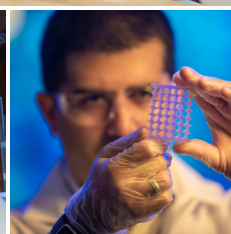




2023

HIGHLIGHTS

Henry M. Rowan College of Engineering





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A MESSAGE FROM THE DEAN


2023
HIGHLIGHTS

Dear Friends:

I am thrilled to share this report with you, which highlights the progress our college has made in the past year toward advancing research, promoting education and driving innovation. Our pursuit of excellence has led us to welcome 10 tenured and tenure-track faculty members and two lecturers across five departments. These distinguished individuals reinforce our commitment to groundbreaking research and exceptional teaching standards. They will play significant roles in advancing our strategic research areas, namely **health, sustainability, connectivity and education**.

Over the past year, we have achieved several notable milestones. These include securing a \$30 million Arctic research contract by CREATES, inducting one of our faculty members into the ASEE Hall of Fame and setting records in research expenditures, Ph.D. enrollment and Ph.D. graduates. We also launched the Digital Engineering Hub (DEHub), a new center dedicated to advancing digital engineering, and witnessed the transformation of our VR center into the Machine Learning, Artificial Intelligence & Virtual Reality Center (MAVRC). Additionally, we held our first-ever Alumni Circle of Distinction induction ceremony, which recognized exceptional engineering alumni for their career accomplishments and community service. These and many more accomplishments of our students and faculty are presented herein.

I trust that you will find this publication engaging and informative and that it provides insight into our objectives and vision for the future of engineering education and the profession.

Sincerely,

Giuseppe R. Palmese, Ph.D.
Dean, Henry M. Rowan College of Engineering



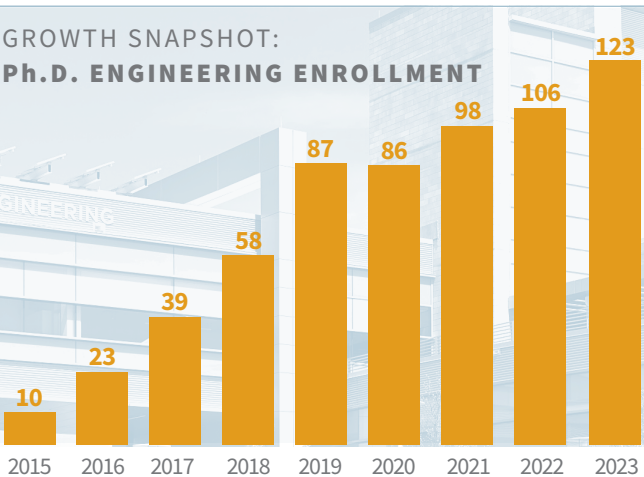
→ “We have experienced exceptional growth this year as we continue to serve our students and conduct impactful research.”

A YEAR IN REVIEW

The 2022–23 academic year saw continued growth within the Henry M. Rowan College of Engineering. More than 1,700 undergraduate, master’s and doctoral students were enrolled in the college, including the largest-ever cohort of engineering Ph.D. students. The academic year closed with 575 new graduates from across all departments and degree levels.



GROWTH SNAPSHOT:
Ph.D. ENGINEERING ENROLLMENT



DEPARTMENTS & DEGREES

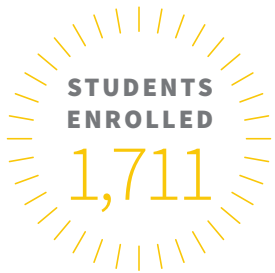
	BS	MS	PhD	PhD/MD	PhD/DO
Biomedical Engineering (BME)					
Biomedical Engineering	✓	✓	✓	✓	✓
Civil & Environmental Engineering (CEE)					
Civil Engineering	✓	✓	✓		
Chemical Engineering (ChE)					
Chemical Engineering	✓	✓	✓		
Electrical & Computer Engineering (ECE)					
Electrical & Computer Engineering	✓	✓	✓		
Experiential Education (ExEEd)					
Engineering Entrepreneurship	✓				
Engineering		✓			
Engineering Education			✓		
Mechanical Engineering (ME)					
Mechanical Engineering	✓	✓	✓		

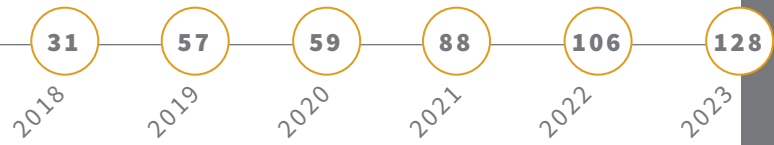
DIVISIONS & DEGREES

	BA	Master's
Construction & Engineering Management		
Construction Management	✓	
Master of Engineering Management		✓
Engineering Technology		
Electrical Engineering Technology	✓	
Mechanical Engineering Technology	✓	
Surveying Engineering Technology	✓	

ENROLLMENT BY DEGREE

UNDERGRADUATE		1365
Biomedical Engineering		105
Chemical Engineering		111
Civil Engineering		275
Construction Management		161
Electrical & Computer Engineering		301
Electrical Engineering Technology		7
Engineering Entrepreneurship		38
Surveying Engineering Technology		18
Mechanical Engineering		347
Mechanical Engineering Technology		2
MASTER'S		223
Biomedical Engineering		15
Chemical Engineering		15
Civil Engineering		41
Electrical & Computer Engineering		58
Engineering Management		32
Mechanical Engineering		62
DOCTORAL		123
Biomedical Engineering		25
Civil & Environmental Engineering		24
Chemical Engineering		23
Materials Science & Engineering		4
Mechanical Engineering		14
Electrical & Computer Engineering		21
Engineering Education		12

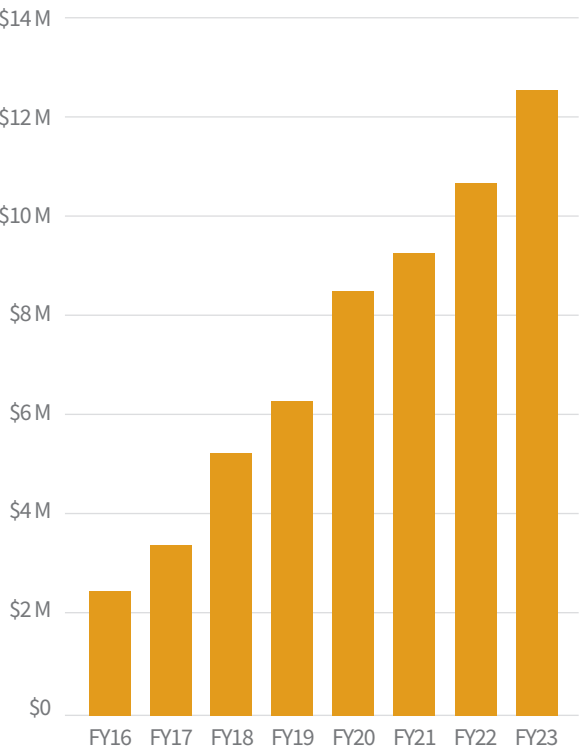




THE YEARLY NUMBER OF JOURNAL PUBLICATIONS HAS QUADRUPLED OVER THE LAST 6 YEARS.



GROWTH SNAPSHOT:
RESEARCH EXPENDITURES



FEATURED FACULTY PUBLICATIONS
(PEER-REVIEWED)

Copling, A., Akantibila, M., Kumaresan, R., Fleischer, G., Cortes, D., Tripathi, R. S., Carabetta, V. J., & **Vega, S. L.** (2023). Recent Advances in Antimicrobial Peptide Hydrogels. *International Journal of Molecular Sciences*, 24(8).

► DOI: 10.3390/ijms24087563

Hasan, A. S., Patel, D., & Jalayer, M. (2023). Did COVID-19 mandates influence driver distraction Behaviors? A case study in New Jersey. *Transportation Research*, 99, 429–449.

► DOI: 10.1016/j.trf.2023.10.019

Stengel, J. P., Lehr, A. L., Aboagye, E. A., Chea, J. D., & Yenkie, K. M. (2023). Development of an Interactive Software Tool for Designing Solvent Recovery Processes. *Industrial & Engineering Chemistry Research*, 62(5), 2090–2103.

► DOI: 10.1021/acs.iecr.2c02920

Hare, R., & Tang, Y. (2023). Player Modeling and Adaptation Methods Within Adaptive Serious Games. *IEEE Transactions on Computational Social Systems*, 10(4), 1939–1950.

► DOI: 10.1109/TCSS.2022.3203926

Riley, D. R., Shuster, H. M., LeMasney, C. A., Silvestri, C. E., & Mallouk, K. E. (2023). First-Year Engineering Students’ Conceptualization of Entrepreneurial Mindset. *Entrepreneurship Education and Pedagogy*, 6(1), 87–109.

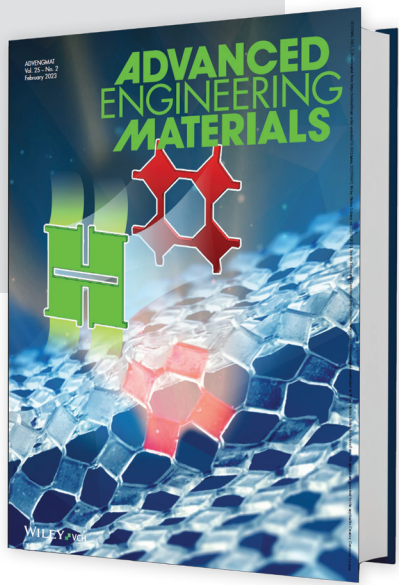
► DOI: 10.1177/25151274211029207

Usman, M., Jamhour, N., Hettinger, J., & Xue, W. (2023). Smart wearable flexible temperature sensor with compensation against bending and stretching effects. *Sensors and Actuators*, 353.

► DOI: 10.1016/j.sna.2023.114224



BEHRAD KOOHBOR
Assistant Professor, Mechanical Engineering



**BUILDING NEW MATERIALS
AND STRUCTURES**

Picture a thick rubber band: When you pull the material, the band becomes thinner as the rubber stretches. A new class of materials does just the opposite. When stretched, the material becomes thicker, a phenomenon known as auxetic behavior. A recent paper, published on October 20, 2022 in the journal *Advanced Engineering Materials*, details the Henry M. Rowan College of Engineering’s efforts in fabricating auxetic thin sheets.

The research was led by Behrad Koohbor, Ph.D., an assistant professor in the Department of Mechanical Engineering. The study also featured contributions from collaborators at Rowan University and San Diego State University. The flexible sheets were designed, fabricated using 3D printers and tested in Koohbor’s lab at Rowan University, with assistance from students. A defining feature of the sheets are orthogonal perforations which give the material its auxetic properties.

Made out of flexible resins, the auxetic materials can be used to make highly stretchable structures with applications in soft robotics and in protective applications due their light weight and high energy impact absorption characteristics.

This paper is one of Koohbor’s recent publications in auxetic materials. He and his team published a series of papers on the subject in the journals of *Materials & Design* and *Advanced Engineering Materials*.

