UB RESEARCHERS DEVELOP NEW MOLECULAR FERROELECTRIC METAMATERIALS

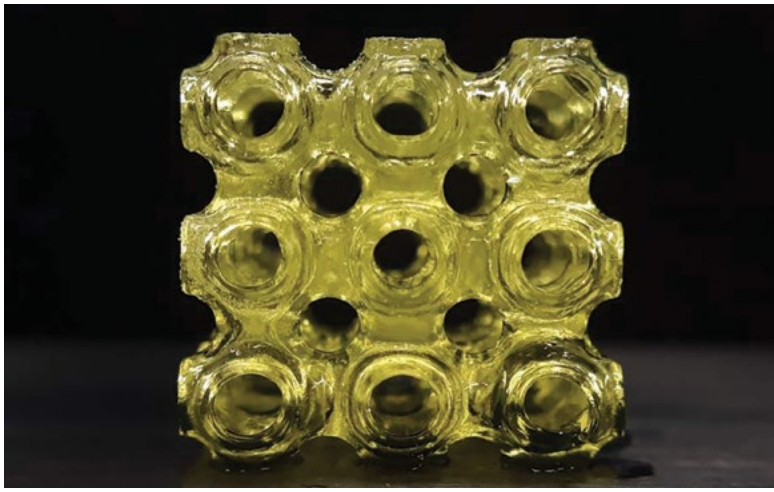


A team of engineers has reported the discovery of a new 3D-printed molecular ferroelectric metamaterial. The new material could benefit everything from acoustic blankets for aircraft soundproofing to shock absorbers and elastic cloaks that shield sensitive electronic systems from external mechanical disturbances.

The advancement, published in the **Proceedings of the National Academy of Sciences**, is a step toward making these lab-created materials more affordable and adaptable to countless multifunctional technologies.

A metamaterial is any material engineered to have a property that is not found in naturally occurring materials. Ferroelectricity relates to crystalline substances that have spontaneous electric polarization that's reversible by an electric field.

The new study uses the latest advancements in computing, additive manufacturing, materials design, acoustics and other fields to produce ferroelectric metamaterials that are cost effective and easily adaptable to electronic and mechanical devices.



3D-printed molecular ferroelectric metamaterial made of imidazolium perchlorate.

The team, led by **Shenqiang Ren**, Department of Mechanical and Aerospace Engineering and part of UB's RENEW Institute, also includes **Chi Zhou**, Department of Industrial and Systems Engineering; **Mostafa Nouh**, Department of Mechanical and Aerospace Engineering; and Jeffrey Grossman, Department of Materials Science and Engineering, Massachusetts Institute of Technology.

They devised a plan to 3D print a scaffold-supported ferroelectric crystalline lattice made of imidazolium perchlorate. The unique design of the lattice enables it to self-correct any deviations from the design while the material is still being printed. Also, the material's stiffness — how much it resists deformation — is reprogrammable, which, in turn, allows researchers to "tune" the material to filter out different subwavelength frequencies.

The work was partially funded by the U.S. Army Research Office. The Department of Energy, National Science Foundation, and UB's New York State Center of Excellence in Materials Informatics provided additional funding.

TCIE DRIVES SUNY EFFORTS TO PREPARE CLEAN ENERGY WORKFORCE

Historically, State University of New York schools have largely operated in siloes in regard to renewable energy education. But the scenario is changing, thanks to a SUNY initiative and an extra push from the UB Center for Industrial Effectiveness (TCIE).

Communications between 10 institutions — from community colleges to research universities — is widening and collaborations are mounting, resulting in new online clean energy courses and a website highlighting SUNY's energy education pathways.

The group's formation began with Gov. Andrew M. Cuomo's Climate Jobs NY initiative. Nearly a dozen SUNY campuses received a two-year Performance Improvement Fund grant to implement clean energy workforce proposals in support of New York's climate change efforts.

Performance Improvement Fund recipients are required to attend a biannual Community of Practice meeting specific to their specialty area. The intention is to establish mutual goals, foster shared resources and best practices, and work toward collective outcomes.

The first session sparked murmurs of "I'm working on something similar. Why aren't we talking?" TCIE took the lead in continuing the conversation beyond SUNY's meetings by hosting monthly calls and organizing campus visits to view labs and equipment.

"It's great to be working together instead of just reporting out to each other," says Jennifer Flagg, TCIE project director.

For example, TCIE has leveraged the group to create online courses that are available on Coursera. These include converting SUNY Erie solar photovoltaic technology curricula into a three-part series on Solar Energy for Engineers, Architects and Code Inspectors. The center also devised Renewable Energy: Fundamentals and Job Opportunities, in conjunction with experts from Alfred State College, SUNY Buffalo State, SUNY Canton, SUNY Erie, Farmingdale State College and SUNY Polytechnic Institute.

Engineering Technology Professor Ilya Grinberg (far right) in SUNY Buffalo State's Smart Grid Laboratory. From left are Timothy Leyh of TCIE, John Williams of Alfred State College, and Jennifer Flagg and Gary Simon of TCIE.

Photo: Onion Studio, Inc.

A cornerstone of WiSE is the annual fall Early Move-In Program, which is integral to their goal of supporting students — even before classes start. This program invites incoming fresh women to settle into campus early and then connect with their peers, network with faculty members, and participate in team-building activities.

LOCAL COMPANIES MAKE 'WiSE' INVESTMENT

Three local companies are doing their part to narrow the gender gap in science and engineering. M&T Bank and Verizon Media join Linde (formerly Praxair) in sponsoring UB's Women in Science and Engineering program, known as WiSE.

Their support will enable WiSE to expand programming and provide deeper support to female students in STEM than ever before.

"The heart of WiSE is fostering a sense of belonging," says Chelsea Montrois, WiSE program coordinator. "And with this extended base of support, we are so grateful that we can keep that going — and grow the reach and impact of WiSE even more."

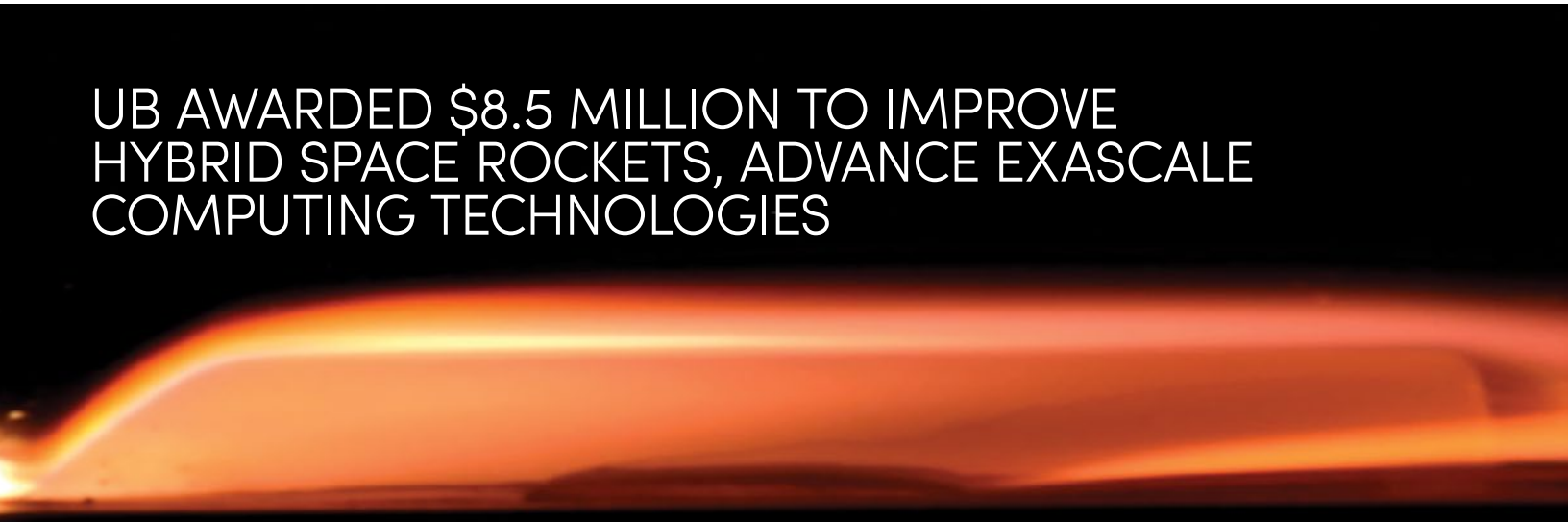
The partnerships with Linde, Verizon Media and M&T Bank will build up professional development programming, strengthening the bridge to industry for female students. Company representatives serve on the WiSE Faculty and Corporate Partner Steering Committee, which supports both big picture planning and the delivery of programs. In addition, students are exposed to opportunities at companies with a demonstrated commitment to diversity.

WiSE hosts over 40 events a year to engage, educate and build community, from their alumni-student dinners, to study groups, to the WiSE Coffee and Conversation series, where students engage in a discussion led by a female faculty member or industry professional over coffee and donuts.

These activities give students a much-needed break — and they bring them together with other women in STEM, whether they're fellow students, faculty and staff, alumni or engaged members of sponsor organizations.

Future goals include using or building a system that tracks WiSE students to measure the program's success and illuminates growth opportunities, and identifying a permanent "home" on campus where WiSE students can study, collaborate, and seek support from WiSE staff.

UB AWARDED $8.5 MILLION TO IMPROVE HYBRID SPACE ROCKETS, ADVANCE EXASCALE COMPUTING TECHNOLOGIES



Slab motor experiment showing the burning of paraffin wax fuel used in hybrid rockets.

Paul DesJardin is leading a team of researchers to study hybrid rockets, a technology that could provide a safer and less expensive way to explore outer space compared to conventional rockets. The $8.5 million U.S. Department of Energy award also enabled UB to establish the Center for Hybrid Rocket Exascale Simulation Technology (CHREST).

The award provides the resources to explore how hybrid rockets — a nearly 100-year-old concept that's getting a fresh look thanks to advancements in computing power and artificial intelligence — can be used to launch satellites into space using common fuels like candle wax and kerosene.

"Our mission is to improve our understanding of how these rocket systems work and to help optimize their performance," says Paul DesJardin, a professor of mechanical and aerospace engineering and CHREST director.

UB will use the bulk of the funds to acquire extremely powerful computers, which the team will use to simulate previously developed hybrid rockets, as well as future theoretical rockets. The team will also develop machine learning algorithms that offer insight into how to better design hybrid rockets.

Potential future uses of hybrid rockets include launching satellites, especially nanosatellites, into space from Earth. Such systems also could be very useful in situations where high thrust is required to lift heavy payloads loads into space from planetary surfaces, such as NASA's planned Mars Ascent mission.

Another component of the grant involves educating UB students about hybrid technology. A portion of the funds will support a team of undergraduates who compete in the annual Spaceport America Cup, the world's largest intercollegiate rocket engineering conference and competition.

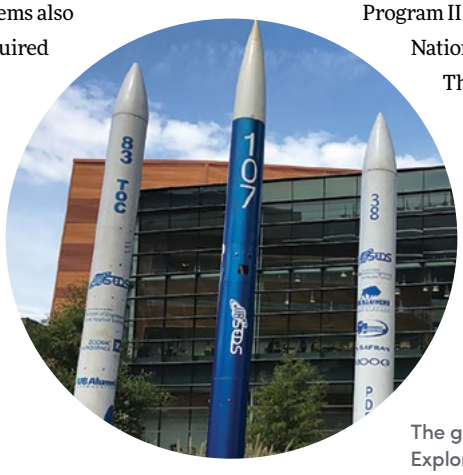
"This award puts UB students at the forefront of scholarly activity in an incredibly exciting field that's of great interest to NASA and other federal agencies, as well as private aerospace companies like SpaceX," says DesJardin, who added that the research team will also work with doctoral students in UB's Computational and Data Enabled Science and Engineering program.

In addition to DesJardin, UB investigators include **Varun Chandola** and **Matthew Knepley**, both associate professors in the Department of Computer Science and Engineering; **James Chen**, associate professor in the Department of Mechanical and Aerospace Engineering; **Mark Swihart**, UB Distinguished Professor and chair of the Department of Chemical and Biological Engineering; **Matthew Jones**, interim director and lead computational scientist at the UB Center for Computational Research; and **Letitia Thomas**, assistant dean for diversity in the School of Engineering and Applied Sciences. Abani Patra, Stern Family Professor of Computer Science at Tufts University, is also an investigator.

