Catalyst

2025

A surface and colloid science legacy

New department chair • Faculty highlights • Student accolades • John Berg's legacy and retirement • Donor reflections • Alumni awards

Message from the Chair

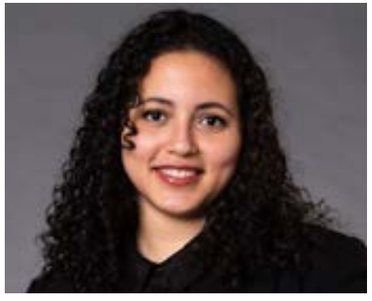
Building on a ChemE legacy

As the newly appointed chair of Chemical Engineering, I am excited to build upon the strong foundation of high-quality, high-impact research and education in our department. We have a significant opportunity to innovate as we navigate a changing landscape in higher education and federal research funding, and remain committed to fostering an inclusive environment for our chemical engineering current and prospective students, faculty, staff, and alumni.

This issue of Catalyst celebrates the retirement of Professor John Berg, whose 61-year legacy of dedication, innovation and excellence has profoundly shaped our department and the field of surface and colloid science. Beyond his own pioneering research, John has been instrumental in developing our curriculum, establishing a comprehensive lab course that remains a core component of both undergraduate and graduate education today. His visionary approach has inspired decades' worth of ChemE students who have gone on to make their own marks in academia, industry and research.

As we honor his remarkable career, we reflect on the indelible impact he has left on our department and the broader scientific community. His work and leadership is threaded throughout every aspect of our department, from our curricular lab to our capstone opportunities and research.

Elizabeth Nance
Department Chair and Steven R. and Connie R. Rogel Endowed Associate Professor



Meet our new faculty

Nada Naser
Catherine M. and Scott C. Roberts Faculty Fellow

Nada Naser has established herself as a strong teacher and mentor, with demonstrated research and expertise in the areas of colloids, protein engineering, nanomaterial synthesis, microscopy and surface characterization.

As an undergraduate student, Naser conducted research in biomineralization and droplet-based microfluidics under the supervision of MSU professor Robin Gerlach. After earning her B.S. in chemical engineering in 2019, she was awarded the Clean Energy Institute (CEI) Graduate Research Fellowship at the University of Washington, and joined ChemE as a graduate student under the mentorship of Charles W. H. Matthaei Endowed Professor François Baneyx. She earned her M.S. ('22) and her Ph.D. ('24) in chemical engineering from the University of Washington, and was named in the Husky 100 of 2024.

Her passion for engineering education and her commitment to promoting inclusivity and accessibility in chemical engineering have been driving forces in Naser's academic and professional careers.

Introduce a Girl to Everyday Science

UW Women in Chemical Engineering (WChE) hosted their eighth annual "Introduce a Girl" event in February of 2025. Children of all ages and genders got to explore the wonders of "Everyday Science" through fun experiments and demonstrations using common household items!

Participants experiment with milk and food coloring at a 2025 Introduce a Girl demonstration table. Photo by Shreya Ramanan.

UW ChemE shines in DEIA Paper Competition

A multifaceted team led by ChemE assistant teaching professor Alex Prybutok and undergraduate student Jamie Clark competed at the 2025 annual meeting of the American Society for Engineering Education (ASEE), in the Chemical Engineering Division.

Their paper, "Assessing accessibility and challenging ableism in Unit Operations Laboratories," was selected to receive the **2026 Joseph J. Martin Award**, for Best Paper and Best Oral Presentation at the 2025 ASEE meeting.

This is the second year in a row that a UW ChemE-authored paper has received the Martin Award.

Assistant professor Alex Prybutok accepts an award at the ASEE Annual Meeting.

ChemE students attended the AIChE Annual Conference in November 2025. Photo provided by Lauren Ellis.

AIChE Poster Prize Winners

Several UW ChemE students attended the American Insitute of Chemical Engineers (AIChE) Annual Conference this fall in Boston. Three undergraduate students were awarded for their research poster presentations in different categories.

Lauren Ellis
3rd place, Catalysis and Reaction Engineering category

Alyssa Hicks
1st place, Materials Science and Engineering category

Kieran Heiburg
1st place, Food Pharma and Biotech category

Elizabeth Nance begins appointment as next ChemE department chair

In her tenure, Nance has made exceptional contributions to growing the undergraduate program and expanding hands-on, project-based curricular opportunities for students in ChemE. She has driven many of the department's diversity initiatives, and brings a strong foundation of experience in fundraising and mentorship from her research lab. Nance is widely recognized as a pioneering researcher in the field of pediatric brain disease and brain therapeutic delivery.