WELCOME, NEW FACULTY

ANTONIOS KONTOSOS

Henry M. Rowan Foundation Professor and Director of the Digital Engineering Hub (DEHub)

Ph.D., Rice University

Dr. Antonios Kontsos joined the Henry M. Rowan College of Engineering in September 2023 as the Henry M. Rowan Foundation Professor, the first of its kind at Rowan University, as well as the founding director of the newly-established Digital Engineering Hub (DEHub). Previously, Kontsos spent 14 years at Drexel University where he was a professor and the director of the Theoretical & Applied Mechanics Group.

One of Kontsos' goals for DEHub is to create a cutting-edge integrated technology center for the research, education and practice of emerging digital engineering methods. To achieve this, DEHub will focus on industry and government collaborations, while forming an access hub to Rowan-wide resources in this research field. DEHub activities will be supported by faculty, staff and students across the Henry M. Rowan College of Engineering and Rowan University, and it will be headquartered at the heart of Rowan's main campus in Glassboro, N.J. The center will utilize a suite of existing and



new equipment and facilities related to both fundamental and applied research in the area of materials and structures with applications in manufacturing, defense, aerospace, energy and biomedical engineering.

Research at the DEHub will be supported by new funding secured from the Defense Advanced Research Projects Agency (DARPA) and anticipated funding from National Institute of Standards and Technology (NIST), as well as industry partners.

Kontsos' primary research interest is in the theoretical, experimental and computational investigation of the mechanical behavior of materials. In his research, he defines microstructure-properties-behavior relations using methods that involve theory, experiments, modeling and simulations.

YING (GRACE) CHEN

Assistant Professor, Ph.D., University of Tsukuba, Japan

Dr. Ying (Grace) Chen is an assistant professor in the Department of Biomedical Engineering and the Cardiovascular Institute at the Rowan-Virtua School of Translational Biomedical Engineering & Sciences. She earned both her Bachelor and Master of Science degrees in biomedical engineering from Sichuan University in China in 2012 and 2015, respectively. She earned her Ph.D. in materials science and engineering from the University of Tsukuba/National Institute for Materials Science (NIMS), Japan. Before joining Rowan in fall 2023, Chen served as a postdoctoral researcher at Cornell University. Chen's research interests are primarily focused on developing innovative engineering solutions for cardiovascular and musculoskeletal tissue.



JUN HEE JANG

Assistant Professor, Ph.D., University of California, Santa Barbara

Dr. Jun Hee Jang is an assistant professor in the Department of Chemical Engineering. He earned a Bachelor of Science at Korea University, South Korea in 2011 and a Master of Science at Seoul National University, South Korea in 2014. He received his Ph.D. in chemical engineering from the University of California, Santa Barbara (UCSB) in 2020. Prior to joining Rowan, he was a postdoctoral research associate at the National Renewable Energy Laboratory (NREL) from 2020 to 2023. His research focuses on heterogeneous catalysis and process engineering to enable biorefining of lignocellulosic feedstock and upcycling of plastic waste towards greater environmental sustainability.





PATRICK HWANG

Assistant Professor, Ph.D., University of Alabama

Dr. Patrick Hwang is an assistant professor in the Rowan-Virtua School of Translational Biomedical Engineering & Sciences. He received his Bachelor of Science in life science (2007) and Master of Science in biomedical science & engineering (2009) from Korea University, Seoul, Korea. He earned his Ph.D. in biomedical engineering from University of Alabama at Birmingham in 2015. Prior to joining Rowan University in fall 2023, Hwang was a director of research & development at Endomimetics, LLC, a biomedical application company. His research focuses on the development of biomimetic nanomatrix platforms to provide biochemical and micro-electric stimuli for vascular and tissue healing therapies, regenerative medicine and improvement of the efficacy for medical device application.



SOPHIA ORBACH

Assistant Professor, Ph.D., Virginia Tech

Dr. Sophia Orbach is an assistant professor in the Department of Biomedical Engineering and the Institute for Regenerative Medicine and Transplantation. She received her Bachelor of Science in chemical engineering from the University of Michigan in 2012. She earned her Master of Engineering in chemical engineering (2015) and Ph.D. in chemical engineering (2018) from Virginia Tech. Prior to joining Rowan University in fall 2023, Orbach was a postdoctoral fellow at the University of Michigan. Her research focuses on integrating tissue engineering and bioinformatics to establish personalized models of adverse drug reactions. Orbach is a member of the American Institute of Chemical Engineers (AIChE) and the Biomedical Engineering Society (BMES).



MOHAMMAD J. MOGHIMI

Assistant Professor, Ph.D., Montana State University

Dr. Mohammad J. Moghimi is an assistant professor in the Department of Biomedical Engineering. He received his Bachelor of Science in electrical engineering from K. N. Toosi University of Technology in 2005 and Master of Science in electrical and computer engineering in 2008 from Amirkabir University of Technology, both in Tehran, Iran. Moghimi received his Ph.D. in electrical and computer engineering from Montana State University in Bozeman in 2013. He joined Rowan University in fall 2023 to develop wearable devices for diagnostic and therapeutic purposes and to conduct translational research to move the technologies to practice. Moghimi is the recipient of the National Institutes of Health (NIH) Early Career Research Award to develop a noninvasive aid to address pediatric hearing loss.



ANDREA VERNENGO

Associate Professor, Ph.D., Drexel University

Dr. Andrea Vernengo is an associate professor with dual appointments in the Departments of Chemical Engineering and Biomedical Engineering at Rowan University. She earned her Bachelor of Science in chemical engineering from Drexel University in Philadelphia in 2003 and completed her Ph.D. at the same institution in 2007. Vernengo recently concluded a sabbatical at the AO Research Institute in Davos, Switzerland. Her research focus at Rowan University lies in the crossroads of biomaterials, biofabrication and tissue engineering. She also has a particular interest in biomedical engineering pedagogy. She is a member of the Orthopaedic Research Society (ORS) and the American Institute of Chemical Engineers (AIChE).



HUAXIA WANG

Assistant Professor, Ph.D., Stevens Institute of Technology

Dr. Huaxia Wang is an assistant professor in the Department of Electrical & Computer Engineering. He received his Bachelor of Engineering in information engineering from Southeast University, Nanjing, China, in 2012, and a Ph.D. degree in electrical engineering from the Stevens Institute of Technology, Hoboken, New Jersey, in 2018. Prior to joining Rowan in fall 2023, he was an assistant professor at Oklahoma State University from 2020 to 2023, a research engineer at Futurewei Technology from 2018 to 2019 and a research intern at Nokia Bell Labs in 2016. His research focuses on AI in wireless communications, adversarial learning, deep reinforcement learning and robotics. He is a member of the Institute of Electrical and Electronics Engineers (IEEE).



MEI WEI

Professor, Ph.D., University of New South Wales, Australia Vice President of Research

Dr. Mei Wei, a professor in the Department of Biomedical Engineering and Vice President of Research at Rowan University, holds a Ph.D. and a Master of Engineering in materials science and engineering from the University of New South Wales, Australia. Additionally, she earned a Bachelor of Engineering in metallurgy materials and engineering from Shenyang University of Technology in China. Wei also holds a management development certificate from the Harvard Graduate School of Education at Harvard University.

Wei joined Rowan University on July 2023, after previously serving at Ohio University, where she held the position of associate vice president for research and creative activity. She has a wealth of experience, having served as the dean of engineering at Ohio University during its transition to R1 status. Prior to that, Wei held the role of associate dean for research and graduate education at the University of Connecticut.



ZHIMING ZHANG

Assistant Professor, Ph.D., Florida State University

Dr. Zhiming Zhang is an assistant professor in the Department of Civil & Environmental Engineering. He received his Bachelor of Science in bioengineering (2010) and Master of Science in environmental engineering (2013) from China University of Mining and Technology, Beijing. He earned his Master of Engineering in civil engineering (2018) and Ph.D. in civil engineering (2019) from Florida State University. Prior to joining Rowan University in fall 2023, Zhang was a postdoctoral fellow at Stevens Institute of Technology. His research focuses on sustainable water and wastewater treatment, soil and groundwater remediation, green technology development, environmental biotechnology, environmental sustainability, resource recovery and renewable energy. Zhang is a member of the Association of Environmental Engineering and Science Professors (AEESP) and the American Chemical Society (ACS).

→ “We welcomed 10 tenured and tenure-track faculty across five departments, reinforcing our commitment to excellence in research and teaching. They will significantly contribute to our strategic research areas: health, sustainability, connectivity and education.”

— Giuseppe Palmese, Ph.D.
Dean of the Henry M. Rowan College of Engineering

CELEBRATING FACULTY ACHIEVEMENTS



HALL OF FAME INDUCTEE

Stephanie Farrell, Ph.D., founding head of the Experiential Engineering Education Department (ExEEd) has been inducted into the American Society for Engineering Education (ASEE) 2023 Hall of Fame. The honor acknowledges standout engineering and engineering technology education professionals whose work has made a significant impact.

Farrell was among 22 individuals and three teams who were honored for their expertise in pedagogy, broadening participation, research, leadership and service, entrepreneurship and more. The society last inducted members into its Hall of Fame in 1993 and 1968.

Farrell is the former president of ASEE and former chair of its diversity committee. Also an ASEE Fellow, Farrell leads the organization's LGBTQ+ Advocacy in STEM initiative, which seeks to diversify the engineering workforce by increasing the participation of LGBTQ+ students and faculty.

GAME-CHANGING EDUCATION

Cheryl Bodnar, Ph.D. (ExEEd), was awarded the 2023 David Himmelblau Award by the AIChE Computing and Systems Technology Division for her work on "Contents Under Pressure," a digital game designed to educate chemical engineers. Developed as an immersive experience, the game puts players in the role of a chemical plant supervisor, prompting decision-making on various factors like time, costs, relationships, leadership, production and safety.

The team behind the award includes Daniel Anastasio, Ph.D., Daniel Burkey, Ph.D., and Matthew Cooper, Ph.D., with support from a National Science Foundation grant and collaboration with Filament Games. Bodnar was also recognized as a 2022 *Journal of Engineering Education* Star Reviewer for her insightful contributions and scholarly feedback.



→ "Games provide an environment where students can experience situations that would not otherwise be possible in the classroom, better preparing them for professional practice."



RECOGNIZING OUTSTANDING TEACHING

Smitesh Bakrania, Ph.D., was awarded the Lindback Distinguished Teaching Award. The award honors one permanent faculty member with an outstanding record of teaching and a sustained commitment to student learning.

Bakrania, an associate professor in the Department of Mechanical Engineering, has been a professor at Rowan for 14 years. During that time, he has led a wide range of classes, including First-Year and Sophomore Engineering, Manufacturing and Measurement Techniques, Introduction to Nanotechnology, Thermal-Fluid Sciences and Quality and Reliability. Bakrania has developed a number of mobile apps for educational purposes.

In 2018, he served as a Fullbright Scholar in New Zealand for six months. He completed his Bachelor of Science in mechanical engineering at Union College in Schenectady, New York in 2003. That same year, he joined the University of Michigan - Ann Arbor for his graduate studies to work on combustion synthesis of nanocomposites for gas sensing applications. He completed his Ph.D. in 2008.