The team will work with an advisory board of scientists from Lawrence Livermore National Laboratory, Sandia National Laboratories and the Los Alamos National Laboratory.

CHREST is one of nine new Predictive Science Academic Alliance Program III Centers selected by the energy department's National Nuclear Security Administration (NNSA). The awards support science-based modeling and simulation and exascale computing technologies. The nine centers are funded by NNSA's Advanced Simulation and Computing program, which engages the U.S. academic community in advancing science-based modeling and simulation technologies.

by Cory Nealon



The grant will support Students for the Exploration and Development of Space (SEDS), a UB student club that builds rockets like these.

AIR FORCE YOUNG INVESTIGATOR AWARD TO ENABLE

UNDERSTANDING HOW AIR FLOWS AROUND SMALL-SCALE DRONES

Frank Lagor, an assistant professor in the Department of Mechanical and Aerospace Engineering, is one of 36 scientists around the country to receive funding from the competitive U.S. Air Force Young Investigator Program.

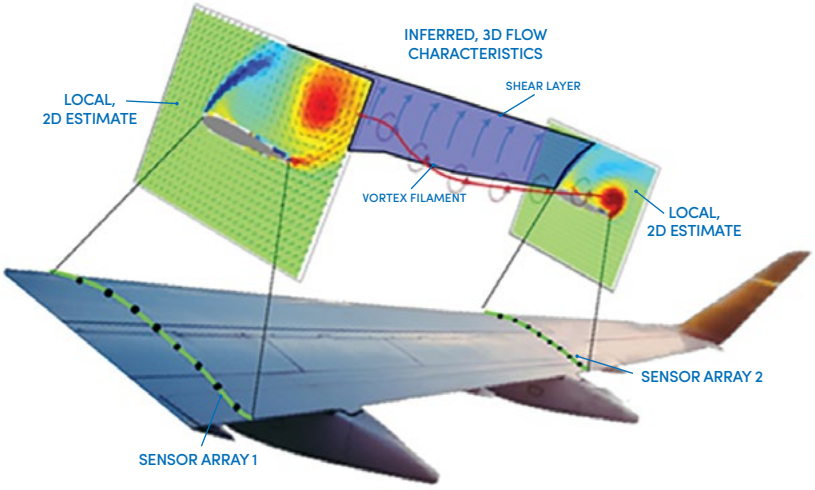
Lagor will use the $450,000 award to study the aerodynamics of small uncrewed aerial vehicles (UAVs), more commonly known as drones.

Small-scale drone use is becoming increasingly common, for example, in package delivery, emergency response, and defense reconnaissance, with more applications emerging every day. However, in order to expand their use, a better understanding of how the air flow patterns over their wings affect lift is needed.

Entitled "Towards Real-Time, 3D Coherent Structure Estimation for Flow Over Finite Wings," the project seeks to improve the fundamental understanding of data-driven estimation of flow fields, as well as optimal sensor placement to visualize the flow.

The Young Investigator Program award is funded by the U.S. Air Force Office of Scientific Research (AFOSR) in association with the Unsteady Aerodynamics and Turbulent Flows Program. It will provide funding for two graduate research assistants, and also benefits an ongoing research collaboration between Lagor and researchers at the Air Force Research Laboratory in Dayton, Ohio.

The objective of the Young Investigator Program is to foster creative basic research in science and engineering, enhance early career development of outstanding young investigators, and increase opportunities for the young investigators to recognize the Air Force mission and related challenges in science and engineering. It is open to United States citizens and/or permanent residents who are scientists and engineers at U.S. research institutions who received PhD or equivalent degrees in the last seven years and show exceptional ability and promise for conducting basic research of military interests.



Conceptual image of the flow sensing to estimate airflow features over a wing.

SCHOOL OF ENGINEERING AND APPLIED SCIENCES

BY THE NUMBERS

#33

No. 33 public engineering school, according to U.S. News and World Report, 2021

$82 MILLION

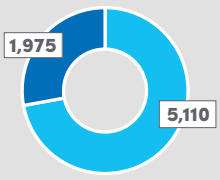
Research expenditures total $82 million annually

253

253 full-time faculty members and growing

9

9 academic departments



Our Fall 2020 student body consists of 1,975 graduate students and 5,110 undergraduates

2,123

2,123 degrees awarded in the 2019-2020 academic year

67 COUNTRIES

A global community with students from 67 countries and 33 different states

ACCREDITED

10 ABET-accredited undergraduate programs

RESEARCH ON THE RISE

TEN WORLD-CHANGING NEW PROJECTS

1 UB is part of an $8.2 million U.S. Department of Transportation project to help vulnerable populations with transportation issues. The UB team is led by civil engineer **Adel Sadek,** and the project focuses on **improving transportation options for people with disabilities,** low-income neighborhoods and older adults. Victor Paquet and Chunming Qiao are collaborating on the project, which is led by Virginia-based ICF International.

2 **Minghui Zheng,** Department of Mechanical and Aerospace Engineering, is the lead investigator on a $3 million NSF-funded project that seeks to **advance effective human-robot collaboration** to reduce electronics remanufacturing costs and improve operator safety. The research will focus on electronic waste including used computers and mobile devices. Civil engineer Xiao Liang is a co-PI on the project.

3 Chemical engineer **Stelios Andreadis** is leading a $2 million grant from the National Institute of Aging to **investigate the regenerative capacity of aged muscles.** The work may have significant impact in regenerative medicine and the quality of life of elderly patients. Co-PIs include faculty from UB's Jacobs School of Medicine and Biomedical Sciences and the School of Public Health and Health Professions.

4 Biomedical engineer **Xiaoliang Zhang** is leading a team of researchers from UB, UC Berkeley, Stanford University, University of Minnesota, Cleveland Clinic and GE Global Research to **develop new MRI tools.** The comprehensive magnetic resonance imaging tool will be able to detect damage to connective tissues, such as ligaments, tendons and bone. The $3.7 million project is funded by the National Institutes of Health.

5 **David Doermann** and **Junsong Yuan,** of the Department of Computer Science and Engineering, are leading a $1.4 million DARPA project to **detect and characterize fraudulent multimedia assets** based on an automatic analysis of communicative intent. UB's expertise in text analysis, video analytics, and information fusion will lead to new tools to combat the widespread onslaught of disinformation campaigns.

6 Chemical engineer **Paschalis Alexandridis** is leading a UB research team to develop processing technologies that will **make discarded plastic easier to reuse.** The project focuses on the development of a novel set of tools such as a robotic system that relies on machine learning and other technologies to autonomously improve its ability to sort plastics, as well as environmentally responsible solvents and new chemistries that break down plastics to make them easier to reuse. It is supported by a four-year, $2 million grant from the National Science Foundation's Emerging Frontiers in Research and Innovation program. SEAS-affiliated team members include Amit Goyal, Thomas Thundat, Marina Tsianou, John Atkinson and Karthik Dantu.

7 Industrial engineer **Lora Cavuoto** is partnering with colleagues at Rensselaer Polytechnic Institute on a project that combines neuroimaging, neuromodulation, and artificial intelligence to **better understand and measure surgical skill acquisition** — and then determine if that mastery can be accelerated. The $2.2 million project is funded by the U.S. Army Medical Research and Development Command of the U.S. Department of Defense.

8 Civil engineer **Negar Elhami Khorasani** is part of a multi-institutional group of researchers who are working together to better understand and **help prevent deadly wildfires.** Elhami-Khorasani is studying how fire spreads, considering uncertainties such as landscape, vegetation and environmental factors. Led by the University of Nevada, Reno, the project is part of a five-year, $2 million grant from NSF's Leading Engineering for America's Prosperity, Health and Infrastructure program.

9 Electrical engineer **Qiaoqiang Gan** is leading a team of researchers to develop a **portable solar still** —a sun-powered water purifier that could provide drinking water in resource-scarce environments. The U.S. Army Engineer Research and Development Center's Cold Regions Research and Engineering Laboratory is funding the project with a $1.4 million grant.

10 Environmental engineer **Ian Bradley** and his research group are collaborating on a $2 million project funded by the Department of Energy that will study the **use of algae to purify wastewater while simultaneously producing biomass for fuel production.** The project is led by the University of Illinois Urbana-Champaign.

NSF CAREER AWARD FOCUSED ON

MAKING NANOELECTRONIC DEVICES MORE ENERGY EFFICIENT

Electrical engineer **Huamin Li** is investigating a novel transistor concept that can switch speed faster and use less energy. The project is funded by a CAREER award from the National Science Foundation.

Li's project "Toward sub-60-mV/decade steep transistors using Dirac-source carrier injection and high-mobility 2D monochalcogenides" is important because it seeks to find an innovative solution to address the need for energy-efficient nanoelectronic devices. It also explores the untapped potential of emerging two-dimensional source and channel materials such as graphene, and represents a major breakthrough in quantum science and technology for extending Moore's law well into the quantum era.

Such technologies are of great interest, as they hold promise for overcoming limitations that may prevent further miniaturization of conventional transistors.

Li's team will combine theoretical research with experiments to learn about the properties of the 2D materials and use them to build a prototypical transistor.

With the support of his CAREER award, Li will also participate in existing programs and develop new activities that seek to inspire the next generation of students to pursue careers in engineering. This includes working with UB and community partners to create educational activities that focus on nanoscience and nanotechnology. The project is funded at $500,000 for five years.

The NSF CAREER Award is given to outstanding scientists who exemplify the role of teacher-scholars through research, education, and the integration of education and research.

EIGHTEEN NEW FACULTY JOIN THE SCHOOL OF ENGINEERING AND APPLIED SCIENCES

The School of Engineering and Applied Sciences welcomed 18 new faculty members this year. These faculty represent a diverse set of research and educational expertise that will help the school and its departments achieve even greater levels of excellence. The new faculty are:

Chemical and Biological Engineering

- Miao Yu, SUNY Empire Innovation Professor
- Ashlee Ford Versypt, Associate Professor
- Viviana Monje-Galvan, Assistant Professor

Civil, Structural and Environmental Engineering

- Yinyin Ye, Assistant Professor

Computer Science and Engineering

- Siwei Lyu, SUNY Empire Innovation Professor
- Nalini Ratha, SUNY Empire Innovation Professor
- Hongxin Hu, Associate Professor
- Xianghang (Scott) Mi, Assistant Professor
- Ziming Zhao, Assistant Professor
- Nasrin Akhter, Assistant Professor of Teaching

Electrical Engineering

- Jian-Ping (Jim) Zheng, SUNY Empire Innovation Professor

Engineering Education

- Matilde Sanchez-Pena, Assistant Professor
- Cory Schimpf, Assistant Professor
- Alice Nightengale, Assistant Professor of Teaching

Industrial and Systems Engineering

- Cecilia Martinez Leon, Associate Professor of Teaching

Mechanical and Aerospace Engineering

- Jiaoyan Li, Assistant Professor
- Jun Liu, Assistant Professor
- Ryan St. Pierre, Assistant Professor


Titus


Ying


Alexandridis


Goyal


Hachmann

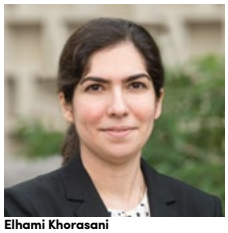

Lin


Neelamegham


Thundat


Anastasopoulos


Bruneau


Elhami Khorasani


Xu


Yuan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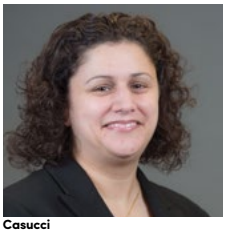
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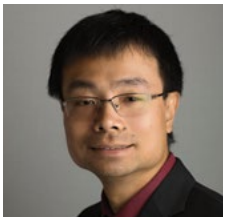
Zhuang


Rajan


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Mollendorf


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FACULTY AWARDS

Biomedical Engineering: **Albert Titus** was named a Fellow of the National Academy of Inventors; **Leslie Ying** was named a Fellow of the American Institute for Medical and Biological Engineering.