Her vision includes strengthening the department's external partnerships and supporting early alumni engagement, along with expanding access to inclusive chemical engineering education that meets the needs of the modern workforce, and enabling collaborative, high-impact translational research.

Faculty AWARDS

David Bergsman
Emerging Leader Award
American Vacuum Society, PNW Chapter

Cole DeForest
Mid-Career Award
Society for Biomaterials

Samson Jenekhe
de Gennes Prize
Royal Society of Chemistry

Elizabeth Nance
2025 Finalist
Blavatnik National Awards for Young Scientists

Buddy Ratner
Athanasiou Medal of Excellence in Translational Bioengineering
Biomedical Engineering Society

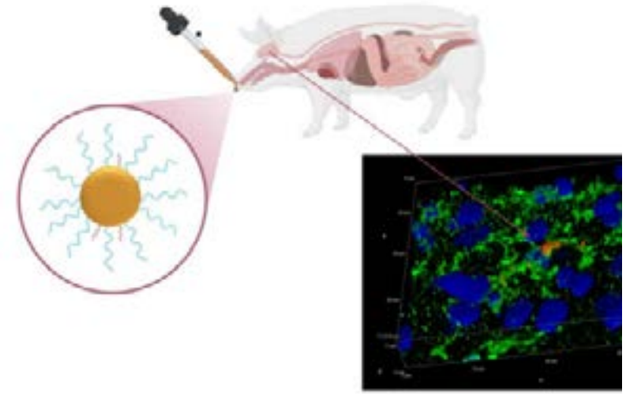
A $1.6 million NIH tech transfer grant to revolutionize dialysis for patients

Professor Buddy Ratner and his colleagues at the medtech startup Kuleana earned a Small Business Innovation Research (SBIR) award supported by the NIH to make kidney dialysis less expensive, more efficient and more portable for patients.

Recycling the fluid rather than flushing it down the drain would allow slower, more frequent treatments that could be completed in the comfort of a patient's home. The team is currently developing a new gas-phase plasma method of synthesizing the catalyst, which will be cheaper, safer and more efficient than the current standard approach.

"We will be able to save the 50 gallons of purified water that is typically used in a single treatment and untether treatment from the wall and plumbing. It will change dialysis entirely and tremendously improve people's lives." —Buddy Ratner

Adapted from an announcement published by the UW Department of Bioengineering.



Nuo Xu presented her research during her Ph.D. defense in June 2025. Photo by Elizabeth Nance.

Treating fetal brain injury

In humans, fetal growth restriction (FGR) affects up to 10 percent of all pregnancies in developed countries and is a leading cause of perinatal complications and mortality, leading to life-long disabilities.

Nance Lab researcher Nuo Xu collaborated with a clinical lab at the University of Queensland in Australia to administer and test therapeutics for FGR brain injuries in newborn pigs, a model much closer in scale to that of a human infant. Xu worked to formulate the drug-loaded nanoparticles in a freeze-dried form to improve the shelf stability, so they could be shipped oversees and retain their effectiveness when administered.

Programmable proteins

Researchers in the DeForest Lab have developed smart drugs that can target disease in the body without affecting other areas. This new class of biomaterials uses the same Boolean logic used by computer programmers, controlling activation when a specific set of environmental cues are present.

Refining targeted drug delivery helps improve the treatment of disease so that immunotherapies can address a problem without causing others throughout the body.

This research study was published in Nature Chemical Biology in October of 2025.

Adapted from an article published by UW News.

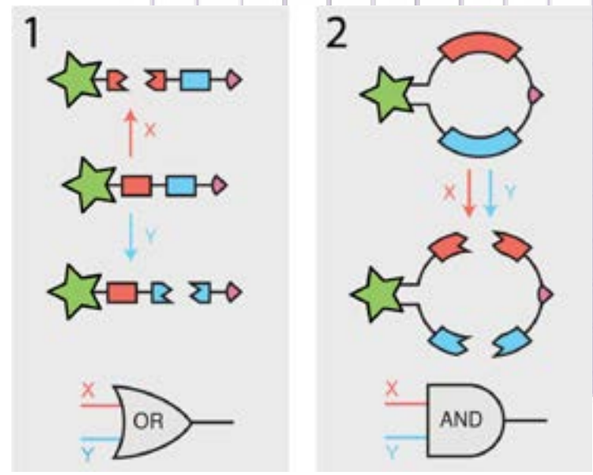


Diagram showing linker structures that can perform different logical operations. Photo by DeForest et al./Nature Chemical Biology.