The Lindback Distinguished Teaching Award is funded by a gift from the Christian R. and Mary F. Lindback Foundation and the winner receives a \$4,000 prize.



TEACHING FACULTY SPOTLIGHT

→ “The foundation of learning lies in the fusion of research experience, hands-on projects and the continuous flow of student input, creating engineers who don’t just build structures but the future itself.”

FAHMIDA RAHMAN, Ph.D. *Civil and Environmental Engineering*

Dr. Fahmida Rahman is a lecturer in the Civil and Environmental Engineering Department who incorporates research and project-based learning in the classroom.

She is dedicated to infusing her curriculum with the latest research findings, cutting-edge methodologies and real-world applications. This dynamic approach ensures that her students gain not only theoretical knowledge but also practical insights, equipping them for the real-world challenges that await them in their future careers.

In her classes, Rahman emphasizes hands-on, project-based learning. This approach allows students to work on real or simulated projects, applying their classroom knowledge to real-world problems. It helps them develop essential skills like problem-solving, teamwork and gives them a deeper understanding of the subject matter.

Rahman is also committed to student feedback. She actively seeks input from her students through weekly surveys, allowing her to fine-tune her teaching methods, class content and overall approach, ensuring the best possible learning experience for students.

Before joining Rowan University, Rahman completed her Ph.D. in civil engineering at the University of Kentucky, focusing on transportation engineering. Her research covers a wide range of topics, from transportation safety and mobility to data analysis.

FACULTY BY THE NUMBERS



At the Henry M. Rowan College of Engineering, the faculty numbers reflect a balanced focus on teaching and research. With 24 faculty members dedicated to teaching and 57 on the tenure track, the institution emphasizes both academic instruction and innovative research. Additionally, the college benefits from the contributions of two dedicated research faculty, ensuring a dynamic and comprehensive educational experience.





ROWAN-VIRTUA School of Translational Biomedical Engineering & Sciences

A NEW PARTNERSHIP

2023 was another banner year for growth in the Department of Biomedical Engineering. A new collaboration allows Biomedical Engineering faculty, undergraduates and graduate students to develop and translate cutting-edge innovations. The newly-established Rowan-Virtua School of Translational Biomedical Engineering & Sciences brings together engineers from the Henry M. Rowan College of Engineering and clinical researchers, faculty, doctors, nurses and other medical professionals from Virtua Health for collaborative biomedical research projects. Led by founding dean Mark Byrne, Ph.D., the School of Translational Biomedical Engineering & Sciences provides engineers and scientists the opportunity to address real-world biomedical needs alongside the doctors and patients who stand to benefit from their innovations.

As a result of the new clinical emphasis, the Department of Biomedical Engineering now spans both the Henry M. Rowan College of Engineering and the Rowan-Virtua School of Translational Biomedical Engineering and Sciences. Within the school are also two new research institutes: the Cardiovascular Institute and the Institute for Regenerative Medicine & Transplantation. This year, the school added four new faculty members; two at the Cardiovascular Institute and two within the Institute for Regenerative Medicine & Transplantation. The Rowan-Virtua partnership's goal is to hire 50 new faculty researchers over the next ten years.

This new partnership has propelled growth within the Department of Biomedical Engineering. Already on an accelerated growth trajectory, Rowan is aiming to double its Biomedical Engineering faculty and new, translational research efforts have commenced.

Some of the active research efforts are within the orthopedic engineering space. One project, led by Vince Beachley, Ph.D., an associate professor of Biomedical Engineering, and Dr. Sean McMillan, the Chief of Orthopedics and Director of Orthopedic Sports Medicine at Virtua-Our Lady of Lourdes Hospital and Virtua Willingboro Hospital, aims to manufacture nanofilament yarns and textiles for orthopedic surgery to suture tendons to bone. Beachley, McMillan and their team recently developed new technology to manufacture continuous multi-nanofilament yarns that have a positive physiological reaction with the body, meaning cells will grow on the nanofilament, which is important for tissue regeneration.

Another ongoing project focuses on methods that would allow for better organ transplant matches. In addition to blood type match, doctors must gauge whether a donor organ's size will be appropriate for a transplant recipient. For example, an adult kidney may be too large for a pediatric

patient. Currently, doctors are limited to MRIs and CT scans to determine the size of a donor organ, an imprecise process that may even disrupt organ transplant procedures when a donor organ is larger or smaller than expected. A Rowan engineering team, led by Erik Brewer, Ph.D., the Biomedical Engineering Chair of Innovation & External Partnerships, has partnered with Dr. Nasser Youssef and the Virtua surgical transplant team to better assess transplant size. Using the MRI and CT scans, Brewer and his team are developing novel approaches to build 3D reconstructions of organs, collect volumetric measurements of the organ, create virtual mock ups of the donor and the recipient and 3D print models of the organ to help doctors assess fit and maximize transplant success.

Both undergraduate and graduate students will work on these and other new research projects and collaborate directly with clinicians at Virtua, helping to propel the work of Rowan biomedical engineers and increase the impact of student research initiatives.

10-YEAR GOAL
IS TO HIRE
50
FACULTY
RESEARCHERS

A NEW RESEARCH AND WORKFORCE DEVELOPMENT CENTER

The Digital Engineering Hub (DEHub) at Rowan University was announced in September 2023. It is led by **Antonios Kontsos, Ph.D.**, the inaugural Henry M. Rowan Foundation Professor in the Department of Mechanical Engineering and **Yolanda Mack, Ph.D.**, the Associate Dean for Industry Partnerships and Workforce Development in the Henry M. Rowan College of Engineering.

DEHub is a cutting-edge, integrated technology center for the research and practice of emerging digital engineering methods. The center focuses on industry and government collaborations while providing the access hub to Rowan-wide resources in this emerging research field. DEHub activities are supported by faculty, staff and students across the Henry M. Rowan College of Engineering and Rowan University. The center, located in Rowan Hall on the Glassboro, N.J. campus, utilizes a suite of existing and new equipment and facilities related to both fundamental and applied research in cyberphysical systems with applications in advanced manufacturing, defense, aerospace, energy and biomedical engineering.



KONTSOS AND MACK LAUNCHED DEHUB WITH TWO RESEARCH PROJECTS:

- 1** The first is funded by DARPA in its Multiobjective Engineering and Testing of Alloy Structures (METALS) program, which focuses on disrupting how materials are considered in the current design process. The goal of this project is to develop technologies that enable material composition and microstructure to be used as continuous variables that designers could tailor across a single part, enhancing thermal, structural, or functional properties precisely where needed. DEHub's role in this multidisciplinary and multi-institutional effort will be to leverage novel methods of material testing based on full-field optical metrology to provide inputs to computational modeling capable of accelerating the incorporation of material parameters into design optimization algorithms.
- 2** The second effort involves the use of cutting-edge nondestructive evaluation methods as inputs to surrogate modeling using artificial intelligence to achieve real-time performance diagnostics and prognostics of materials and structures of interest to the U.S. Navy.

DEHub already employs state-of-the-art sensing, testing, simulations and manufacturing equipment to create data processing pipelines that allow real-time applications. These applications could be leveraged in engineering domains where data-driven decision-making is crucial.



A NEW CENTER FOR AI AND VR

Rowan University has launched a newly expanded virtual reality (VR) research center—now integrating cutting-edge machine learning and artificial intelligence (ML/AI). Directed by **Nidhal C. Bouaynaya, Ph.D.**, with **George Lecakes, Ph.D.**, serving as the Associate Director for VR, the newly named Machine & Artificial Intelligence Virtual Reality Center (MAVRC) at Rowan aims to transform VR experiences by creating realistic and immersive VR environments that dynamically adapt and respond to user interactions in real time.

Situated at the South Jersey Technology Park in Mantua Township and the Joint Health Sciences Center in Camden, MAVRC boasts state-of-the-art VR systems designed to engage multiple users in virtual and mixed-reality environments. The Camden site features a four-sided Cave Automatic Virtual Environment (CAVE) system, accommodating up to six users wearing stereoscopic glasses, exploring data projected onto its walls and floor. An infrared tracking system precisely identifies users' locations within the system, to ensure that projected information responds seamlessly to users' actions. The Mantua system can host up to 15 users, offering exploration of simulated environments, data, live feeds and video conferencing. Recently, the Center introduced a free roam pod for six networked users, allowing participants to explore digital worlds together, seamlessly interacting with each other and the virtual environment in real-time.

With a rich history of collaboration, MAVRC has established enduring partnerships with federal and state agencies as well as industry partners, including small businesses. Notably, the center has maintained a decade-long collaboration with the Federal Aviation Administration (FAA) William J. Hughes Technical Center, contributing to advancements in aviation technology and safety. Furthermore, MAVRC is currently engaged in a multi-million dollar project with the U.S. Army Picatinny Arsenal, incorporating machine learning to expedite the development of a combat simulation system, which uses ML/AI to sense the environment and recommend responses to its users.

IMPACTFUL RESEARCH

The Henry M. Rowan College of Engineering is dedicated to supporting research that makes a difference. Engineers in all disciplines consistently undertake groundbreaking studies and innovations in four key areas: **health**, **sustainability**, **connectivity** and **education**. The College's research efforts are inspired by Henry M. Rowan's commitment to transformative projects that have the power to change lives.



PEDIATRIC CANCER INNOVATION

Dr. Rachel Riley (BME) secured a three-year research grant of \$500,000 from the N.J. Commission on Cancer Research within the New Jersey Department of Health. Her groundbreaking work focuses on pioneering less invasive and personalized treatment avenues for pediatric acute myelogenous leukemia (AML), aiming to transform the landscape of pediatric cancer care.

MAGNETIC HYDROGEL RESEARCH

Dr. Peter Galie (BME) received a three-year NSF Award to develop magnetically active hydrogels. These hydrogels mimic the dynamic changes in the mechanical properties of the spinal cord after injury and are used to enhance our understanding of astrocyte-mediated glial scar formation.



CRYOGENIC MATERIALS

Dr. Wei Xue (ME) has been granted a substantial three-year award from the Office of Naval Research (ONR), totaling \$450,000. The focus of this research initiative is the design and characterization of nanocomposite dielectrics tailored specifically for cryogenic applications. Dr. Xue's project aims to contribute valuable insights into the development of materials optimized for use in extreme low-temperature environments, with potential applications in naval research and beyond.

SUSTAINABLE CHEMICAL MODELING

Dr. Kirti Yenkie (ChE) has been awarded a multi-year US EPA grant in the amount of \$314,416 to develop computational models and machine learning methods for sustainable process synthesis, safer alternative chemicals and the assessment of their environmental impacts.



VIRTUAL COMBAT MODELING & SIMULATIONS

Dr. Nidhal C. Bouaynaya (ECE) secured an additional \$3 million for the advancement of virtual and mixed reality combat simulations enhanced by artificial intelligence (AI). This project builds upon the foundation of a substantial \$5.5 million partnership between Rowan University and the U.S. Army Combat Capabilities Development Command — Armaments Center at Picatinny Arsenal, New Jersey. Driven by innovation, this initiative aims to push the boundaries of simulation technology, offering a cutting-edge approach to military training and readiness.