Chemical and Biological Engineering: **Paschalis Alexandridis** was named a Fellow of the Royal Society of Chemistry; **Amit Goyal** was named a SUNY Distinguished Professor and a Fellow of the Institute of Electrical and Electronics Engineers; **Johannes Hachmann** received a SUNY Chancellor's Award for Excellence in Teaching; **Haiqing Lin** received an Innovation Award from the Separations Division of the American Institute of Chemical Engineers; **Sriram Neelamegham** was named a Fellow of the Biomedical Engineering Society; **Thomas Thundat** was named a Fellow of the Institute of Electrical and Electronics Engineers.

Civil, Structural and Environmental Engineering: **Panos Anastasopoulos** was named a Highly Cited Researcher by Clarivate Analytics; **Michel Bruneau** received a Special Achievement award from the American Institute of Steel Construction; **Negar Elhami Khorasani** received an Early Career Faculty award from the American Institute of Steel Construction.

Computer Science and Engineering: **Wenyao Xu** received the President Emeritus and Mrs. Meyerson Award for Distinguished Undergraduate Teaching and Mentoring award from UB; **Junsong Yuan** was named a Fellow of the Institute of Electrical and Electronics Engineers.

Electrical Engineering: **Vladimir Mitin** was named a Fellow of the Optical Society of America; **Kwang Oh** received a SUNY Chancellor's Award for Excellence in Teaching award.

Industrial and Systems Engineering: **Rajan Batta** received a Military Operations Research journal award for best paper; **Ann Bisantz** received the Woman Mentor of the Year award from the Human Factors and Ergonomics Society; **Sabrina Casucci** was named a 2020 Open SUNY Online Teaching Ambassador; **Lora Cavuoto** received the President Emeritus and Mrs. Meyerson Award for Distinguished Undergraduate Teaching and Mentoring from UB; **Jun Zhuang** received the Excellence in Graduate Student Mentoring Award from UB and was included in Buffalo Business First's list of 40 Under 40 honorees.

Materials Design and Innovation: **Krishna Rajan** was named SUNY Distinguished Professor.

Mechanical and Aerospace Engineering: **John Crassidis** was named SUNY Distinguished Professor and a Fellow of the American Society of Mechanical Engineers; **Joseph Mollendorf** was inducted into the Niagara Frontier Aviation and Space Hall of Fame; **Mostafa Nouh** received the Gary Anderson Early Achievement award from the Aerospace Division of the American Society of Mechanical Engineers.

SEAS PROFESSIONAL DEVELOPMENT PROGRAMS EARN IELTS USA BEST PRACTICES AWARD

Ensuring that all graduate students, both domestic and international, are ready to contribute to the job market is one of the core values of the School of Engineering and Applied Sciences.

The International English Language Testing System (IELTS) USA along with the recommendations of the Higher Education Advisory Council, recently recognized the school's efforts in this area with its Best Practices in International Enrollment Management Award.

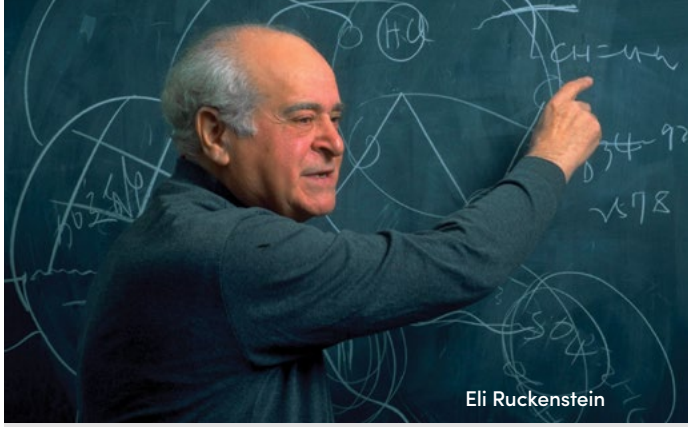
The award cites the SEAS 360° Professional Development Program, a collaboration between the School of Engineering and Applied Sciences, International Student Services, Alumni Relations, Blackstone Launchpad and Career Services, as being critical to the successful recruitment and retention of its international students.

According to IELTS, "The University at Buffalo, SEAS 360°, and its collaborators are an example of an outstanding international enrollment management model that sets institutional goals for recruitment, retention, and graduation of international students. The variety of internal and external stakeholders demonstrates the importance of working in unison to foster an environment where international students have equal and equitable opportunities to take full advantage of their education."

IELTS USA provides English language assessment literacy to support strategic international enrollment management initiatives that link admissions and recruitment practices to institutional support programs at their network of more than 3,400 higher education institutions and organizations.

Members of the SEAS 360° program team outside Davis Hall. From left are: Jude Butch, Ed Brodka, Holly Justice, Katie Lengel, Lauren Rothschild, Lindsay DiAngelo, Jennifer Gammell, Kate Tudini and Christopher Connor. Not pictured are Hadar Borden, Todd Brooks, Betty Johnson, Bethany Mazur and Jim Wehrfritz.

Photo: Maximilian Kapitonoff



Eli Ruckenstein

TRIBUTES TO OUR EMERITUS FACULTY

The SEAS Community will fondly remember these outstanding faculty members and their valued contributions to our school.

Eli Ruckenstein, a UB faculty member for nearly 50 years who was awarded the U.S. National Medal of Science for his groundbreaking research in chemical engineering and other fields, passed away Sept. 30 at the age of 95. Lauded for his prolific and imaginative research, Ruckenstein, SUNY Distinguished Professor Emeritus, was one of the most influential chemical engineers of his era, as well as one of UB's most renowned faculty members. Read the obituary here: **https://bit.ly/3rhnm5z**

William J. Rae, SUNY Distinguished Teaching Professor Emeritus in the Department of Mechanical and Aerospace Engineering, died on July 15 at home at the age of 90. An expert in the fields of aerospace, flight dynamics and fluid mechanics, Rae joined UB in 1985, and worked for over 30 years as a research scientist and engineer at the Cornell Aeronautical Laboratory (which later became Calspan). He was instrumental in the creation of CUBRC. Read the obituary here: **https://bit.ly/3uRJSEq**

John Medige, Emeritus Professor in the Department of Mechanical and Aerospace Engineering, passed away peacefully at home in Buffalo on January 21, 2021, at the age of 90. He founded the biomechanics lab in conjunction with UB's Department of Orthopedics, the first such collaboration between the engineering and medical schools. Read the obituary here: **https://legcy.co/2Prrceo**

Alan Selman, long-time faculty member and former chair of the Department of Computer Science and Engineering, passed away on January 22, 2021. He was 79. Selman was an expert on complexity theory, and many colleagues will fondly recall "P NE NP." Read the obituary here: **https://bit.ly/3sOqOoB**

10 QUESTIONS
WITH DEAN KEMPER LEWIS

Kemper E. Lewis, PhD, MBA, was named dean of the School of Engineering and Applied Sciences on May 1, 2020, following a national search. A global leader in engineering design, system optimization and advanced manufacturing, Lewis joined UB in 1996. He is also the Moog Professor of Innovation in the Department of Mechanical and Aerospace Engineering, where he served as department chair prior to being named dean, and the director of UB's Community of Excellence in Sustainable Manufacturing and Advanced Robotic Technologies (SMART). He succeeds Rajan Batta, a SUNY Distinguished Professor in industrial and systems engineering, and the SEAS Associate Dean for Faculty Affairs and Diversity, We talked with Lewis about his thoughts on leading the school, and his vision for the future.

You enjoyed success in your academic career as a teacher, researcher and administrator. What drove your decision to become a dean?

What's great about being a dean is that I still get to be a teacher, researcher and administrator, but how those responsibilities get accomplished have changed. For example, I get to apply design thinking and decision theory to the development of broader research initiatives that involve many of our terrific faculty and their collective expertise.

Photo: Onion Studio, Inc.

Obviously, the pandemic has had an enormous impact on universities across the county. What do you see as its greatest impact on SEAS?

With every crisis comes opportunity. For instance, we have had significant challenges onboarding our outstanding international students. At the same time, this allowed us the opportunity to develop a robust and innovative set of online programs and onboarding initiatives for our students. As another example, the pandemic forced our research labs to pivot how they operated. But this pivot allowed our faculty to develop new research plans and creative partnerships that have created new momentum with significant success.

Looking down the road, where do you see SEAS in the next 5-10 years?

I see SEAS sustaining and accelerating our excellence across research, education, outreach and partnerships, establishing our position as one of the preeminent public research institutions in the nation. At our core will persist our values of achievement, diversity, integrity, tenacity, collaboration and collegiality.

What would alumni who graduated 20 or more years ago be surprised to know about the school today?

That we don't have the dreaded trailers any longer :). Actually, what may be less known is that we have doubled in size, allowing us to greatly expand learning experiences for our students and research capabilities. We are now the #1 ranked public engineering and computer science school in New York.

What can alumni do to help you and the school reach its goals?

Do their jobs really well as that will make their companies aspire to hire more students from UB. Also, we want to expand our mentoring networks and programs. The best mentors are those who are a season ahead and our alumni can play a significant role by being mentors for our students.

What has been most rewarding about serving as the SEAS dean?

Being able to work with the outstanding leadership teams we have in SEAS and at the university level to address difficult but critical issues. I have also greatly enjoyed hearing how our students have adapted and are positioning themselves as emerging leaders across many fields.

Serving as dean is demanding — how do you unwind and relax?

My faith and family are of utmost importance to me and where I find great solace, purpose and strength. I also enjoy exploring all the outdoor experiences we have in Western New York, including trail running, cycling and camping.

What is your favorite place on campus?

This is a great question. It's hard to narrow down to one, but I enjoy Baird Point, Grace Plaza, the Amherst biking path that winds through campus, and Alumni Arena during a UB Bulls basketball game. Of course, anywhere in our SEAS footprint is a great place to be since it's where my friends, peers and colleagues are. And once we are able to build the new engineering building, that will have some unique features that we will all get to enjoy as well.

Who makes the best wings in Buffalo?

This is a trap question since I will offend readers regardless of what I say. I'm actually not a big fan of wings, but Buffalo pizza...now we're talking! I haven't met a slice I have not liked. Picasso's, Luigi's, Lovejoy, Good Guys, Just Pizza, Bocce, are all up there for me. You can't go wrong in Buffalo for pizza!

Cat or dog?

Nothing against cats, but it is dog for me.

by Jane Stoyle Welch

2021 ENGINEERING PARTNERS

GOLD PARTNERS

SILVER PARTNERS

To become an engineering partner, contact **Nick Lane** at nmlane2@buffalo.edu or **Christine Human** at chuman@buffalo.edu.

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AT THE FOREFRONT OF THE PANDEMIC

From vaccine development to mental health apps, our researchers have stepped up to help.

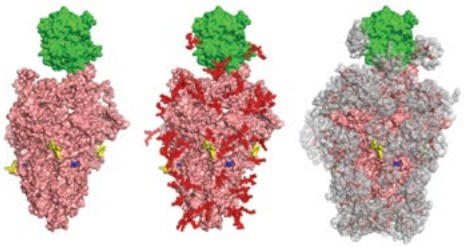
by Jane Stoyle Welch

Faculty, students and staff in the School of Engineering and Applied Sciences are collaborating with colleagues across the University, the region and the world, sharing their expertise to address critical issues related to the pandemic. Here we present some of our ongoing research initiatives and results, as well as a few examples of other ways that the engineering and applied sciences community has stepped up to help.

DISCOVERING TREATMENTS FOR COVID-19

Sriram Neelamegham, a professor in the Department of Chemical and Biological Engineering, and colleagues are developing molecular strategies to inhibit SARS-CoV-2, the virus that causes COVID-19. The spike protein of this virus has several carbohydrates, known as glycans, attached to it. The overarching goal of the research is to identify weaknesses in viral binding, entry and replication that can be exploited for therapeutic benefit. Their studies have revealed that glycan epitopes expressed on the virus may serve as novel druggable targets. They observed that modifying carbohydrate epitopes using both genetic approaches and small molecules may enable fine-tuning of viral entry into host cells. The small molecule inhibitors they are evaluating represent potential drugs that could be used to ameliorate COVID-19 as well as other viral infections.