Gharios, R., Ross, M.L., Li, A. et al. Boolean logic-gated protein presentation through autonomously compiled molecular topology. Nat Chem Biol (2025). https://doi.org/10.1038/s41589-025-02037-5

2025 STUDENT ACHIEVEMENTS

Three ChemE juniors received **2025 CEI Testbeds Undergraduate Research Awards** to support their research projects in clean energy.

From left: Andrea Guiley, Dijia Bao and Gabrielle Zaher

Senior **Alyssa Hicks** was named a **2025 Future Leader in Chemical Engineering** for her research with the Bergsman Research Group.

Senior and DeForest Lab researcher **Annabella Li** received the **Dean's Medal for Academic Excellence.**

Brendan Butler, ChemE Ph.D. graduate from the Nance Lab, was nominated for the **2026 Schmidt Science Fellowship.**

THE HUSKY 100

Naomi Kern and **Kristin Bennett** were listed among the **Husky 100**.

Junior **Sofia Dahlgren** has received scholarship awards from the **Goldwater Foundation** and the **Astronaut Scholarship Foundation** for her research focused on developing treatments for ALS.

Tata Serebryany, first-year Ph.D. student in ChemE and researcher in the Rorrer Lab, received the **$7,000 Schneider Electric Scholarship** from the Renewable Energy Scholarship Foundation.

ChemE team wins innovation prize

Team JanuTech won the third-place $5,000 prize at the **2025 Foster School of Business Environmental Innovation Challenge** for their novel quick-charging drone batteries, which were developed using conventional, low-cost tools to replicate professional machines. Led by ChemE graduate students Kevin Lee and Zach Wylie, this project and showcase served as the senior capstone for the all-ChemE team's undergraduate members.

Team JanuTech accepting their award at the 2025 Environmental Innovation Challenge. Photo by Matt Hagan.

This was the first time that a senior capstone project involved collaborating with ChemE graduate students rather than industry partners. Their success has opened a door of opportunity for graduate students and undergraduates to work together on innovative technology development.

Become a ChemE Industry Capstone Sponsor!
tinyurl.com/ChemECapstones

A surface and colloid science legacy

Professor John C. Berg's unique surface and colloids lab makes the University of Washington's chemical engineering education stand out. This story summarizes the history of Berg's career and contributions to the department in his 61 years of service.

Identifying a fundamental gap

On top of being a full-time professor, Berg was an avid industry consultant throughout most of his career. Starting in the late 1960s major manufacturing companies, like 3M and Proctor and Gamble among others, invited him to their facilities. His job was to assess how they could make improvements to chemical processes like coating, adhesion, sedimentation, water-proofing, and a range of challenges in the area of surface and colloid science. While able to offer help with these issues, Berg realized that none of these topics were being taught in his students' classes.

At that time, he knew of only a few institutions offering coursework to meet these specific industry demands. It became clear that this key subject area of surface and colloid science was largely missing from the chemical engineering curriculum.

CONTINUED




ChemE students in the Surface & Colloids Lab during the 1990s. Photos provided by John Berg.

ChemE students in the Surface & Colloids Lab in 2025. Photos by Dennis Wise.

Starting from scratch

Determined to meet this deficiency, Berg took it upon himself to become a surface and colloids expert. He conducted extensive self-study and consulted with industry professionals that were more familiar with the topic than he was at the time. A colloids lab course being offered at Carnegie Institute of Technology, now known as Carnegie Mellon University, was extremely beneficial in informing his work to develop his own. Research conducted within his lab at the UW was directed into these industry-critical focus areas, and helped to inform his course material.

In the 1980s, Berg launched his new interfacial and colloid science lecture and lab course as an elective. He offered an additional professional course variation for industry engineers over one week during the summer.

"It was sort of an experiment," he said, "I got a lot of valuable feedback from teaching the course in both formats, for two very different student audience groups."

The experiment was an indisputable success, and the lecture-lab course continued to evolve over the following decades. In that time, Berg had the opportunity to travel across the country and even internationally. He brought his mastery of surface and colloid science and his lab teachings into industry settings, and provided lectures and demonstrations on site. He also invited industry engineers into his classroom to perform instrument demonstrations.

Photo by Dennis Wise

Raising the bar in the classroom

The surface and colloid science course has been a core requirement of UW ChemE's undergraduate curriculum since 2009. UW ChemE is one of only a few programs that not only requires fundamental colloids education at the undergraduate level, but that offers a lab component to the course as well. Several students, including graduate students who take the course as an elective, have come to the UW for ChemE's academic programs because of John Berg, his research lab and his nationally recognized expertise.