ROADWAY SAFETY INNOVATION

Dr. Mohammad Jalayer (CEE), in collaboration with Texas State University and Texas A&M Transportation Institute (TTI) secured a \$350,000 grant from the New Jersey Department of Transportation. The project aims to enhance traffic safety through several key objectives: identifying robust products for striping different road surfaces, creating comprehensive guidelines for improved installation specifications and cost-effective maintenance practices. Additionally, the research evaluates existing specifications and requirements for road markings and stripe paints, particularly within the context of Connected and Autonomous Vehicles (CAVs) and Advanced Driver Assistance Systems (ADAS) operation.



ENGINEERING SCHOLARSHIPS

Dr. Kaitlin Mallouk (ExEEd) has secured a substantial \$1.5 million National Science Foundation Division of Undergraduate Education award. This recognition is dedicated to advancing educational opportunities for high-achieving, low-income students in the field of engineering at Rowan University. Dr. Mallouk's project not only provides scholarships for eligible students but also focuses on enriching the overall undergraduate experience for all engineering students. Through a comprehensive approach, the initiative incorporates both curricular and extracurricular programming to support the academic and personal development of students pursuing engineering degrees at Rowan.

BROADENING PARTICIPATION INITIATIVES

Dr. Juan M. Cruz (ExEEd) secured NSF funding for a \$500,000 collaborative grant aimed at assessing the effectiveness and enduring challenges of broadening participation initiatives in STEM fields. Dr. Cruz's research focuses on using complex systems theory to understand how the academic ecosystem influences the persistence of female engineering faculty.

MACH₂

Mid-Atlantic Clean Hydrogen Hub
Delaware, SE Pennsylvania, Southern NJ

DIVING INTO HYDROGEN ENERGY

Rowan University has been named one of the education partners supporting the Mid-Atlantic Clean Hydrogen Hub (MACH2), alongside University of Delaware, the University of Pennsylvania and Cheyney University of Pennsylvania. Selected by the U.S. Department of Energy, MACH2 is building a network of hydrogen producers, consumers and local connective infrastructure in Delaware, southeastern Pennsylvania and South Jersey. The hub will support the production, storage, delivery and end-use of clean hydrogen, a pollutant-free energy.

The Chemical Engineering department is leading the effort at Rowan in the area of workforce development for a clean hydrogen economy. This involves developing new undergraduate and graduate level certificate programs with courses on hydrogen processing as well as hydrogen-related research opportunities for engineering clinic programs and Ph.D. students. The plan is for initial hydrogen energy courses to be available in Fall 2024 or Spring 2025. These efforts will support and accelerate the Chemical Engineering department's mission in developing the technological innovations and future workforce for a more sustainable environment.

Rowan is also partnering with Bioenergy Devco, a company that converts waste biomass into renewable natural gas, to build a pilot plant designed to convert waste material into biogas and hydrogen at the South Jersey Technology Park in Mullica Hill.

“The U.S. Department of Energy invests in a new clean hydrogen hub, MACH2. As a partner, Rowan Engineering aims to develop future technologies and workforce for clean hydrogen.”

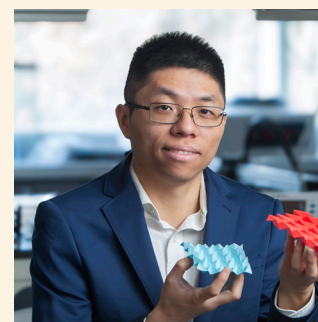
NSF INVESTMENTS IN EMERGING ENGINEERS

Among the funding awarded to Henry M. Rowan College of Engineering researchers, the National Science Foundation (NSF) has continually made investments in emerging engineers. The Engineering Research Initiation (ERI) program supports new researchers with funding for their research programs and education careers.

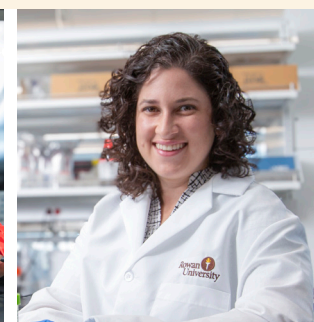
Over the last two-years, five engineering faculty have received this federal award.

NSF-ERI AWARD RECIPIENTS:

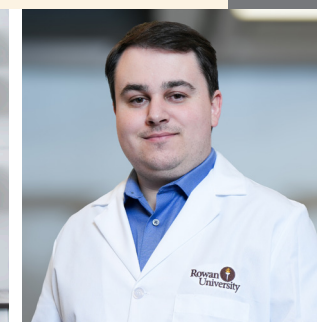
- 1 Dr. Chen Shen (ME):** Exploiting Dynamic Origami for Reconfigurable and Versatile Control of Acoustic Waves
- 2 Dr. Rachel Riley (BME):** The Impact of Ionizable Lipid Chemistry and Targeting Ligands on Biological Interactions of Lipid Nanoparticles
- 3 Dr. Gerard Capellades (ChE):** Solubility-Boosting Effect of Lattice Impurities in Anisotropic Crystals
- 4 Dr. Hua Zhang (ECE):** Modular Multiphase Interleaved High Current Conversion for Distributed Energy Resources
- 5 Dr. Mitja Trkov (ME):** Human-Inspired Robotic Assistance to Prevent Slip-Induced Falls



Chen Shen, Ph.D.



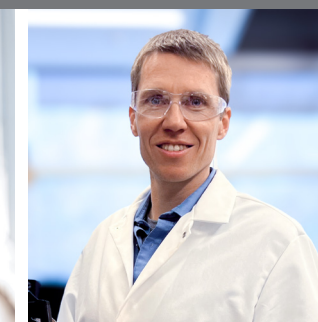
Rachel Riley, Ph.D.



Gerard Capellades, Ph.D.



Hua Zhang, Ph.D.



Mitja Trkov, Ph.D.



DR. SEBASTIÁN L. VEGA RECEIVES NSF CAREER AWARD

Sebastián L. Vega, Ph.D., an assistant professor of biomedical engineering at Rowan University, has received a five-year, \$512,890 CAREER Award from the National Science Foundation (NSF) to investigate why stem cells lose their “identity” outside the body. The Faculty Early Career Development (CAREER) Program offers the NSF’s most prestigious awards to early-career faculty. Vega has dual appointments in the Henry M. Rowan College of Engineering and the Rowan-Virtua School of Translational Biomedical Engineering & Sciences, where he is also a founding faculty member of the Rowan-Virtua Institute of Regenerative Medicine and Transplantation.

Funding from Vega’s CAREER Award will be used to develop materials to understand the role of stiffness, adhesion and the interactions between cells on mesenchymal stem cells’ (MSCs) identity. MSCs live in bone marrow and body fat. Their “identity” can be defined by their ability to divide into more stem cells, adapt to new environments and differentiate into specialized cells that produce tissues like bone, ligament, cartilage and fat.

→ “This award recognizes Dr. Vega’s exceptional research and the promise of future breakthroughs associated with stem cell manufacturing.”

— **Giuseppe Palmese, Ph.D.**
Dean of the Henry M. Rowan
College of Engineering

COLD WEATHER RESEARCH

Rowan University’s Center for Research & Education in Advanced Transportation Engineering Systems (CREATES) was awarded a \$30 million, five-year contract from the U.S. Army Corps of Engineers (USACE), Engineer Research and Development Center (ERDC), to expand Arctic region research.

Climate change has impacted the military’s transportation infrastructure in the Arctic, affecting roads, runways and bridges. CREATES researchers will develop innovative construction technologies and materials to withstand fluctuating temperatures and surface conditions. The creative solutions the team will propose range from pavements that can melt ice and detect frost to resilient asphalt and concrete materials that can withstand cold conditions.

The funding will support projects such as full-scale testing of highly elastic asphalt binders in cold regions; the development of cold weather self-consolidating concrete infrastructure; and testing mechanical and thermal efficiency of insulated pavement structures through full-scale, accelerated loading.

The project is led by **Yusuf Mehta, Ph.D.**, director, and **Ayman Ali, Ph.D.**, associate director, at CREATES. The grant also promotes the advancement of the next generation of engineers: Students will contribute to the research and development of new technologies. CREATES also offers a pathway to industry employment through workforce development.



ENTREPRENEURIAL SPIRIT BEGINS IN THE LAB

The work biomedical engineers perform in the laboratory will, ideally, improve patients' lives. A new company that began in the lab at Rowan University is on the path to doing just that.

CONDUCTink is a biotechnology company that delivers perfusable in-vitro models for preclinical Alzheimer's therapeutic discovery. Founded in 2023 by **Louis Paone** and **Peter Galie, Ph.D.**, an associate professor of biomedical engineering, the company developed a platform to screen drugs related to Alzheimer's disease with the goal of ultimately replacing animal models.

Through his work as a Ph.D. student, Paone worked alongside Galie in his lab to design the novel 3D printed material, which is able to closely mimic human tissue. The pair did not set out to start a company based on their innovation, but in the process of filing a patent for the idea, Paone and Galie learned about the NSF Innovation Corps (I-Corps), a seven-week entrepreneurial training program for scientists and engineers that taught them about the commercialization process.

Paone and Galie first took part in the regional Northeast I-Corps Hub, based out of Princeton University, and then participated in the national program, which ran from October through December 2023. Through I-Corps, Paone and Galie homed in on the specific use of their technology and were able to conduct interviews with potential customers to learn how to best suit their needs. They also included an industry mentor from the technology commercialization office at Rowan University, Sanaz Shahi, MBA, in the program. CONDUCTink is now focusing on securing funding to build a prototype for their technology and obtain laboratory space.

TURNING IDEAS INTO REALITY

In addition to its cutting-edge research output, the Henry M. Rowan College of Engineering has fostered an entrepreneurial spirit among its engineers. Over the past five years, several engineering faculty have been recognized with the National Science Foundation Innovation Corps (NSF I-Corps) award. The NSF I-Corps program started in 2011, bridging the gap between academic research and market-ready solutions. The goal is to translate the outcomes of NSF-funded research into innovative products, processes, devices and services.

Rowan is a proud participant in the NSF I-Corps program on both a national and regional level. Rowan University is an integral member of the I-Corps Northeast Region Hub, a collaborative coalition of



universities dedicated to assisting researchers to create products that benefit society. The Northeast Hub comprises ten academic members, including the lead institution Princeton University, Rutgers University, Rowan University, Temple University, University of Delaware, Delaware State University, Drexel University, Lehigh University, New Jersey Institute of Technology and Yale University.