The paper, "Inhibition of SARS-CoV-2 viral entry upon blocking N- and O-glycan elaboration," was published by **eLife.**

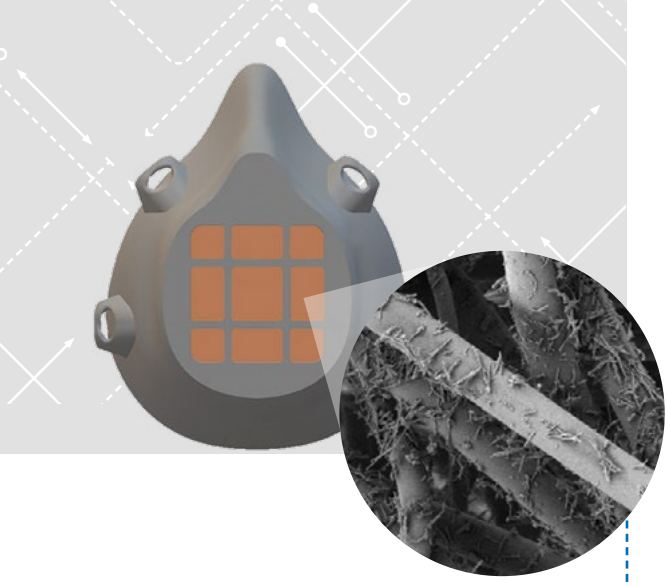


A molecular model of SARS-CoV-2 Spike protein binding to human ACE2.

MORE EFFECTIVE VACCINES

Biomedical engineer Jonathan Lovell is the lead investigator of a research team that has discovered a technique to increase the effectiveness of vaccines against the novel coronavirus. Lovell's team had previously developed a technology to convert small, purified proteins into particles through the use of liposomes, or small nanoparticles formed from naturally-occurring fatty components. In the new study, the researchers included a special lipid within the liposomes called cobalt-porphyrin-phospholipid, or CoPoP, which enables the receptor-binding domain (RBD) protein to rapidly bind to the liposomes, forming more nanoparticles that generate an immune response. When laboratory mice and rabbits were immunized with the RBD particles, high antibody levels were induced. Compared to other materials that are combined with the RBD to enhance the immune response, only the approach with particles containing CoPoP gave strong responses. Other vaccine adjuvant technology does not have the capacity to convert the RBD into particle-form. The vaccine is now entering clinical trials in South Korea in partnership with Eubiologics, a South Korean vaccine maker.

The paper, "SARS-CoV-2 RBD Neutralizing Antibody Induction is Enhanced by Particulate Vaccination," was published in **Advanced Materials.** The study was supported by the National Institutes of Health, and the Facility for Electron Microscopy Research at McGill University.



MAKING SAFER, REUSABLE MASKS

Mark Swihart, professor and chair of the Department of Chemical and Biological Engineering, and his team, in collaboration with faculty from UB's Jacobs School of Medicine and Biomedical Sciences and the School of Dental Medicine, have developed materials for antimicrobial masks with possible COVID-19 implications. While face masks are effective in limiting transmission, most medical-grade face masks are not self-sterilized or reusable. Their widespread use consumes tremendous resources and generates a corresponding amount of waste.

Swihart's team developed a novel material for treating the filtration media used in medical-grade masks to inhibit the growth of microbes. They have produced thin copper@ZIF-8 core-shell nanowires, where ZIF-8 is a zinc-based metal organic framework. When a virus- or bacteria-laden droplet contacts these nanostructures, they slowly release copper and zinc ions, which can kill bacteria and deactivate viruses. These were applied to filtration media by simple dip-coating to uniformly cover the filter fibers. This ensures any deposited droplets will contact the nanomaterial, while requiring miniscule amounts of the material. The filtration performance of the media was maintained or improved. The proposed low-cost and scalable synthesis of Cu@ZIF-8 NWs and straightforward deposition onto filter media has great potential for creating reusable face masks and other medical textiles to reduce disease transmission, resource consumption and environmental impact of waste.

The paper, "Copper@ZIF-8 Core-Shell Nanowires for Reusable Antimicrobial Face Masks," was published in **Advanced Functional Materials.**

WASTEWATER SURVEILLANCE FOR COVID-19

Ian Bradley, an assistant professor in the Department of Civil, Structural and Environmental Engineering and the RENEW Institute, is leading a pilot program with environmental engineering colleagues Yinyin Ye, assistant professor, and Ning Dai, associate professor, to monitor wastewater from all of the treatment plants located in Erie County, which includes the city of Buffalo. The researchers are working on an analysis of all the data that has been collected since September with the aim to create a public dashboard in collaboration with the Erie County Department of Health and Sewer Authority.

Bradley is also piloting an innovative wastewater surveillance approach to monitor a wide range of viral infections on campus, extending the capacity of current wastewater surveillance techniques that are based on genome detection. The project involves interdisciplinary collaborations between environmental engineers and analytical chemistry faculty and students to develop methods for detection of viral proteins and levels of antiviral drugs and other pharmaceuticals, such as anti-inflammatory drugs that are used in managing complications of viral infections in wastewater. Yinyin Ye is a co-investigator on the project.

REDUCING WORRY AND STRESS IN LOW INCOME NEIGHBORHOODS

Wenyao Xu is part of a team of UB researchers who are helping adults living in low-income, racial- and ethnic-minority neighborhoods reduce stress due to the COVID-19 pandemic. The $2.5 million award comes from the independent and non-profit Patient-Centered Outcomes Research Institute. The research team will compare a video conference mindfulness-based stress reduction (MBSR) group intervention to a MBSR mobile app. Both approaches seek to reduce worry among adults living in these areas who have limited or reduced access to mental health care, particularly due to the pandemic. Xu, an associate professor in the Department of Computer Science and Engineering, is leading the technical team in the development of the app. The app will provide an innovative alternative to current mental health care. It is more accessible, portable and cost-effective, and lowers the barriers to treatment. The project is led by the UB School of Nursing, and the contract is one of seven awarded by the Institute nationwide through a special COVID-19-targeted funding announcement.

BETTER MATERIALS FOR MASKS

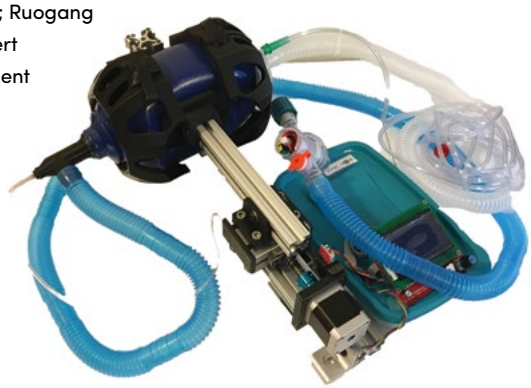
Prathima Nalam, assistant professor in the Department of Materials Design and Innovation, and Anirban Dutta, assistant professor in the Department of Biomedical Engineering, shared their expertise on mask materials with the community group MadeToAid. They suggested some techniques for using common fabrics and other readily available products to improve filtration effectiveness and reduce viral transmission.

MadeToAid's fabrication and distribution effort is helping to close the PPE need gap, as well as the product quality gap, by bringing together area designers, manufacturers, the DIY community and UB faculty from across the university, including the School of Architecture and Planning, College of Arts and Sciences, and the Community for Global Health Equity.

DEVELOPING LOW-COST VENTILATORS

Early in the pandemic, there was a severe shortage of ventilators needed by critically ill COVID-19 patients. In response to this need, a team of engineers and doctors joined forces on a fast prototyping project based on additive manufacturing technology and resources from the open source motion control community. The system is based on a mechanical actuating device that is coupled to a manual Ambu bag. Additive manufacturing technology was used to construct the mechanical ventilator and a mechatronic system was developed to achieve reliability and motion control accuracy. Early tests showed that the system could achieve a respiration rate up to 30 cycles per minute and a maximum pressure of more than 60 cmH2O. Under atmospheric pressure, the delivery volume of each respiration achieved 750 ml, which meets the basic clinical requirement. The team's first basic functional version was delivered for testing within 72 hours.

As a case study for implementation of fast prototyping technologies with limited resources, the project has great potential to assist the health care community under crisis conditions like the COVID-19 pandemic. The project team includes Chi Zhou, associate professor, and Tianjiao Wang, PhD student, Department of Industrial and Systems Engineering; Ruogang Zhao, associate professor, and Albert Titus, professor and chair, Department of Biomedical Engineering; and colleagues from UB's Jacobs School of Medicine and Biomedical Sciences. It was partially funded by the National Science Foundation.



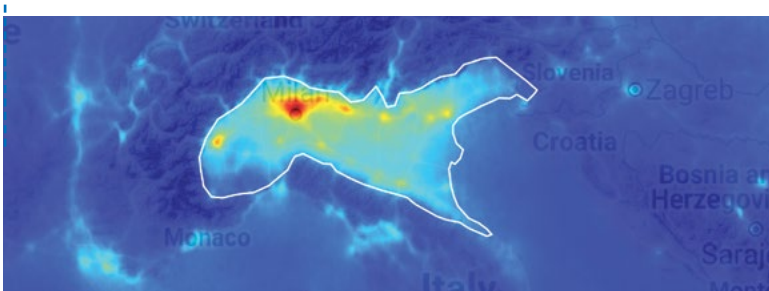
HELPING THE HOMELESS

Albert Titus, professor and chair of the Department of Biomedical Engineering, was part of a group from UB that donated more than 200 reusable 3D-printed face masks and 100 face shields to the Buffalo City Mission. The masks and face shields were created by UB's 3D printing group, which formed at the start of the pandemic as a partnership among faculty, staff and students in the School of Dental Medicine, School of Engineering and Applied Sciences and the Jacobs School of Medicine and Biomedical Sciences.

Early in the pandemic, the UB group teamed up with the Buffalo chapter of e-NABLE, the international, open-source 3D printing movement that has stepped up during the pandemic to produce personal protective equipment for communities all over the world. Together, they developed designs and physical prototypes, and published the designs so that anyone could produce the face shields and masks.

IMPACT OF COVID-19 ON AIR POLLUTION IN URBAN AREAS

To learn how air pollution has changed in populated areas of the world, and how these changes might impact the chemistry of the atmosphere in the future, Kang Sun is studying three polluted regions: Southern California, the Jianghan Plain (which includes Wuhan) in China and the Po Valley in Italy, where once-congested streets were made easily navigable by travel restrictions associated with the novel coronavirus. Sun, an assistant professor in the Department of Civil, Structural and Environmental Engineering and the RENEW Institute, is developing a new data-driven framework that combines satellite and meteorological data, that will take NASA satellite assets one step further to quantify the reduction in emissions and their impact on atmospheric chemistry. The resulting framework can eventually be quickly applied to other regions. The project is funded by a grant from NASA's Earth Science Division, through its Rapid Response and Novel Research in Earth Science initiative.



MODELING THE EFFECTIVENESS OF PPE FOR CHILDREN

Members of the Advanced Simulations for Computing Energy Transport (ASCENT) Laboratory, led by Francine Battaglia, professor and chair of the Department of Mechanical and Aerospace Engineering, are investigating the protective features of the Little Lives PPE Face Shield™, a commercially available personal protective equipment product designed primarily for children. The team, which includes graduate student Vedant Joshi, is using computational fluid dynamics to numerically model and simulate the fluid flow and track the spread of a virus such as COVID-19. The objective is to determine how air flows around the face shield and how well it prevents the spread of airborne viruses emitted during the wearer's respiratory processes such as sneezing, coughing and breathing.

In another project, the team is working to examine COVID-19 safety efforts implemented by the Buffalo Philharmonic Orchestra in Kleinhans Music Hall. Of concern is the spacing between musicians and whether the Plexiglas shields provide sufficient protection to the musicians during performances. The work includes examining a high-denier material to cover the bell of brass instruments to reduce the amount of respiratory aerosols released as an instrument is played.

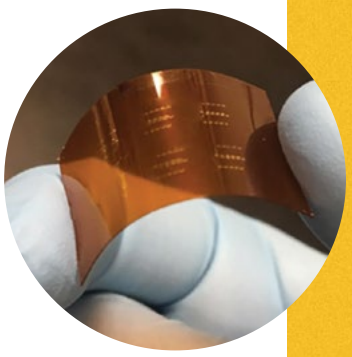
DEVELOPING 3D-PRINTED, REUSABLE N95-LIKE RESPIRATORS

Most 3D respirators are made of sturdy hard plastic but lack the sealing capability of traditional respirators, which are flexible and designed to form a protective barrier around the face. To address this limitation, Albert Titus, professor and chair of the Department of Biomedical Engineering, is leading a team to design safe, effective and reusable N95-like respirators. The respirators are made from a malleable plastic that requires more expertise to print, and have an opening to insert a filter cut from MERV 15 air filters that are commonly used in hospitals, clean rooms and other environments. An added benefit is that they would be reusable because they could be sanitized after each use.

The team is also looking at ways to custom print respirators for a specific person. Either an actual scan from a 3D face scanner or a 3D model of a person's face from a phone or tablet-camera could be used as the blueprint. They have designed plans for at least five different respirator sizes that take into consideration typical female and male facial features. This is believed to be unique, as many 3D-printed respirators are based on a one-size-fits-all approach.

The team includes researchers from the Jacobs School of Medicine and Biomedical Sciences, the School of Dental Medicine, and the Sustainable Manufacturing and Advanced Robotic Technologies (SMART) Community of Excellence. They are also working with e-NABLE, an online community that works on 3D-printed prosthetics and other devices, to develop and validate designs that are more comfortable.

EARLY DETECTION OF COVID-19 AT HOME



Arindam Sanyal, an assistant professor in the Department of Electrical Engineering, and Jung-Hun Seo, assistant professor in the Department of Materials Design and Innovation, have teamed up with colleagues at Emory University to develop a solution for early detection and management of COVID-19. The idea is to use wearable bio-sensors to continuously monitor patient physiological signals, such as heart-rate, respiration-rate, blood oxygen content and temperature, together with artificial intelligence (AI) to analyze the sensor data and predict if the wearer has been infected. The multi-modal bio-sensing patch comprises a flexible bio-sensor designed with ultra-thin nanomaterials (<5μm thickness) and embedded AI that continuously analyzes 5-10s frames of sensor data and transmits abnormal segments to a cloud AI model. The cloud AI model performs fusion of multi-modal sensor data and the patient's electronic medical records to accurately predict if they have been infected.

The preliminary focus of the research is on predicting cardiac events, such as arrhythmia, and sepsis from user physiological signals. The device can predict arrhythmia with 98% accuracy (sensitivity of 0.9) and sepsis with 86% accuracy three hours before onset. The team is now modifying the AI algorithm and the silicon integrated circuit to predict COVID-19 infection, and the immediate anticipated impact is the development of an at-home COVID diagnostic kit that will result in early detection. Successful generalization of the proposed technology may lead to a new frontier of at-home patient-health monitoring devices that can target different bio-markers and allow early screening of preventable diseases, which will improve health care quality for all.

The UBEAA kicked off coffee hours — a longtime dream of the board — in early 2020, in the new Legacy Lounge in Bell Hall.

Photo: Maximilian Kapitonoff

MAKING AN IMPACT ON STUDENTS

UB Engineering and Applied Sciences Alumni Association improves school spaces, creates more opportunities to connect with students

by Nicole Capozziello

Photo: Maximilian Kapitonoff

Students and alumni gathered for a casual evening of s'mores and warm beverages at a bonfire near Lake LaSalle.

Photo: Onion Studio, Inc.

Stephen Cross was among the many UBEAA members to give one-on-one resume feedback to students during the school's annual Career Perspectives and Networking Conference.

For 70 years, the members of UB's Engineering and Applied Sciences Alumni Association (UBEAA) have served as a channel through which the school's alumni can communicate, network and realize their professional potential.

In recent years, the organization's board has sought to focus not only on their crucial role in meeting the needs of current alumni but guiding and supporting future ones, particularly in the midst of the global pandemic.

"Our immediate goal for the UBEAA is to make an impact on the students that come after us — so that they can boldly take up the reins of our shared legacy," says Jordan Walbesser (BS '07 Computer Engineering, JD '10), current president of UBEAA. He commenced his role in 2019, succeeding Kurt Bessel (BA '07 German, BS '07 Aerospace, MS '08 Mechanical).

From 2016 to 2019, Bessel presided over an era of what he calls "refocused vision," during which the organization looked inward.

"UBEAA is and has always been a great hub for connecting alumni with each other," says Bessel. "But I thought our greatest opportunity for impact truly lay in what we could offer current students."

Knowing that this link was essential, the board, under Bessel and now Walbesser, asked: what does that connection look like?

The answer was to create space — relationally, time-wise, and physically — for students and alumni to connect.

"We recognize that the engineering curriculum is demanding," says Walbesser. "So, the UBEAA is responding to two needs: helping students adjust to the rigors of UB's program and supplementing the engineering curriculum with opportunities to learn soft skills that will make grads more capable and marketable in the workplace."

And now, the group has taken on helping support student needs — in the present and future — during the pandemic. "We've adjusted our programming to support students through online meetups and pushed electronic tools like UB's Career Connector Network," says Walbesser. "And we're also aligning with Dean Lewis's goal of trying to make every student feel known. I challenged the UBEAA chairs to come up with creative solutions to help meet that goal."

Tim van Oss (BS '14, MS '16 Civil Engineering), UBEAA secretary and chair of the Sports and Leisure Committee, says, "Since COVID-19, we've made a conscious effort to tie mentorship into every event we host."

A cornerstone of how UBEAA meets student needs is running four distinct, active committees: Wellness and Mentoring, Professionalism, Sports and Leisure, and Awards.

> "Our immediate goal is to make an impact on the students that come after us — so that they can boldly take up the reins of our shared legacy."
>
> **Jordan Walbesser,** president, UBEAA

Both the Sports and Leisure and Awards committees will be familiar to alumni of yore for the longtime, essential roles they've played. The Sports and Leisure committee can be found at football and basketball games coordinating Engineer Alley, while the Awards committee gives out annual student scholarships and the esteemed Engineer of the Year award.

However, the board recognized that students could use support beyond scholarships — and that UBEAA members could play a role in providing it. Thus were born the Professionalism Committee and the Wellness and Mentoring Committee, both formed during the 2016 revamp, and both of which have been more important than ever during the disconnected time of the pandemic.

The Professionalism Committee aims to round out students' rigorous technical training with soft skills prep, providing how-tos on everything from networking to professional wear. The committee was formed in response to alumni of all ages' first-hand experience of how companies' hiring criteria and expectations had broadened beyond the technical.

Photo: Tim van Oss

A hike at the Eternal Flame trail in Chestnut Ridge Park was the perfect setting for students to talk to alumni about the challenges and benefits of remote learning.

"We want to give alumni ways to give back by sharing their time and experiences," says Walbesser.

"It's rewarding to be giving back to UB's engineering program, and paying it forward when interacting with current UB engineering students," says Briana Tom (BS '17 Chemical Engineering/MBA '17), one of the committee's leaders. "I love being able to share my experiences with current students, so that they don't make the same mistakes that I did. Everyone on the UBEAA board is very dedicated to making our next generation of UB engineers and applied scientists better and better."

The impact, unwavering dedication, and ingenuity of UBEAA members has never been more apparent than in 2020. "When the pandemic hit, we realized that we had a strong enough organization and board to go virtual without any hiccups," says Walbesser. "I was reminded that the UBEAA is full of servant-leaders that are willing and able to rise up and meet challenges like the pandemic. Lastly, I realized how much smaller the world becomes when we leverage technology to connect our students and alumni from around the globe — and we plan to use that to our advantage in the future."

The committee recruits UBEAA members to volunteer and speak at School of Engineering and Applied Sciences events, such as the annual Career Perspectives and Networking Conference and the SEAS 360° Certificate of Professional Development program.

"Entering industry can be scary, and being able to present yourself to a potential employer and colleagues is important," says Tom. "Not only does the student benefit from the 360° program personally, but a potential employer will view the student as a more viable candidate."

As for their other work, the Professionalism Committee doesn't just seek to engage students but is thoughtful and creative in how they do so. Rather than holding resume roundtables or mock interviews, the Professionalism Committee hosts at least one outing a semester, coupling fun and social learning.

At their annual Movie Mingle event, they have an alumni speaker on a topic related to professionalism, while also teaching and encouraging the students to informally network with the alumni in attendance. The committee hosted a panel of alumni and HR managers at their ice-skating event to answer students' questions about job search and hiring processes.

Opportunities for support are rounded out by the Wellness and Mentoring Committee, which puts on events that give students an open place to talk about their stress and concerns, and connect with alumni who've been in their shoes.

"We check in with students about how it's going for them and tell them that others have been through stressful semesters — and it's okay to ask for help if they need it," says Courtney Bentley (BS '14, MS '16 Civil Engineering), one of the committees' leaders. "In the past, we typically held our events in fun, casual environments on and off campus so that it was easy for students to stop by, chat and relax for a while."

> "We've made a conscious effort to tie mentorship into every event we host."
>
> **Tim van Oss,** UBEAA secretary and chair of the Sports and Leisure Committee

Past activities have included ice cream socials and fireside chats and s'mores at campus firepits. In the spring of 2020, UBEAA also hosted a Zoom mentorship roundtable where

alums were split up into small groups with students to help be a sounding board and give them someone to talk to. Realizing students were craving in-person connection, they also led a hike in fall of 2020, where 17 students, and four UBEAA members made the trek to the Eternal Flame trail at Chestnut Ridge Park.

"For many students, the hike was their first time off campus all semester. They were eager to interact with other students and us alums even if it was from a little distance and behind a mask," says van Oss. "It was a great opportunity to encourage them to keep up their hard work and remember to take a break from their studies to enjoy the natural beauty around us all."

"I love the outdoors so I was very excited to see an engineering alumni event that was a hike," says Ellise Blake, a junior mechanical and aerospace engineering major. "I enjoyed meeting new people and seeing what life after college is like in different engineering disciplines."

The goal of facilitating more opportunities for casual connection led the group to want to create a space specifically for alumni-student connection on campus.

"A few years ago, we worked with (then) Dean Folks' office to collaborate on renovating a space in an engineering building that would serve the purpose of drop-in style socialization," says Bessel.

That space came to life in Bell Hall, where UBEAA funding helped to create a welcoming lounge area in the northwest entrance to the building. Named the Legacy Lounge, the space also showcases scholarship winners, Engineer of the Year recipients, information about the UBEAA, a large screen digital monitor to showcase UBEAA activities, and a dedicated conference room where UBEAA members can meet together and with students.

Bessel says, "What I needed as a student — and I found out that many other students needed too — was merely some perspective from our future selves: professional engineers. And when we facilitate those conversations, the messages students hear can make all the difference."

A night of ice skating at the Northtown Center in Amherst provided students with a much-needed break and some tips from HR managers about finding a job.

Photo: Maximilian Kapitonoff

The Engineer Alley tailgate and UB Bulls game during Homecoming week includes game tickets, food, drinks, giveaways, lawn games and student-alumni networking.

Photos: Larry Matthews

Learn more about the UBEAA at engineering.buffalo.edu/home/alumni/association/engage or by reaching out to President Jordan Walbesser at jlw28@buffalo.edu.

Photo: Doug Levere

Andrew Olewnik (center) and students at an e-NABLE workshop in Davis Hall. Participants were taught how to assemble and test previously printed parts of prosthetic hands for children.

GIVING THE WORLD A HELPING HAND

STUDENTS DESIGN 3D-PRINTED PROSTHETICS

By Nicole Capozziello

Each year, thousands of people around the world lose a hand or finger, often due to accidents, war, natural disaster or illness.

After this loss, accessing and affording traditional prosthetic devices can present their own challenge to these individuals, who are often in developing countries with limited medical care.

A group of undergraduate students recently aspired to fill this gap, putting their knowledge, creativity and resources to use as an engineering intramural activity and creating a UB chapter of e-NABLE — an online global community of 30,000 volunteers who use 3D printers to make free and low-cost prosthetic upper limb devices for adults and children in need.