ROWAN ENGINEERING NSF I-CORPS RECIPIENTS SINCE 2022:

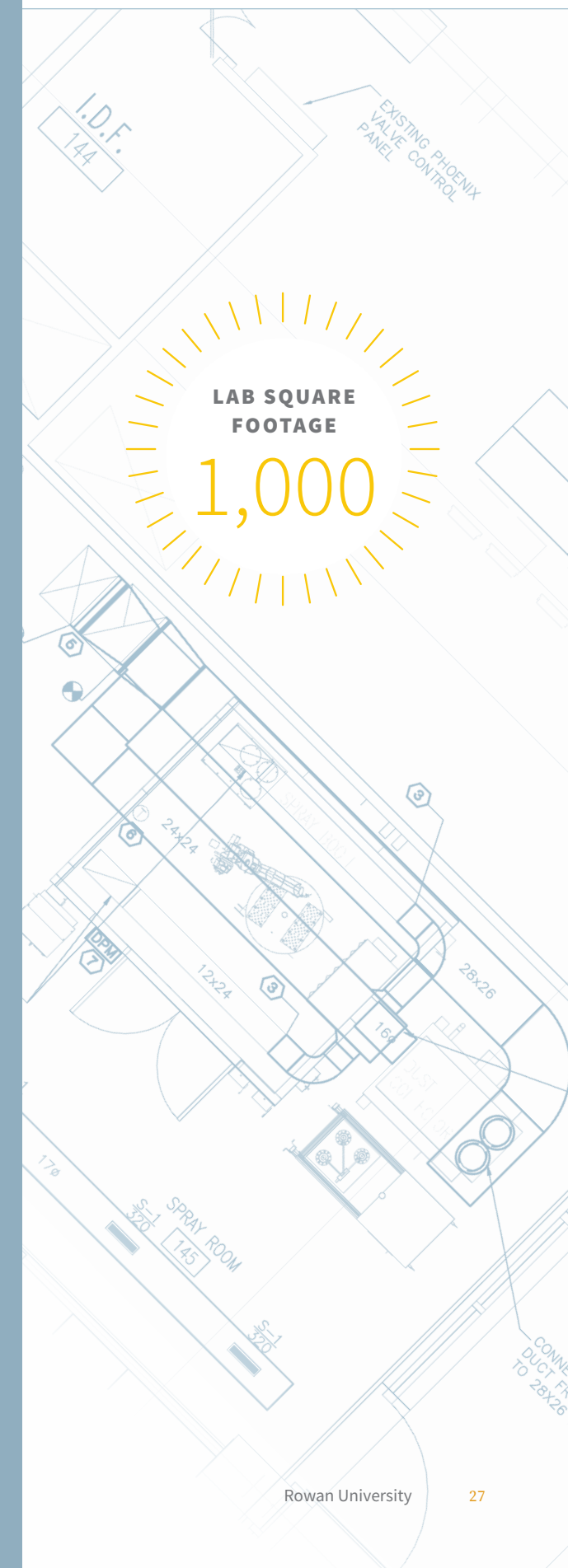
- Peter Galie, Ph.D.
- Hua Zhang, Ph.D.
- Dwaipayan Chakraborty, Ph.D.
- Mohammad Abedin-Nasab, Ph.D.

CUTTING-EDGE LAB FACILITY

Rowan University is home to a unique, state-of-the-art additive manufacturing facility: the Cold Spray Laboratory. Housed within the Advanced Materials & Manufacturing Institute (AMMI) on the first floor of Rowan Hall, the centerpiece of the lab is a VRC Metal Systems Gen III Cold Spray System. By spraying thin coats of metals, ceramics, polymers, or combinations thereof, the system can repair parts, coat parts, add components to parts and 3D print entirely new parts for uses in infrastructure, automotive, military, aerospace, marine and renewable energy. Research scientists, postdoctoral research fellows, technicians and undergraduate and graduate students are all involved in cutting-edge fundamental and applied research projects that utilize this facility.

Other features of the Cold Spray Laboratory include equipment and instrumentation for pre-spray powder processing and post-spray deposition characterization and testing as well as in-house, custom built, portable mini cold spray units. The facility also includes instruments for material design, computer-aided design and advanced manufacturing training.

Among the Cold Spray Laboratory's research projects are the initiatives to convert birch tree bark into plastics quickly and sustainably and utilizing recycled glass in advanced manufacturing applications. These projects fit within Rowan's university-wide sustainability mission by developing processes and technologies that use bio-sourced materials with minimal processing steps and upscaling of materials.



DEPARTMENT HIGHLIGHTS



BIOMEDICAL ENGINEERING (BME)

The Department of Biomedical Engineering (BME) is one of the nation's fastest-growing departments, committed to tackling global challenges and improving quality of life. Our innovative curricula provide graduates with essential skills across diverse sectors, emphasizing both fundamental and applied engineering education. Through cutting-edge research and practical problem-solving, our programs drive innovation, preparing students to positively influence the world.



1996 College of Engineering is founded



2014 BME department is established



2015 Renamed Henry M. Rowan College of Engineering



2018 BME graduates its first class

Mary Staehle, Ph.D.
*Biomedical Engineering
Associate Professor
and Interim
Department Head*



2014

- The Biomedical Engineering Department forms; first undergraduates and Ph.D. students enroll.

2015

- The Accelerated 3+4 BS/DO program with Rowan University School of Osteopathic Medicine is established.
- Accelerated 3+4 BS/MD with Cooper Medical School of Rowan University is established.

2016

- Dr. Peter Galie wins major American Heart Association Research Grant for "Establishing a Mechanistic Link Between Cerebral Blood Flow and the Blood-Brain Barrier" and publishes groundbreaking work in the area in the journal *Biomaterials*.

2017

- Dr. Mohammad Abedin-Nasab wins PA Science Center competition to create medical robotics company, Robossis, producing orthopedic surgical robots.
- Dr. Vince Beachley, first BME faculty member, wins National Science Foundation (NSF) CAREER Award to study novel electrospinning methods and materials.
- Department accelerates three major, faculty-led medical device startup companies with Rowan Innovation Venture Fund.

2018

- Department graduates first undergraduate class and achieves first ABET accreditation.
- BME undergraduates lead University in national prestigious undergraduate scholarships.
- Two NSF graduate research fellowships, one honorable mention and three Goldwater Scholarship winners.
- Department establishes new NSF Research Experiences for Undergraduates Site in Biomedical Materials, Devices, Therapeutics and Emerging Frontiers.
- Department graduates first BME Ph.D. students.

2019

- BME faculty members surpass \$8.5 million in funding from major agencies, the National Institutes of Health, NSF, industry and major foundation extramural funding.

2020

- Drs. Sebastián L. Vega and Nichole M. Daringer receives a \$250,000 grant from the National Science Foundation. Their goal: developing self-healing materials.
- Dr. Peter Galie secures a NSF grant to study how the novel coronavirus heightens stroke risk.

2021

- Rowan BME students' sepsis app progresses to real-world testing at Virtua Our Lady of Lourdes Hospital in Camden, N.J.

2022

- Dr. Rachel Riley leads Rowan University's efforts with a \$500,000 grant from the N.J. Commission on Cancer Research to enhance pediatric leukemia treatment.

2023

- Dr. Sebastián L. Vega, Rowan University's assistant professor of biomedical engineering, secures \$512,890 NSF Career Award for medical breakthroughs.

DEPARTMENT HIGHLIGHTS



CHEMICAL ENGINEERING (ChE)

Long recognized as a beacon of excellence in the field, the Chemical Engineering department thrives on its commitment to academic rigor and practical application. With a dedicated faculty and state-of-the-art facilities, students are equipped with the skills and knowledge to tackle real-world challenges and pursue environmentally sustainable solutions.



1996 College of Engineering is founded



2000 ChE graduates its first class



2015 Renamed Henry M. Rowan College of Engineering

Ken Lau, Ph.D.
*Chemical Engineering Professor
and Department Head*



2012

- Pfizer Inc. and the U.S. Environmental Protection Agency (EPA), department develops a sustainable design toolbox for pharmaceutical manufacturing.

2013

- Johnson Matthey, in collaboration with the ChE department, is investigating a new process for recovering and reusing nitric acid.

2014

- DuPont, the EPA and the ChE department are developing a sustainable pollution prevention design for batch-based specialty chemical manufacturing.

2015

- Johnson Matthey is collaborating with the ChE department to develop a soluble polymer for removing nickel from the waste stream.

2016

- ChE department develops a road map for Nestle and the EPA in food processing intensification methods.

2018

- With the EPA and other partners, ChE department develops a road map for solvent recovery for industrial manufacturing.
- ChE department hosts the ninth International Conference on Engineering Education for Sustainable Development, the first time prestigious conference was held in the United States.

2019

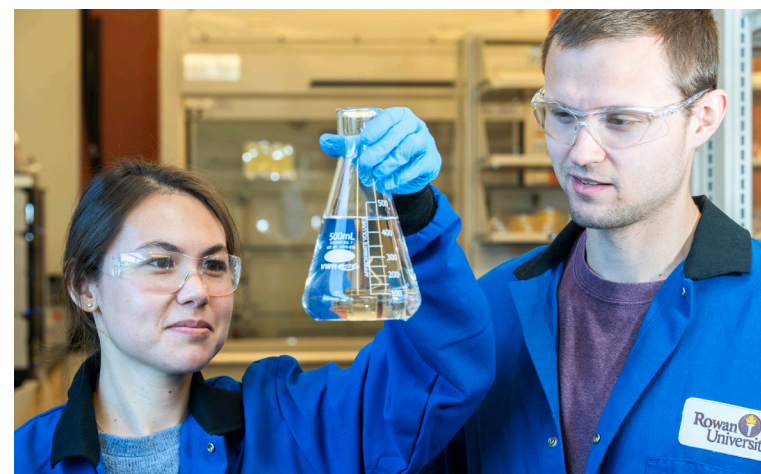
- Department receives \$14.3 million grant from the U.S. Department of Defense for Advanced Materials & Manufacturing Institute.
- ExxonMobil and the ChE department optimize pipeline flushing operations at the company's lubricant oil blending plant.

2022

- Dr. Kirti Yenkie and her students win awards at this year's AIChE Annual Meeting in Phoenix, Arizona.
- Rowan Chemical Engineering team receives nearly \$315K funding from the US EPA Pollution Prevention Program to find greener, more sustainable chemicals.

2023

- ChE students, faculty and alum receive recognition from department for their scholarly achievements.
- Dr. Gerard Capellades receives an NSF research grant to study impurities in pharmaceutical crystals.
- Dr. Joe Stanzione receives an N.J. Department of Environmental Protection grant to make local glass recycling more sustainable.



DEPARTMENT HIGHLIGHTS



CIVIL & ENVIRONMENTAL ENGINEERING (CEE)

The Civil and Environmental Engineering department at Rowan University leads in smart city development, utilizing advanced technologies and interdisciplinary collaboration to tackle urbanization challenges. Additionally, through proactive initiatives and inclusive education, it fosters diversity and integrates varied perspectives, preparing future engineers to address complex global issues.



1996 College of Engineering is founded



2000 CEE graduates its first class



2015 Renamed Henry M. Rowan College of Engineering

2016

- Three '14 alumni become National Science Foundation (NSF) graduate research fellows at Carnegie Mellon University, the University of Michigan and University of Virginia.
- First civil engineering program in the nation to receive \$1.92 million NSF Revolutionizing Engineering Departments grant for diversity education.
- Center for Research and Education in Advanced Transportation Engineering Systems (CREATES) is established.

2017

- Junior Kayleigh McDevitt receives the \$10,000 Sol Seid Award.