"Over the last few years, we've been experimenting with 3D printed prosthetics, which is what e-NABLE is all about," says Andrew Olewnik, director of experiential learning programs in the School of Engineering and Applied Sciences, and an assistant professor in the Department of Engineering Education. "Working with e-NABLE provided cool opportunities for students to apply engineering work and contribute to that community."

Part of the school's Experiential Learning Programs, an engineering intramural is any problem-based extracurricular project that provides students with a real-world learning experience. The school has been partnering with e-NABLE on various intramural projects since 2018.

Last spring, over 20 students teamed up to explore different aspects of the 3D printed prosthetics process. Over the course of the semester, four teams focused on different projects: designing a pre-prosthetic forearm that can have various hand attachments to perform a variety of tasks; testing upper limb prosthetics to assure that the designs meet appropriate specifications and metrics; developing a bill of materials and instruction manual for assembling a 3D printed hand and ideal conditions for printing; and analyzing and improving the methods of parameterization when a patient is remotely measured for their preferred prosthetic, which is scaled before printing and delivering.

Students made a test hand as part of the project.

"Engineering intramurals and e-NABLE have given me a newfound love and interest in 3D printing, as well as furthered my interest in prosthetics and orthopedics as a career," says Alyssabeth Czajkowski, a biomedical engineering major and a team project manager.

Czajkowski's team addressed the challenge of creating an upper limb pre-prosthetic (also known as an interim prosthetic). Patients may wait a long time for their final prosthetic; during this time, a pre-prosthetic, such as e-NABLE's Unlimbited Arm design, is crucial for both rehab and getting the patient adjusted to using a prosthetic. After printing their designs, the students hope to work in conjunction with the Erie County Medical Center to test their models in real-life scenarios.

While the projects were challenging before the coronavirus pandemic, when the teams went remote in March, they had to be particularly creative.

"When we lost access to the labs and were unable to carry out some of the testing that we had planned, we determined that we needed to come up with a new approach that could be carried out remotely," says Sabrina Sleasman, an intramural participant and student in the Department of Biomedical Engineering. "We had to ask: how can we still test these remotely?" For her team, which focused on test engineering 3D printed prosthetics, the answer lay in developing an analytical model, which was a new experience for the students.

UB became an official chapter of e-NABLE this spring. With the help of Olewnik, Eric Paccione and Czajkowski, the chapter leads, researched the requirements of becoming an e-NABLE community chapter, brainstorming project ideas and seeking out students to begin the chapter.

"One of the requirements was to print a 'test hand' to show our competence with 3D printing and assembling e-NABLE designs," says Paccione, a biomedical engineering major and team project manager. "This led to our chapter hosting its first workshop and interest meeting where we had already 3D printed the parts, and we had groups of students work to assemble hands."

The e-NABLE community has over 140 e-NABLE chapters and hundreds of schools participating in their mission of making free 3D printed hands for those in need, using open-source and low-cost designs.

"What I like most about the projects we do is that our end results can reach much further than UB. With the community chapter network and e-NABLE forum, we are able to share what we do directly with people around the world who are working on similar projects, contributing to a greater body of knowledge," says Paccione.

In addition to Czajkowski, Paccione and Sleasman, Ruby Acquah, Connor Bittlingmaier, Huy Dang, Sovannrith Em, Jeff Joseph, Taylor Marabella, Marsha Maredia, Angelique Miane, Preethi Sivaswaamy Mohana, Sreeja Morishetty, Jui Mahendra Naik, Daniel Pardo, Taylor Quinn, Anthony Romeo, Wilson David Jo Siu, Rachael Warren, Elise Williamson and Jason Yin participated in the e-NABLE projects. Graduate students Elakkiya Jayaraman and Aliakbar Eranpurwala served as project mentors. In addition, Filip Stefanovic and Mark Ehrensberger, faculty members in the Department of Biomedical Engineering, and the 3D Printing Working Group collaborated with the students.

ABOUT THE SEAS INTRAMURAL PROGRAM

The SEAS Intramural program sponsors a number of projects each year. The projects are intended to be resume builders and give students an opportunity to apply what they learn to solve a real problem on behalf of a client. Industry partners, community organizations and faculty/staff/students are encouraged to submit problems for consideration. Learn more at engineering.buffalo.edu/elp or contact Melinda Somerville, experiential learning business development assistant, at melindas@buffalo.edu.

Aparajita Dasgupta

Edward Swinnich

FIRST PHD STUDENTS GRADUATE FROM MDI

In May of 2020, Aparajita Dasgupta and Edward Swinnich became the first two PhD students to graduate from the Department of Materials Design and Innovation, a joint program between the College of Arts and Sciences and the School of Engineering and Applied Sciences.

Dasgupta is now a post-doctoral researcher in the Department of Chemical Engineering at the Massachusetts Institute of Technology (MIT), where she is researching the development of machine learning models that will have an impact on human health and the drug development and manufacturing process. For her PhD, she worked with Krishna Rajan, SUNY Distinguished Professor and Erich Bloch Chair, to use data science and statistical analysis techniques to uncover fundamental relationships in materials science and find new materials of interest. She earned her BS in chemical engineering at BITS Pilani Dubai, and an MS in chemical engineering from UB.

Swinnich is a senior process engineer at GlobalFoundries, where he is in charge of electroplating at the company's Fab10 facility. For his PhD, he worked with Jung-Hun Seo, assistant professor, to combine dissimilar semiconductors that have never been researched together before — gallium oxide and diamond — for the creation of new electronic devices for high power applications. He completed his BS in electrical engineering from UB.

A YEAR LIKE NO OTHER

The UB bull statue got a new mask to promote health and safety.

The Human Factors and Ergonomics Society won the Outstanding Student Chapter Award from the national organization. One of their regular activities is participating in Engineers Week at the Buffalo Museum of Science.

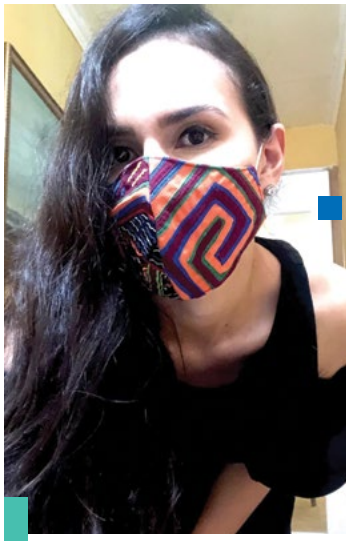
The COVID-19 pandemic changed our campus and the way students learn. Last May, undergraduates involved in Engineering Intramural projects made their final presentations online.

The first virtual commencement took place and graduates found ways to celebrate from home.

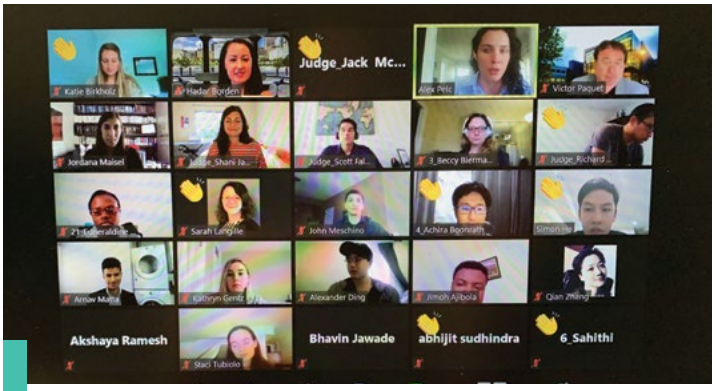
Engineers for a Sustainable World learned how to make key chains in the SEAS Machine Shop during the fall semester. The club is hosting a virtual national conference at UB this spring.

Chemical engineering PhD student Emmanuel Nsengiyumva was selected for the SUNY PRODiG Fellowship, a program to increase the number of underrepresented faculty in the SUNY system.

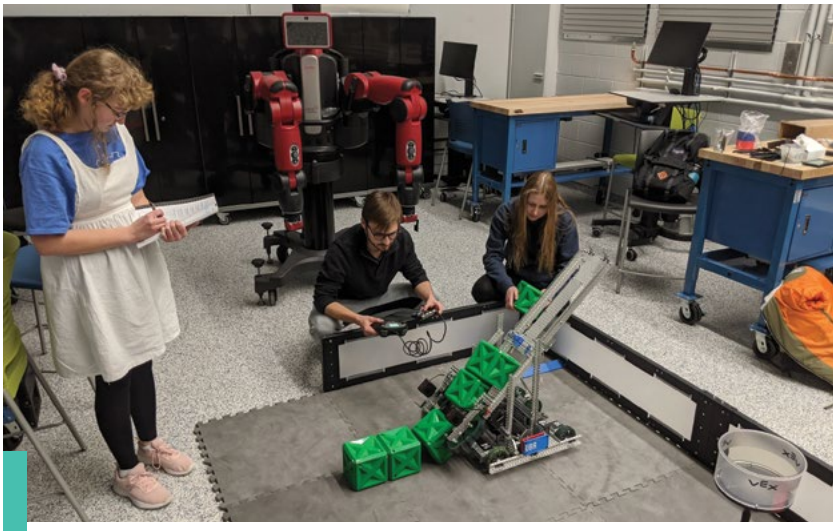
Wakil Pranto was named one of "10 New Faces of Civil Engineering" by the American Society of Civil Engineers (ASCE).



Karla Rivera took first place in the SEAS "Show Off Your Mask" contest. She is from Panama City and is a master's student in the sustainable transportation and logistics program.



Over 100 SEAS students participated in the Inclusive Vehicle Design Challenge last summer, hosted by UB's Blackstone LaunchPad and SEAS. Many SEAS faculty and alumni served as mentors.



The UB Robotics club earned its first-ever spot at the international VEX U World Championship, after taking first place at the RIT VEX U tournament, held on February 22, 2020, in Rochester, N.Y.

Aerospace engineering student Rachael Gold won first place in the undergraduate category at the WE Local Des Moines Collegiate Competition for her research on eliminating debris in space.

Riley Blasiak, a junior with a double-major in civil and environmental engineering, won UB's GIS Day Map Competition. Her project used data provided by the California Environmental Data Exchange Network to determine the impact of different green infrastructure initiatives in Los Angeles County.

Photos: Douglas Levere

LOCAL DISTILLERY TURNS SPIRITS INTO SANITIZER

by Michael Andrei

A micro-distillery on the Niagara Wine Trail co-owned by UB alums is helping Western New Yorkers stay healthy by turning spirits into hand sanitizer.

Todd Snyder at Niagara Craft Spirits Distillery is making hand sanitizer and giving it away to the community free of charge.

Inset top: Nick Cappello stirs a vat of grain used to make the high-test alcohol.

Inset bottom: Jugs of World Health Organization–approved hand sanitizer.

Todd Snyder and Joe Nardecchia, co-owners of Niagara Craft Spirits Distillery and Tasting Room, are trying to help meet a critical need brought about by the COVID-19 crisis.

"I had been reading — and hearing — story after story about the need for hand sanitizer," said Snyder, an instructional support specialist in the Department of Civil, Structural and Environmental Engineering and UB alumnus (MS '96 civil engineering).

"We all know how quickly bottles of hand sanitizer disappear from store shelves. And how difficult it is to keep it in stock," he said. "It has become a necessity that all of us are using on a daily basis."

Snyder said basic hand sanitizer is not a complicated product to make. He and Nardecchia, a 2003 graduate of the UB School of Management, thought they could produce their own using alcohol distilled at Niagara Craft Distillery. After conducting an online search for a sound formula, Snyder was a bit surprised by what he found out.

"I learned there are almost as many formulas for hand sanitizer as there are different brands," he said.

"I wanted to produce a powerful product, one that could also be useful in health care for sanitizing certain types of instruments or surfaces.

"We settled on the formula that is certified by the World Health Organization, which is 160 proof. Most hand sanitizers that are sold for day-to-day use are usually in the range of 120 proof," said Snyder.

"We are preparing it using our own ethanol, distilled from local Niagara County wine and/or corn, according to the WHO's published, ethanol-based, hand sanitizer guidance."

Niagara Craft Spirits Distillery is a New York State Farm Distillery, required by law to use at least 75% New York State agricultural ingredients in their products. Snyder and Nardecchia create their mash, for example, with corn from farms in Niagara County.

"We use the corn for our whiskey and bourbon. Our spent grain goes to a nearby chicken farm as feed for livestock," said Nardecchia.

Snyder and Nardecchia also accept wine from any of the wineries on the Niagara Wine Trail that wasn't bottled, for one reason or another, which they distill and turn into handcrafted gin. Or, now, ethanol for hand sanitizer.

"It may be wine that didn't go so well," Snyder explained. "We distill it down to 80 proof. Then it goes into one of our three 30-gallon polishing stills for more carefully controlled distillation, which can take it up to 190 proof.

"We are fortunate to have received a lot of very strong support for the hand sanitizer project from the local wineries, farms and other neighbors here in Cambria," Snyder said. "We have 2,000 gallons of donated wine — it's not good enough for bottling, but it works for hand sanitizer.

"We have wonderful neighbors, in a great community. We are grateful to them for their contributions."

Snyder and Nardecchia said they are making a commitment to that community. "Niagara Craft Spirits Distillery is focused on producing as little waste as possible. Sustainability — how we operate our business — is very important to us," Snyder said.

"We love being here and we want our visitors to enjoy their visit and feel comfortable coming back."

Anyone with an empty hand sanitizer bottle — up to six ounces — that they would like refilled is invited to stop by the distillery during regular business hours for a free refill.

"We'll top you off with up to six ounces per person per day," Snyder said. "And we will continue doing this — there's no shortage of alcohol for this effort. This is not a one-weekend event, so there is no reason to panic or hoard."

For more information, visit the distillery's website, **niagaracraftspirits.com** or follow them on social media.

ALUMNI-LED COMPANIES FIND WAYS TO HELP DURING PANDEMIC

For the last few years, Tonawanda-based **Innosek** has specialized in rapid prototyping, low volume manufacturing, project management and product development. But when the coronavirus hit, the start-up, co-founded by alum Brian Bischoff (BS '15 industrial engineering), pivoted. They manufactured thousands of face shields with their 3D printers, and partnered with Rapid Medical Parts to convert sleep apnea machines to emergency ventilators under a preliminary U.S. Defense Department contract. The company also received a grant from FuzeHub, the New York Manufacturing Extension Partnership state center, to produce face shields for New York's first responders at no cost.

Buffalo-based engineering design and prototyping firm **Tresca Design,** founded by Daniel Buckmaster (BS '18, MS '20 mechanical engineering), along with Blank Slate Enterprises and PostProcess Technologies, manufactured 3D printable face shields. The shields were donated to local fire departments, including the Town of Amherst's Emergency Services & Safety Department, and were also shipped at no cost to health care workers in states from Vermont to Florida.

Buffalo Automation is piloting a new project called BiFrost that is adapting the company's AI-based boat navigation system to streamline the process of taking body temperatures. The BiFrost project got its start early in the pandemic, when shipping companies were reluctant to proceed because they feared Buffalo Automation staff would inadvertently infect ships' crews. The equipment takes specific human features from thermal images and measures the skin temperatures from areas most likely to indicate a fever. Early results indicate that it could be more effective in detecting fevers than a handheld IR measuring device. Buffalo Automation was founded by computer science and electrical engineering major Thiru Vikram and two UB undergraduates in 2014.

All three companies have benefited from support provided by the UB Center for Industrial Effectiveness (TCIE). Through a grant program, student engineering assistance at a subsidized rate proved crucial in establishing their company foundations.

PARTICIPATE IN UB'S ALUMNI ORAL HISTORY PROJECT

In 2021, the University at Buffalo is celebrating its 175th anniversary. To mark this historic year, UB is embarking on an oral history project to capture stories directly from its 273,000 alumni. In partnership with Publishing Concepts Inc., UB is collecting and curating the campus experience through the years. These stories will be preserved in a book that celebrates the 175th anniversary. Every UB graduate has a story, and we want to hear yours. To participate, call **1-888-842-5884** to update your alumni record, share your UB memories and be a part of history.

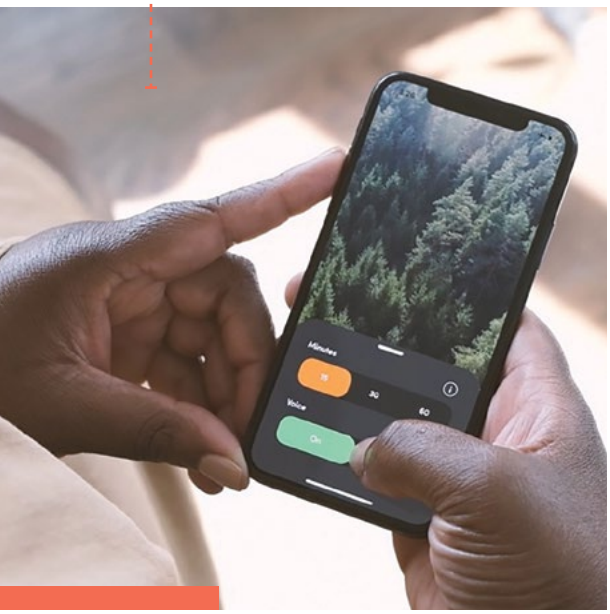
DRIFTING TOGETHER

Oyin Antwi uses Industrial Engineering background to grow joy and connection with wellness app

Industrial engineers find ways to optimize systems, improving things as diverse and complex as TSA, mail carrier routes, and manufacturing assembly lines. Or, with Oyinkansola Antwi's recent project, our well-being.

When the coronavirus pandemic hit in 2020, Antwi (BS '11 industrial engineering) wondered, "What could the community use right now?" And then: "How could we put that out into the world?"

The answer was "Drift – wellness + sleep," a wellness app for sleep and focus. The app, which was released in August of 2020, is the first creation of Digital Park, a tech company Antwi started with her husband Jeffery (BS '11 Business Administration).



The app, like everything she's done throughout her career, aims to give back, providing others with a new approach and more joy.

While launching a wellness app might not be what many expect of an industrial engineer, Antwi, a senior operations analyst at NYC-based jewelry design house Gabriel & Co., has always been comfortable outside the realm of the ordinary. And her industrial engineering training at UB has provided her with the perfect foundation.

When Antwi came to UB in 2007, she knew she wanted to do something technical while not losing her creative side. "I realized that industrial engineering was exactly what I'd been looking for — that concept of getting to take a systematic, mathematical approach to the creative world. You can apply its methodology to any industry, basically carving out your own path."

And for the last decade, that's exactly what she's done, leaving her mark, large and small, at an array of companies.

"All of the industries I've worked in — fashion, textiles, jewelry — involve heavy labor," explains Antwi. "The goal is not to replace workers but to optimize their day, ultimately making their lives easier."

To each company, she's brought the industrial engineering mindset of thinking differently, all the way down to the most minute of details. Ultimately, what Antwi prizes most is how her work impacts people, who get joy and meaning from well-made, thoughtfully-designed objects, from a rug to an engagement ring to an app.

Antwi and husband, who shares her interest in the human experience, started developing "Drift – wellness + sleep" in March of 2020.

It comes at a one-time cost of $4.99 and is intended to be a streamlined experience — there's no log-in, no hidden fees. "We want you to jump right in and forget about what's happening," says Antwi.

In the months since "Drift – wellness + sleep's" release, Antwi has already gotten to see its impact. Press and promotion from Pop Sugar, NYU, and Afrotech has helped get word out and users have praised "Drift – wellness + sleep" for its intentionality and accessibility. The app's success has also made an impact on the greater community; a portion of the proceeds from each sale is donated to their partnering Black mental health organization, Africa's Health Matters, to continue supporting their services in the community and the Black Lives Matter movement as a whole.

Looking at what Digital Park has accomplished so far and all that lies ahead, Antwi says, "This is the beginning of so many products we want to put out into world. And I hope that the human experience part stays with us forever. I'll make sure of it."

Learn more about "Drift – wellness + sleep" here: **apple.co/2NmlV7n**

by Nicole Capozziello

SAFIUDDIN NAMED ENGINEER OF THE YEAR

Mohammed Safiuddin, president of STS International and a long-time teacher in the Department of Electrical Engineering, was named Engineer of the Year by the UB Engineering and Applied Sciences Alumni Association

UBEAA president Jordan Walbesser (left) presents Mohammed Safiuddin (right) with the Engineer of the Year award.

Photo: Onion Studio, Inc.

Each year, the award goes to a school alumnus or closely affiliated person with distinguishing activities in alumni, community, business and professional affairs.

Safiuddin, who earned his PhD in electrical and computer engineering in 1982, has impacted a generation of UB engineering students through his research and teaching, where he focused on connecting classroom instruction to the real world of industry and business.

In accepting the award, which was presented during Engineer's Week at the annual Order of the Engineer and Pledge of the Computing Professional ceremonies held last year, Safiuddin described how engineers must exemplify the value of integrity, adhere to the facts, and speak the truth.

"Our work as engineers affects what I call the three P's— People, Planet and Profit," says Safiuddin. "To do right by ourselves and our profession, we should all be committed to serving **people** and our **planet**, and ensuring no harm to them. When we look after these two "P's," then we will find sustainable **profit** and prosperity for all."

Safiuddin spent much of his professional career at Westinghouse Electric in Buffalo, N.Y. Over a dozen of his projects were recognized as "First of its Kind" in the world. One of his projects was designated as a top ten "Engineering Achievements for 1977" by the National Society of Professional Engineers and the Society of Civil Engineers. He received ten U.S. patents for his innovative control system designs. He established STS International, a technology service firm, in 1985, as Westinghouse ceased its operations in Buffalo.

His interests in continuing education kept him in close contact with UB, where he taught part-time in the early sixties, was an adjunct associate professor from 1977–1991 and then a research professor from 1991–2010. He is currently a research professor Emeritus in the Department of Electrical Engineering.

His areas of technical interests cover static power conversion and optimal control systems as applied to industrial processes, renewable energy, and Smart Grid power systems. He has authored dozens of technical papers and conference presentations, and received a number of awards and recognitions, including Life Fellow (1993) of the IEEE. He was nominated for the prestigious IEEE Education medal in 2018 and was recognized with International Business and Academic Excellence 2019 "Distinguished Educator Award" in 2019 by the GISR Foundation and American College in Dubai.

by Jane Stoyle Welch

1970s

Paul Speranza, PE (MS 1979, BS 1977, civil) was named senior managing engineer at Shumaker Consulting Engineering and Land Surveying, D.P.C.

1980s

Robert Bojanek (BS 1983, electrical and computer engineering) joined the Board of Trustees of the Community Foundation of Herkimer and Oneida Counties. Bojanek is the co-founder of ShoreGroup Inc. and Optanix Inc., and is currently a managing partner at KAPFirst LLC. He is involved with several community foundations and nonprofit organizations with a focus on education and youth development.

Daniel D'Angelo, PE (BS 1983, civil) was recognized by the National Academy of Construction for his "significant contributions to the effectiveness of the engineering and construction industry." D'Angelo is a principal civil engineer at Applied Research Associates.

Wahid Albert, PE (BS 1984, civil) won the 2020 Chairman's Award from the American Council of Engineering Companies of New York. Albert is vice president, regional director of highway/bridge projects for the NY Metropolitan area.

1990s

Darrell Kaminski (ME 1990, BS 1983, civil) joined the Federal Highway Administration technical working group to help advance the administration's Every Day Counts Five initiative. He is an assistant professor of practice in UB's Department of Civil, Structural and Environmental Engineering and senior transportation engineer at LaBella Associates.

Satish Nagarajaiah (PhD 1990, civil) received the Takuji Kobori Prize from the International Association of Structural Control and Monitoring. He is a professor of civil and environmental engineering at Rice University.

Nicos Makris (PhD 1992, MS 1990, civil) received the 2020 J. James R. Croes Medal from the American Society of Civil Engineers. Makris is the Addy Family Centennial Professor in Civil Engineering at Southern Methodist University.

Corey Smith (BS 1993, mechanical) was appointed North American creative supervisor at ReDefine, an animation and visual effects services company. Smith previously worked at Walt Disney Animation Studios, on projects such as Dinosaur, Chicken Little, Tinker Bell and Meet the Robinsons.