2018

- Sustainable Facilities Center is established.
- Intelligent Transportation Systems Laboratory is established.
- Dr. Cheng Zhu receives an NSF Innovation Corps grant titled "The Shaker Shield— An Innovative Technology for Inhabitant Protection in High Seismic Risk Areas."
- Taylor Groves '19 is named Best Entrepreneur Lead, NYC Innovation Node, for the "Shaker Shield" project.
- Dr. Yusuf Mehta and the CREATES team receive \$3.4 million from the U.S. Department of Defense for innovative construction materials for cold regions applications, the largest award at the Glassboro campus.
- CEE Alumna Patricia Hurley '18 receives the \$10,000 George W. Laird Merit Fellowship at the University of Delaware.

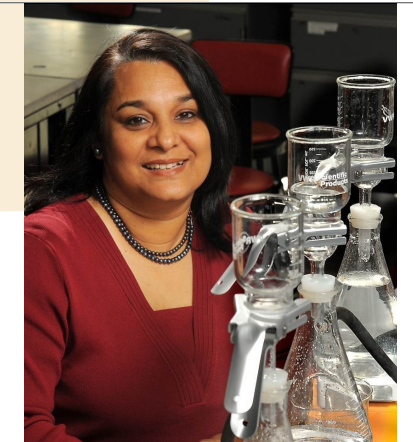
2019

- Jerome Malaran receives the \$10,000 Sol Seid Award.
- Junior Christopher Haugland receives the \$10,000 Moles Scholarship.
- The Sustainable Facilities Center celebrates its grand opening.
- Dr. Yusuf Mehta and his CREATES team receive an additional \$3.4 million from the U.S. Department of Defense to continue their research.
- Sustainable Facilities Center wins the 2019 Army Community Partnership Award. These awards recognize exceptional community partnerships that have improved readiness, driven modernization and contributed to reform initiatives throughout the U.S. Army.

2021

- Dr. Kauser Jahan is honored with the 2021 NJ STEM Civic Leadership Award for her dedication to leadership and outreach, including founding programs such as Engineers on Wheels and Rowan's Attracting Women into Engineering outreach program.
- The Department of Civil & Environmental Engineering, in collaboration with ExEEd and CREATES, is launching a \$1.5 million GAANN Fellowship program to recruit and train 13 doctoral fellows in transportation engineering, aiming to address the United States' need for highly skilled civil engineers as it plans to overhaul its transportation infrastructure.
- Dr. Mohammad Jalayer receives \$500,000 from the South Jersey Transportation Authority for "The Last Mile Solution: Improving Health & Access to Transportation for Camden's Vulnerable Populations."

Kauser Jahan, Ph.D., P.E.
*Civil & Environmental Engineering Professor
and Department Head*



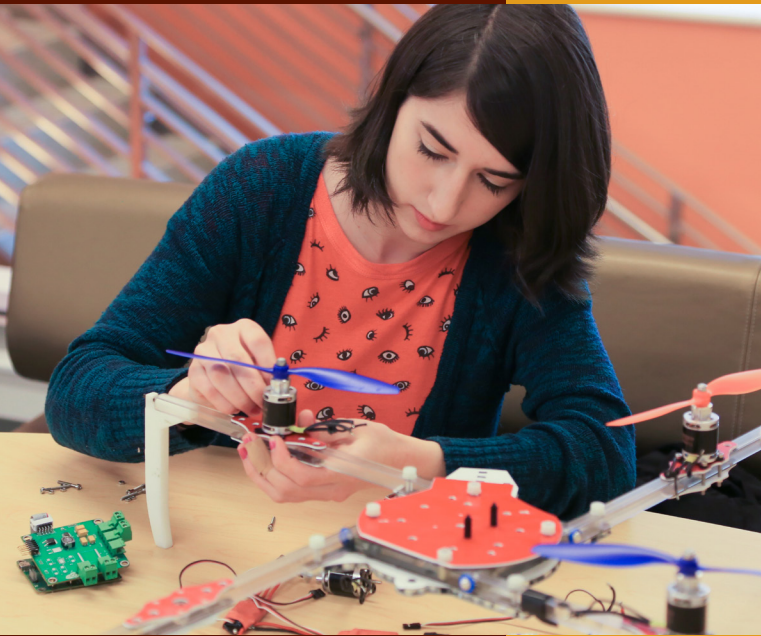
2022

- CEE partners with seven universities to transform industry engagement in higher education, aiming to shift advisory boards towards active partnerships to foster entrepreneurial mindsets in engineers, supported by a \$662,000 grant from the Kern Family.
- Dr. Mohammad Jalayer's research on distracted driving, funded by the National Highway Traffic Safety Administration, draws state attention by revealing it as a leading cause of fatal crashes in New Jersey, prompting a proactive safety campaign.

2023

- Dr. Adriana Trias receives the Innovation Award during the 2023 TechConnect World Innovation Conference & Expo.
- Matt Denafio, '06, a CEE alumnus becomes president of Atlantic County Utilities Authority.
- A team of researchers, led by Yusuf Mehta, Ph.D., is honored with an Edison Patent Award.
- Lawrencia Akuffo, graduate student working under Dr. Adriana Trias receives national recognition for receiving the First Prize for the FHWA's 2023 Long-Term Infrastructure Performance Student Data Analysis Contest. Her paper title was "Quantification of the correlation between bridge skew angle and deterioration rate."
- Dr. Yusuf Mehta, founding director of CREATES at Rowan University, secures a \$30 million, five-year contract from the US Army Corps of Engineers to advance Arctic research efforts.

DEPARTMENT HIGHLIGHTS



ELECTRICAL & COMPUTER ENGINEERING (ECE)

Electrical & Computer Engineering at Rowan University is at the forefront of groundbreaking research and offers innovative learning experiences that prepare students for real-world challenges. The department's commitment to excellence in both research and education fosters a dynamic environment where students can thrive and contribute to cutting-edge advancements in technology.



1996 College of Engineering is founded



2000 ECE graduates its first class



2015 Renamed Henry M. Rowan College of Engineering

2015

- ECE introduces a Ph.D. in Engineering with a focus on Electrical and Computer Engineering, welcoming its inaugural cohort of doctoral students.

2016

- ECE students launch ProfHacks, an annual hackathon, drawing hundreds of high school and college students from the Mid-Atlantic. The event features design competitions, workshops and social gatherings.

2017

- The department establishes a new unique co-op program with Lockheed Martin that allows students a six-month full co-op while earning a certificate in Combat Systems Engineering and graduating within four years.
- ECE secures a \$1.3 million grant from the U.S. Department of Education's GAANN program to train Ph.D. students in artificial intelligence and machine learning.

2018

- Dr. Ben Wu receives a grant from the N.J. Health Foundation, the first of several the Department receives in subsequent years.

2019

- Dr. John Schmalzel, founding chair of the ECE Department, is named as the founding editor-in-chief of the IEEE *Journal of Miniaturization for Air & Space Systems (J-MASS)*.

2020

- ECE starts a new B.S. in Electrical Engineering Technology, a 2+2 program in collaboration with Rowan College of South Jersey.
- ECE celebrates the graduation of its first Ph.D. student, Dr. Dimah Dera, who later went on to become an assistant professor at the Rochester Institute of Technology.

2021

- ECE alumni fly 600 drones in formation, stemming from a project by Rowan ECE students Tony Samaritano, Anthony Merlino and Chris Franzwa. Their endeavor evolves into Verge Aero, a pioneering company with global drone swarm operations, even making it to the finals on NBC's America's Got Talent — Extreme Edition with a Golden Buzzer.

2022

- Isabella Marshall, a junior undergraduate student, is named a Goldwater Scholar, making her the first Rowan ECE student to receive this prestigious, congressionally funded undergraduate scholarship in all of the natural sciences, mathematics and engineering in the United States.
- The department expands its certificate programs to include Applied Machine Learning, Power Systems Engineering, and Wind Energy, in addition to the previously established Combat Systems Engineering, which remains the nation's only program of its kind.

Robi Polikar, Ph.D.
*Electrical & Computer Engineering Professor
and Department Head*



2023

- Dr. Nidhal Bouaynaya, professor and associate dean for research, rebrands the department's virtual reality center as the Machine and Artificial Intelligence Virtual Reality Center (MAVRC), renewing and expanding the Army's grant to develop AI solutions for enhancing future capabilities.
- Paragon Systems and DTCUBED partner with ECE to sponsor the Cybersecurity Engineering certificate program, the Department's fifth, and first to be externally sponsored.
- The department grows its research footprint in power systems through a pair of grants totaling over \$1M: one by NSF to its newest faculty member, Dr. Hua Zhang, and the other by the NJ Board of Public Utilities to Dr. Jie Li.
- The department expands its co-op programs to include Exelon Corporation, offering students valuable real-world experience, enabling them to undertake a full 6-8 month co-op, earn a certificate in Power Systems Engineering, and graduate within four years.
- ECE celebrates its largest-ever graduating class from the B.S. in ECE program, adding 93 students to its alumni community.

DEPARTMENT HIGHLIGHTS



EXPERIENTIAL ENGINEERING EDUCATION (ExEEd)

Experiential Engineering Education (ExEEd) is led by the department, overseeing the engineering entrepreneurship degree. This innovative program empowers students to explore, invent, develop, and ultimately bring their products and services to market. With a strong emphasis on hands-on learning, ExEEd provides a dynamic environment where students can thrive as they navigate the exciting intersection of engineering and entrepreneurship.



1996 College of Engineering is founded



2015 Renamed Henry M. Rowan College of Engineering



2016 ExEEd department is established



2020 ExEEd graduates its first class

Stephanie Farrell, Ph.D.
Experiential Engineering Education Professor and Founding Department Head



2016

- ExEEd department is founded.
- First Engineering Entrepreneurship undergraduate students enroll.

2017

- ExEEd moves into its new home in Engineering Hall.
- ExEEd leads the Henry M. Rowan College of Engineering in joining the KEEN network, dedicated to transforming undergraduate engineering education with an entrepreneurial mindset.
- Dr. Cheryl Bodnar wins ASEE Chemical Engineering Division's Ray W. Fahien Award for outstanding teaching and educational scholarship.
- Dr. Cheryl Bodnar receives a grant from the National Science Foundation (NSF) to develop experiential process safety training.

2018

- ExEEd hosts the ASEE's national First-Year Engineering Experience Conference.
- ExEEd Founding Chair Dr. Stephanie Farrell becomes American Society for Engineering Education (ASEE) President.
- Dr. Stephanie Farrell receives a grant from the NSF for a project to promote LGBTQ+ Inclusion in Engineering nationwide.
- Dr. Stephanie Farrell is awarded the Nikola Tesla Chain for excellence in engineering education by the International Society for Engineering Pedagogy.
- ExEEd is awarded \$300,000 from KEEN to enhance the integration of innovation and entrepreneurship into the First-Year and Sophomore Engineering Clinics.

2019

- ExEEd introduces a Ph.D. in Engineering with a concentration in Engineering Education.
- Engineering Entrepreneurship student Michael Weinberg chosen as a Stanford University Innovation Fellow.
- ExEEd undergraduate Clinic Team earns distinction in ASEE's Best New Ideas in Entrepreneurship and Innovation competition for their paper presented at the annual conference in Tampa.
- Dr. Kaitlin Mallouk secures an NSF grant to investigate the influence of engineering guilds on the adoption of research-based instructional practices.
- Dr. Juan Cruz joins ExEEd as an assistant professor.
- ExEEd launches first College of Engineering study abroad program and students participate in transformative trip to China.

2020

- ExEEd launches an undergraduate certificate in Product Development.
- ExEEd graduates first undergraduate class of engineering entrepreneurship majors.

2021

- Dr. Juan Cruz secures a \$400,000 NSF award to develop the Rising Doctoral Institute, a research-based intervention model addressing the lack of diversity in graduate engineering education.
- Dr. Stephanie Farrell is elected to the rank of Fellow member of the American Institute of Chemical Engineers (AIChE).

2022

- The first Engineering Education Ph.D. in the state of New Jersey is pioneered by ExEEd.
- ExEEd welcomes two new assistant professors, Dr. Cassandra Jamison and Dr. Justin Major.
- Led by Dr. Kaitlin Mallouk, ExEEd receives a \$1.5 million grant to enhance inclusivity in STEM and offer scholarships to low-income students.
- Dr. Mallouk is named KEEN National Rising Star.
- NSF recognizes two ExEEd doctoral students through the prestigious Graduate Research Fellowship Program.
- Dr. Cheryl Bodnar secures a \$300,000 grant to develop the theoretical foundation for KEEN's renowned entrepreneurial mindset model.

2023

- ExEEd graduates first Ph.D. student, Dr. Jeffrey Stransky.
- Dr. Stephanie Farrell is inducted into ASEE Hall of Fame.
- AIChE honors Dr. Cheryl Bodnar and collaborators with the David Himmelblau Award for Innovations in Computer-Based Chemical Engineering Education.
- Dr. Juan Cruz receives a \$200,000 NSF Award to apply complex systems methods in examining factors influencing the success of STEM participation initiatives.

DEPARTMENT HIGHLIGHTS



MECHANICAL ENGINEERING (ME)

The nationally ranked Mechanical Engineering program continues to excel in numerous fields, showcasing its commitment to high standards and quality education. With state-of-the-art facilities and dedicated faculty, students are provided with unparalleled opportunities for hands-on learning and research experiences.



1996 College of Engineering is founded



2000 ME graduates its first class



2015 Renamed Henry M. Rowan College of Engineering

2015

- Research programs receive funding through the New Jersey Health Foundation and the National Institutes of Health.
- Rowan engineers take third place in the North American Baja car competition.
- Dr. Krishan Bhatia receives the Christian R. & Mary F. Lindback Distinguished Teaching Award. Dr. Bhatia is the second recipient of this award in the department.

2016

- Stanford program names Rowan students University Innovation Fellows.

2017

- ME department graduates Rowan University's first Ph.D. in Engineering student.
- Dr. Wei Xue receives a grant from the Naval Surface Warfare Center under the Naval Engineering Education Consortium to study cryogenic dielectrics.

2018

- Rowan team is chosen for the 2018 NASA Revolutionary Aerospace Systems Concepts — Academic Linkage Mars Ice Challenge.
- Dr. Smitesh Bakrania receives the Fulbright Scholar award to explore how the mobile apps that he had developed could enrich engineering pathways in New Zealand.
- Graduate student wins Charles P. Fenimore Best Student Presentation at the Spring Technical Meeting of the Eastern States Section of the Combustion Institute.
- Dr. Francis Haas collaborates with College of Engineering colleagues to receive the college's first GAANN (Graduate Assistance in Areas of National Need) award from the U.S. Department of Education, significantly boosting college-wide Ph.D. enrollment.

2019

- Dr. Francis Haas partners with Rowan University's Advanced Materials and Manufacturing Institute to develop a cooperative agreement with the Army Research Laboratory, encompassing — at the time — the largest single research award in Rowan University history.

2020

- Dr. Smitesh Bakrania receives Rowan's Excellence in Online Learning Award for his work on the Introduction to Nanotechnology course.
- Dr. Francis Haas is working on the Rowan University face mask team to mass-produce 50,000 reusable masks for public distribution during the early stages of the COVID-19 pandemic.

2021

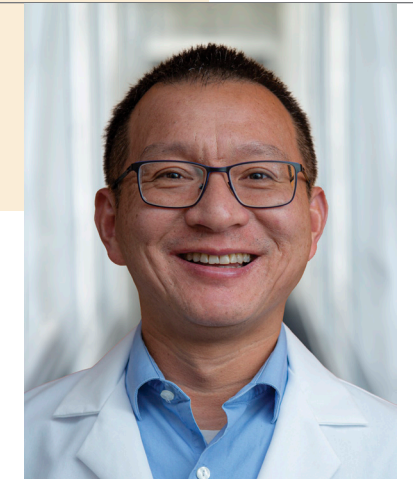
- Dr. Behrad Koohbor receives a grant from the NSF to investigate density-graded auxetic foams.
- Dr. Chen Shen receives the Young Scientist Award from the Photonics and Electromagnetics Research Symposium (PIERS).

2022

- Dr. Chen Shen receives a grant from the NSF to study acoustic wave manipulation using reconfigurable origami structures.
- Dr. Smitesh Bakrania receives the Christian R. & Mary F. Lindback Distinguished Teaching Award. Dr. Bakrania is the third recipient of this award in the department.
- ME students earn multiple awards, including Best Student Paper at the 2022 ASME IMECE Conference, Wind Institute Fellowship from NJEDA and First Place in the Cold Spray Action Team Poster Competition.
- Dr. Francis Haas contributes to an interdisciplinary team of College of Engineering investigators for a USDA-sponsored grant studying landfills' threats to water resources.

Wei Xue, Ph.D.

*Mechanical Engineering Associate Professor
and Interim Department Head*



2023

- Dr. Antonios Kotsos joins the department as the first Henry M. Rowan Foundation Professor.
- Dr. Antonios Kotsos establishes a new research center, Digital Engineering Hub (DEHub), where he serves as the director.
- ME researchers Drs. Kotsos, Shen, Trkov and Xue, receive over \$2 million from federal agencies like NSF, ONR, NIST and DARPA. These funds support investigations in digital manufacturing, robotics, engineering education, bioengineering and advanced materials.
- The ME department establishes the Ph.D. in Mechanical Engineering program.
- ME graduate student receives the American Society for Composites (ASC) Ph.D. Research Scholarship Award.
- The department initiates the Engineering in Germany study abroad program, led by Dr. Smitesh Bakrania and Karl Dyer. The program offers global exposure to manufacturing through faculty-led visits to automotive assembly plants and technology museums in Germany.
- ME students receive multiple awards, including the Best Student Paper Award at the 2023 ASME IMECE Conference and the 2023 American Society of Composites Ph.D. Research Scholarship.

MEET DR. YOLANDA MACK

ASSOCIATE DEAN FOR INDUSTRY PARTNERSHIPS AND DIGITAL ENGINEERING HUB CO-DIRECTOR

Yolanda Mack, Ph.D., joined the Henry M. Rowan College of Engineering in October 2023 as the Associate Dean for Industry Partnerships and Workforce Development and co-director of the newly established Digital Engineering Hub (DEHub). Mack comes to Rowan from Raytheon, an aerospace and defense company, where she has worked as an engineer since 2007, most recently as an Associate Director of Strategic Initiatives.

Mack is the college's first Associate Dean for Industry Partnerships and Workforce Development. In the position, Mack will manage and develop the pipeline for industry partnerships that both bolster the college's research opportunities and enhance the student education experience. Mack will also spearhead the creation of continuing education training for industry professionals at Rowan.

Along with director Antonios Kontsos, Ph.D., Mack will lead the DEHub, a cutting-edge integrated technology center for the research, education and practice of emerging digital engineering methods. Mack looks to bolster the list of industry partners who will collaborate with the university through the DEHub. She also hopes to foster collaboration between engineering departments to work on digital engineering research.



While at Raytheon, Mack led several internal research and development projects in the areas of digital twin, digital engineering, manufacturing, artificial intelligence and machine learning, aerodynamics, and guidance, navigation and control.

Mack received her doctorate degree in aerospace engineering (2007) and a master's degree in mechanical engineering (2004) from the University of Florida in Gainesville, Florida.

Mack has served as Vice President on the Board of Directors for Pi Tau Sigma, the International Honor Society for Mechanical Engineers, since 2018. Her other accolades include the 2017 Black Engineer of the Year Award for Outstanding Technical Contribution in Industry, the 2017 Outstanding Young Alumna Award from the Mechanical and Aerospace Engineering Department of the University of Florida and the 2006 Amelia Earhart Fellow.

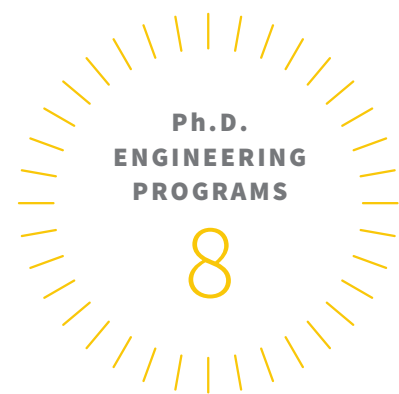
PFIZER AND ROWAN PARTNER TO OPTIMIZE DRUG MANUFACTURING

The Henry M. Rowan College of Engineering continues its partnership with multinational pharmaceutical and biotechnology company, Pfizer. Most solid drug formulations, like tablets or capsules, include their active ingredient as a crystalline powder. The size, shape and structure of those crystals have a critical impact on the medical function of the drug. Rowan engineering researchers in the Crystallization Science & Pharmaceutical Engineering (CSPE) lab, led by Dr. Gerard Capellades, are using automated experiments and digital tools to quickly design and evaluate a process that is able to deliver the drug's properties in a safe and robust manner. All the while, this process shortens the time it would take to bring a new drug to a commercial scale.

To achieve this, the researchers are using data-rich experimental methods, integrated with image analysis, to train mathematical models for process optimization. These models serve as "digital twins" that can predict, in seconds, the results of experiments that would otherwise take several days.

This work furthers Rowan's ongoing industry partnership with Pfizer, which began in 2021. The ongoing collaboration has resulted in published articles, as well as two summer internships for junior chemical engineering students.





2023 DOCTORAL GRADUATES BREAK RECORDS

A record 21 engineering Ph.D. students graduated from Rowan University in 2023. In addition, several engineering doctoral programs graduated their first students, such as the University's first Ph.D. graduates in engineering education, as well as the first students to graduate with Ph.D. degrees in the specific disciplines of chemical, civil, electrical and computer, and mechanical engineering, rather than in general engineering. Other engineering disciplines that graduated doctoral students at commencement included biomedical engineering and materials science and engineering.

Among those graduates is **Jeffrey Stransky**, who has the distinction of being the first graduate of Rowan University's doctoral program in engineering education. After receiving his bachelor's degree in mechanical engineering from Rowan, Stransky decided to remain in academia. The engineering education program is in the Experiential Engineering Education Department (ExEEd) and focuses on research in areas related to pedagogy and engineering education.