Dexter Johnson (PhD 1995, MS 1989, mechanical; BS 1987, aerospace) received the American Institute of Aeronautics and Astronautics 2021 Diversity and Inclusion Award. Johnson, a NASA technical fellow — loads and dynamics, was recognized for his "significant contributions to advancing diversity and inclusion within the aerospace and astronautics community through your AIAA collaborations with students and industry partners."

Jerry Bryant (BS 1996, electrical) was appointed assistant vice president in Information Technology Services at the Federal Reserve Bank of Richmond. Bryant had previously worked for the Federal Reserve's National IT function and as a senior manager at Oracle.

Dennis Elsenbeck (ME 1996, mechanical), an expert in the energy field, has been included on Energy & Environment Power 100 list, compiled by City & State. Elsenbeck is an energy consultant and the head of Energy and Sustainability at Phillips Lytle, a Buffalo law firm. He previously worked at National Grid.

2000s

James Mayrose (PhD 2000, MS 1993, mechanical; BS 1989, aerospace) was appointed provost and vice president for academic affairs at SUNY Buffalo State, after serving in the position on an interim basis since January 2019. His career at Buffalo State spans two decades, and prior to this appointment, he was dean of the School of the Professions.

Mike Kurdziel (PhD 2001, MS 1988, BS 1986, electrical and computer engineering) was selected Innovator of the Year by the Rochester Intellectual Property Law Association. Kurdziel was recognized for a U.S. patent he secured for a customizable encryption algorithm based on a sponge construction with authenticated and non-authenticated modes of operation. He is chief engineer of systems and technology at L3Harris Technologies.

Mohamed A. Bagha, PE, PMP, CFM (ME 2003, civil) was named vice president and regional practice lead-water at Michael Baker International, located in Houston. Bagha, who has been with the company for 15 years, will facilitate the growth of the firm's water practice in the Gulf Coast Region.

Edward M. Murphy, PE (ME 2003, civil; BS 1999, chemical) joined the Buffalo office of Civil and Environmental Consultants, Inc. as a principal. Murphy will lead the office's environmental engineering and sciences practice, consulting to industry, mining, and legal sectors.

Carla Ng (MS 2003, BS 2001, chemical) received an NSF CAREER Award, "Harnessing biology to tackle fluorinated alkyl substances in the environment." Ng is an assistant professor of environmental engineering at the University of Pittsburgh. She earned her PhD from Northwestern University in 2008.

Sean Moskal (BS/MBA 2006, mechanical/business administration), senior vice president of commercial banking at KeyBank, was profiled in Buffalo Business First. He returned to Buffalo in 2018 after 12 years with HSBC Bank, with assignments in Chicago and Hong Kong.

Jonathan M. Walczak, PE (BS 2006, civil) has been promoted to managing engineer at Barton & Loguidice. A resident of Palmyra, N.Y., Walczak is a member of the firm's Transportation Practice Area.

Claudia Marin (PhD 2007, MS 2003, civil) is leading a National Science Foundation-funded project to develop an intelligent surveillance platform for Damage Detection and Localization of Civil Infrastructure. She is a professor of civil and environmental engineering at Howard University.

Kari Bancroft (BS 2008, computer science) joined the Department of Computer Science and Engineering's Advisory Board. Bancroft, the first female to join the board, is a senior engineering manager at Webflow.

Keep in touch and network with fellow alumni from our school by joining our LinkedIn page linkedin.com/school/ub-seas.

Visit UB Connect (ub-connect.com) to submit your class note, update your profile, find your friends, and learn about your benefits as a UB alumni.

Chelsea Spahr, PE (BS 2008, civil) was named city engineer in the City of North Tonawanda, N.Y. Spahr, a city resident who rejoined the Engineering Department three years ago, previously worked at Wendel for nine years.

2010s

Violet Castor (BS 2014, electrical) joined Arlington, Vt., based Mack Molding as a manufacturing engineer.

Sudeep Hegde (PhD 2015, MS 2010, industrial) accepted a tenure-track assistant professor position at Clemson University's Department of Industrial Engineering. Hegde's research involves the application of resilience engineering and human factors engineering towards enhancing performance and safety in health care and other complex domains.

Joshua Rodems (MS 2015, civil) joined Bergmann as a project manager and structural engineer in its Northeast infrastructure group in Rochester. Rodems has nine years of structural engineering experience working on a wide range of new and rehabilitated highway and rail bridge projects for state and municipal owners, as well as for contractors under design build delivery.

Colin Nims (BS 2018, civil) has been named design engineer/CAD technician at Larsen Engineers.

Harshita Girase (BS 2019, computer science) led a team of volunteers as the executive director of Buffalo Startup Week. She is a software engineer at Torch Labs, a venture capital-backed tech company based in San Francisco which is building out its software engineering hub in Buffalo.

2020s

Tyree Singleton (MS 2020, BS 2019, industrial) accepted a position as a junior operations researcher for the Perduco Group, a government contractor working with the Air Force's Air Education Training Command's Studies and Analysis Squadron.

"Interacting with students is very rewarding. If I can play a small part in helping to nudge them in a helpful direction, that is all the thanks I need."

Robert Harrison, vice president, Transmission Developers, Inc.

DEAN'S ACHIEVEMENT AWARD RECIPIENT BOB HARRISON URGES CLASS OF 2020 TO EMBRACE LIVING OUTSIDE OF COMFORT ZONE

When Robert Harrison graduated from UB with a degree in mechanical engineering in 1983, he didn't know exactly where his career would take him, but was confident that his education as an engineer could provide the foundation he would need to make a difference.

Over the last 37 years, Harrison has found this to be true, working in the engineering/construction industry to build industrial gas facilities, chemical processing plants and energy infrastructure around the world, all while giving back to the UB community.

His dedication and commitment to guiding the next generation of engineers was honored with the Dean's Award for Achievement, the highest honor presented by the school. Awarded annually, the recipient of the Dean's Award provides the undergraduate commencement address.

Delivered via video this year, Harrison, who is currently the vice president of engineering and construction at Transmission Developers, Inc., told the Class of 2020 that one of the key takeaways from his career has been to continually try something new.

"While the entire world is living outside their comfort zone during these times, the engineering world is playing a vital role in helping us to understand how to best navigate our way through the unknown and save lives," Harrison said.

And, he looked to the next chapter of our country's story. "Soon, we will be looking at this challenge in the rear view mirror and focusing on economic recovery. In the renewable energy sector, jobs will be created to speed our transition to carbon free energy sources. In the transportation sector, jobs will be created to build out and rehabilitate our roads, bridges and transit systems."

"What do these initiatives have in common?" he asked. "Both demand the unique skill sets of engineers of all disciplines."

Harrison's perspective draws on his long and varied career, which began in the natural gas industry as plant supervisor/field engineer in a liquefied natural gas plant, to being a leader at Transmission Developers, Inc., a project development company that brings large-scale renewable power to urban load centers via high voltage, direct current transmission lines.

Harrison has remained involved with SEAS throughout the years as a member of the Dean's Advisory Council and chair of the Department of Mechanical and Aerospace Engineering's Advisory Board. He regularly engages with students, and in 2018, was honored for his dedication with the SEAS Mentor of the Year award.

by Nicole Capozziello

WEARABLE FITNESS DEVICES DELIVER EARLY WARNING OF POSSIBLE COVID-19 INFECTION

The difficulty many people have getting tested for SARS-CoV-2 and delays in receiving test results make early warning of possible COVID-19 infections all the more important, and data from wearable health and fitness devices shows promise for identifying who might have COVID-19.

Today's wearable devices gather data about physical activity, heart rate, body temperature and quality of sleep. This data is typically used to help people track general well-being. Smartwatches are the most common type of wearable. There are also smart wristbands, finger rings and earbuds. Smart clothing, shoes and eyeglasses can also be considered "wearables." Popular brands include Fitbit, Apple and Garmin.

Several studies are testing algorithms that assess data from wearable devices to detect COVID-19. Results to date show that the concept is sound. However, wearables can be expensive and sometimes challenging to use. Addressing these issues is important to allow as many people as possible to benefit from them.

TOWARD DETECTING VIRUSES

The drawback of many existing wearable sensors is that they can't actually detect the presence of a virus such at SARS-CoV-2. To do this, they would have to detect virus-specific RNA.

RNA detection typically involves several steps, including extracting RNA from a sample, making many copies of the RNA and identifying the RNA. Although there has been a lot of progress in miniaturizing RNA detection equipment for use in rapid, point-of-care testing, there's still a ways to go before it can fit in wearable devices.

Much of the ongoing research on developing rapid, point-of-care pathogen detection uses "lab-on-a-chip" technology. Lab-on-a-chip refers to the goal of shrinking laboratory tests that once required many large pieces of equipment to the size of a computer chip or microscope slide.

An example is a COVID-19 diagnostic test undergoing clinical trials. The test's sensor is a specialized ion-sensitive field-effect transistor (ISFET) that is designed to respond to the presence of the virus RNA. The device can perform a test in less than one hour, but requires a sample collected by nasal swab.

While this technology is not wearable, it could become the launching point for future virus-detecting wearables because these can be made small and use little power. A wearable device that continuously monitors a person and indicates that they've contracted or been exposed to the virus would allow the person to seek treatment and isolate themselves to prevent further spread.

SONIC SCREWDRIVERS AND TRICORDERS

Fans of Dr. Who know the sonic screwdriver, and Star Trek followers know the tricorder. The ideal wearable of the future would be similar to these wondrous fictional devices. It would be able to detect the presence of the virus in the environment around the wearer, providing the opportunity to leave before becoming exposed.

But airborne virus detection requires significant equipment to collect air samples and analyze them. Other methods, such as the plasmonic photothermal biosensor, provide promising results, but still require the user to perform the analysis. It will be some time before a smartwatch will be able to alert its wearer to the presence of a dangerous virus.

WEARABLE AND ACCESSIBLE

For all the promise of wearables as tools to tackle the COVID-19 pandemic, and future pandemics, there are barriers to widespread use of the devices. Most wearables are expensive, can be difficult to learn to use by non-native English speakers, or are developed without data from a broad population base. There's a risk that many people won't accept the technology.

Continued development of broadly accepted health-based wearables should include community input, as outlined in a National Academies Workshop Summary. By ensuring that everyone has access to wearables, and accepts them, the devices can help keep people healthy in the midst of a global pandemic. Ongoing research should result in improved technology that, with care, will benefit all of society.

by Albert Titus

Albert Titus is professor and chair of the Department of Biomedical Engineering, a joint program of the School of Engineering and Applied Sciences and the Jacobs School of Medicine and Biomedical Sciences at the University at Buffalo. This story was also published by **The Conversation.**

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THE CAMPAIGN FOR UB

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Whether it's exploring ways to use renewable energy sources, developing new biomedical devices, or unlocking the potential of artificial intelligence, we're not afraid to do what it takes to make an immeasurable impact on our community and around the globe. The *Boldly Buffalo* campaign provides countless opportunities for students to discover their passions and achieve their dreams. To learn how you can help create a better world, visit **buffalo.edu/campaign**.

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Photo: Letitia Thomas

LSAMP Summer Internship participants pose for a group photo in front of Lake LaSalle on UB's North Campus.

CHAMPIONING JUSTICE, EQUITY, DIVERSITY AND INCLUSION

Justice, Equity, Diversity and Inclusion (JEDI) – these four words express the collective effort around racial equity in the School of Engineering and Applied Sciences. While many of our readers may think of JEDI as guardians of peace and order in the Star Wars galaxy, for us, it signifies our commitment as a school to make the time to lean in, listen, reflect and learn from one another.

Following the murder of George Floyd and the ensuing protests to highlight systemic racism throughout our country, Dean Kemper Lewis created the SEAS Working Group for Action on Racial Equity. Co-led by Letitia Thomas, assistant dean for diversity, and Christine Human, associate dean for accreditation and student affairs, the working group included over 40 faculty, staff and students from across the school. Over the fall semester, the group reviewed all aspects of the school's current policies and procedures, from faculty and staff recruitment to student support, to K-12 outreach, resulting in a comprehensive report with recommendations for the school. Phase Two began this spring, with the creation of the Standing Committee for JEDI in SEAS. To contribute to this effort, visit **buffalo.edu/giving/jedi.**