2023 GOLDWATER SCHOLAR

Biomedical engineering major **Brendan Connor** earned the prestigious 2023 Goldwater Scholarship. The Barry M. Goldwater Scholarship and Excellence in Education Program is awarded to college sophomores and juniors who intend to pursue research careers in the natural sciences, mathematics and engineering. The scholarship awards students up to \$7,500 per year in funding. Connor hopes to earn a Ph.D. in biomedical engineering and continue research in novel methods for therapeutic drug delivery.

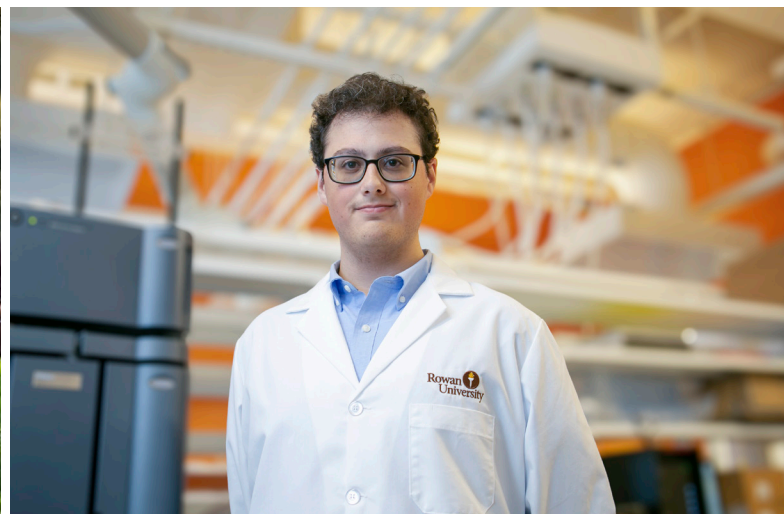
Now a senior, Connor is a member of the Martinson Honors College, the engineering honor society Tau Beta Pi and the Rowan chapter of the Biomedical Engineering Society.

REACHING NEW HEIGHTS

This year, the Henry M. Rowan College of Engineering welcomed a new student organization to its slate of nearly two dozen groups. Introduced in May 2023, the Rowan chapter of the Vertical Flight Society was founded as a result of increasing collaboration between Rowan and The Boeing Company's Vertical Lift Division, based in Philadelphia. Future collaborative plans include junior and senior clinic projects, as well as internship and career opportunities with Boeing.

Through the VFS, students can network with local and international companies that are pursuing vertical lift and aerospace interests. The quickly growing organization is collaborating with other engineering student groups, including the Rowan chapter of the American Institute of Aeronautics and Astronautics (AIAA) and the Society of Women Engineers (SWE).

Chapter meetings, led by a seven-member executive board, include both informative presentations and hands-on activities, like drone-flying instruction.





UNSINKABLE CONCRETE VESSELS

When you think of a canoe, you most likely picture a lightweight wooden vessel. Student engineers working on the Concrete Canoe Leadership Team Clinic project were able to buck convention with their concrete canoe.

Rowan University hosted the 2023 American Society of Civil Engineers Symposia where concrete canoes fabricated by teams of student engineers from across the country were judged on an academic paper and presentation, durability, speed and ability to float. To create Rowan's concrete canoe entry, Birds Of Prey, civil engineering students **Jake Block, Matthew Eggink, Joseph Pranci, Daniel Friend and Daniel Lynch** tested multiple mixes to determine the lightest and most durable concrete mix. The final result is a heavy concrete canoe that can float and be maneuvered on a body of water. For their efforts, Rowan was awarded the Innovation Award at the competition.



→ “This was a great experience for the students who competed locally and those that were able to travel to Wisconsin to compete against and learn from the other national caliber teams.”

— Doug Cleary, Ph.D., P.E.



ALUMNI CIRCLE OF DISTINCTION

On Saturday, October 14th, the Henry M. Rowan College of Engineering hosted its inaugural Alumni Circle of Distinction event to honor outstanding engineering alumni. Recognizing their distinguished career achievements, contributions to the college's growth and dedicated service to the community, the event featured a breakfast induction ceremony and department head speeches highlighting the accomplishments of each inductee.

THE ESTEEMED RECIPIENTS OF THE AWARD INCLUDED:

- **Christina Bowen**, '01 Mechanical Engineering
- **Anthony Marino**, '02, M'03 Electrical & Computer Engineering
- **Jeff Miles**, '02 Electrical & Computer Engineering
- **Bryan Nese**, '04 Mechanical Engineering
- **Brad Summerville**, '01, M'02 Civil & Environmental Engineering

Established in 2023, the Alumni Circle of Distinction is a prestigious recognition that spotlights Henry M. Rowan College of Engineering alumni who have excelled in their careers, contributed significantly to the college's advancement and demonstrated exemplary service to the community. Inductees are carefully selected each year through nominations submitted by faculty, staff and fellow alumni.

→ Please contact Dan Drutz at drutz@rowan.edu if you would like to nominate a Rowan Engineering alum for the Alumni Circle of Distinction. Nominations are always being taken for consideration in the future.

→ “The Alumni Circle of Distinction highlights our dedication to honoring the remarkable achievements of our engineering alumni. This year's inaugural inductees have had lasting impact on our institution and beyond through their accomplished careers, contributions to our college's growth, and dedication to community service.”

— **Giuseppe Palmese, Ph.D.**
Dean of the Henry M. Rowan College of Engineering



CHRISTINA BOWEN, '01 (ME)

Christina Bowen, an Engineering Leader at The Boeing Company in Philadelphia's Vertical Lift Division, spearheads the integration of initiatives, evaluates future platform needs and nurtures employee growth. Graduating as one of two women in Rowan University's inaugural mechanical engineering class, she co-founded the university's Society of Women in Engineering. Bowen's leadership journey spans Sikorsky Aircraft to Boeing since 2008, where she champions diversity through SWE and SWE-BWIL. Actively promoting STEM outreach and engineering diversity, she drives initiatives like the Inspiring Fellow Initiative at Boeing. Bowen fosters collaboration with Rowan, facilitating aerospace program development and establishing a student chapter with Boeing's support. Committed to social impact, she established a scholarship in memory of her late husband, aiming to empower future engineers dedicated to societal betterment.



ANTHONY MARINO, '02, M'03 (ECE)

Anthony Marino brings nearly two decades of diverse leadership experience at Lockheed Martin, currently serving as a Workforce Strategist for the Corporate Strategic Workforce Initiatives team. In this role, Marino crafts innovative talent development strategies, including skill-based programs and collaborations with community colleges. Previously, he excelled as an Engineering Project Manager for the Aegis Ballistic Missile Defense program, ensuring program success through meticulous cost, schedule and technical management. Marino's commitment to talent development is evident in his leadership of recruitment initiatives and STEM outreach programs, fostering collaborations with academic institutions like Rowan University. His pioneering work includes establishing internships, engineering clinics and a neurodiversity hiring pilot, setting a precedent for inclusive workforce practices at Lockheed Martin.



BRYAN NESE, '04 (ME)

Bryan Nese, a partner at Mayer Brown's Washington DC office, specializes in complex patent litigation. As a registered patent attorney, he navigates the technical intricacies of patent disputes across various fields, including computer technology, automotive and medical devices. Nese's expertise stems from his diverse background, including research in combustion at Penn State and leading engineering projects at Rowan University. His undergraduate achievements include leading teams in designing fuel cells and underwater vehicles, earning scholarships and induction into prestigious honor societies. Currently, he serves on the Rowan Engineering Advisory Council, showcasing his commitment to fostering engineering excellence.



JEFF MILES, '02 (ECE)

Jeff Miles, Senior Manager of Gas Engineering and Asset Performance at Delmarva Power, an Exelon Company, focuses on the natural gas sector's role in clean energy initiatives. Collaborating internally and externally, he ensures Exelon drives solutions while maintaining system performance and customer service standards. Within previous roles, Miles focused on enhancing reliability and safety in petrochemical and utility facilities, designing systems to minimize downtime and bolster resilience. Miles is active in the Rowan engineering community. He chairs the Rowan Engineering Alumni Council and serves on the Rowan Engineering Advisory Council. Jeff also leads alumni efforts to support current students in their career development.



BRAD SUMMERVILLE, '01, M'02 (CEE)

Brad Summerville, Vice President of PT Consultants, Inc. (PT), brings over 20 years of environmental expertise to the New Jersey-based firm specializing in environmental consulting in the Northeast. Licensed as a Professional Engineer in multiple states and a Licensed Site Remediation Professional in New Jersey, Summerville founded Summerville Engineering in 2016 to extend services to New York. He has held leadership roles in the American Society of Civil Engineers (ASCE), including presidency in the South Jersey Branch and New Jersey Section, and currently serves as ASCE Region 1 Governor. Committed to student development, Summerville mentors civil and environmental engineering students at Rowan University and Atlantic Cape Community College, where he sits on the Engineering Science Advisory Board.

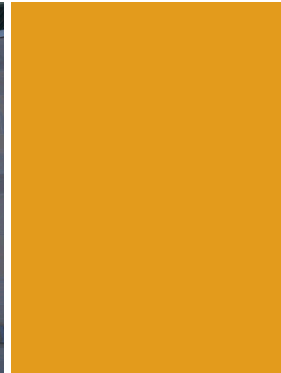
A HISTORY OF GENEROSITY

Established in 1996, Rowan Engineering has remained committed to delivering a practical and engaging engineering education. Upholding the vision of our esteemed benefactor, Mr. Henry M. Rowan, the college has successfully guided numerous engineers through their academic journey, preparing them to excel in various industries, academic realms, institutions and beyond. Mr. Rowan’s aspiration to nurture great engineers remains at the forefront of our mission, a commitment we uphold with pride each day.

Since its inception, the Henry M. Rowan College of Engineering has leaned on the support of alumni, faculty, staff, Rowan parents and friends to uphold our founder’s vision, bolster our students and programs and propel the college toward an innovative and dynamic future.



DONATION BREAKDOWN	
Academic Divisions	\$1,065,626
Student Financial Aid	\$318,500
Endowed Academic Divisions	\$2,000,000
Endowed Student Financial Aid	\$119,748
Research	\$100
Other	\$2,500
TOTAL	\$3,506,474



LEADERSHIP

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Dean

Steven Chin, Ph.D. P.E.

Vice Dean

Nidhal C. Bouaynaya, Ph.D.

Associate Dean for Research & Graduate Studies

Yolanda Mack, Ph.D.

*Associate Dean for Industry Partnerships
& Workforce Development*

Jenn Bing

Assistant Dean for Strategic Initiatives

DEPARTMENT HEADS

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Biomedical Engineering

Kenneth Lau, Ph.D.

Chemical Engineering

Kauser Jahan, Ph.D. P.E.

Civil & Environmental Engineering

Robi Polikar, Ph.D.

Electrical & Computer Engineering

Stephanie Farrell, Ph.D.

Experiential Engineering Education

Wei Xue, Ph.D.

Mechanical Engineering

DIVISION DIRECTORS

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Construction & Engineering Management

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