"[His class was] hands-down the best class I've ever taken, taught by the best teacher I've ever had," says Jill Seebergh, National Academy of Engineering member and ChemE Ph.D. alumna from Berg's research program, "The principles of surface and colloid science that I learned in the classroom and applied in the laboratory prepared me beautifully for my first post-Ph.D. job at 3M, and then became the foundation for success in my long career in coatings research and development at Boeing."

Berg published the first edition of his textbook, *An Introduction to Interfaces and Colloids: The Bridge to Nanoscience*, in 2010. The second edition was released in 2024, and is now used by over 100 universities as the required textbook for their colloids courses.

Aside from his subject matter expertise, ChemE alumni routinely comment on the privilege it was to have been taught by John Berg because of his enthusiasm, encouragement, and his boundless capacity to champion for his students.

Mary Armstrong (ChemE B.S. '79) credits Berg for her consideration to apply for graduate school, and remembers how he was able to really bring chemical engineering to life.

"John's enthusiasm for chemical engineering courses was catching. He could explain complex principles in an understandable way and tie them to real-life applications. I was never afraid to ask a question in class or during his office hours, because of the way John responded. He had a very high standard for his courses and a very high teaching standard for himself."

Maintaining and continually upgrading the course has been a challenge, with an evolving repertoire of 20 experiments demanding a broad range of instrumentation and techniques. Berg's long-standing industry work and his commitment to nurturing relationships with industry and decades of alumni have helped to maintain ongoing funding for the operation of the Surface & Colloids Lab in Benson Hall.

Handing off a legacy

Now, after being a professor of chemical engineering at the UW longer than Benson Hall has existed, John Berg is preparing to retire from the full-time faculty role he has held for over six decades. Throughout that time, he has graduated 57 Ph.D. students and 55 master's students from his research lab.

He intends to continue teaching the surface and colloids lab and lecture in the spring of 2026, as a part-time professor.

Berg's contributions to the UW, to the Department of Chemical Engineering, and to the broader world of surface and colloid science and education have not gone unrecognized throughout his tenure. He received a Guggenheim Fellowship in 1974, and was invited to be a guest professor at the Federal Institute of Technology (ETH) in Zürich, Switzerland. In 1984, he was honored with the Alpha Chi Sigma Award for Chemical Engineering for his outstanding achievements in chemical engineering research.

A 50th anniversary event hosted at the UW in 2014 brought together five decades of ChemE alumni to celebrate Berg, and he was honored with the UW Distinguished Teaching Legacy Award in 2023. In June of last year, the American Chemical Society Surface and Colloid Science Symposium was dedicated to him.

"This has been a labor of love for me, and in the hope that the program will continue following my retirement, I have endowed a Teaching Assistant Professorship in Interfacial and Colloid Science in the Department of Chemical Engineering."

—John C Berg

Send John a message in honor of his retirement at
tinyurl.com/BergRetirement

Two ChemE alumni cite John Berg as inspiration for their continued support

Mary Armstrong (ChemE B.S. '79) and Jill Seebergh (ChemE Ph.D. '95) reflect on how Professor John Berg and their overall ChemE experiences inspired them to give back to the department.

"Because of John's encouragement and counsel, I applied and was accepted to the University of Rochester master's program in chemical engineering. The additional master's coursework and research project, along with the experience of living in a different region of the country, had a significant impact on my resume and my self-confidence.

Since that time, I have had a very exciting career, initially in the oil industry and then in aerospace. I have held engineering, operations and executive positions, and served as an elected official until 2024. John's mentorship played a huge role in my broad ranging career, teaching me to believe in myself, stretch my horizons and strive for excellence."

Armstrong wanted to help other students access the same life-changing experience she had as a result of choosing the ChemE path at the UW. In 2018 she started the Armstrong Scholarship in Chemical Engineering, to provide future undergraduate students the opportunity to achieve the same life-changing career success.

"In my five years as a graduate student in the Berg group, John was a great advisor. It's a time of my life that I really treasure—the students and the faculty, but also just the broader culture of the department. It was a really great experience and I felt very prepared to go out into the world and start my career.

When I moved back to Seattle, it was great to be able to reconnect with ChemE. I was able to get involved with some of the work that John was doing in his research group, got invited to support undergrad mentorship, and served on industry panels to share experience. I really wanted to help ensure that other students got to have the same very positive experience that I had."

Seebergh has been inspired to maintain a connection to ChemE. In addition to serving on the External Advisory Board, both Seebergh and her husband Matthew Hinck (also a ChemE alumnus) have given back to the department through annual giving.

Above: Jill Seebergh as a graduate student in Berg's lab.
Right: John Berg (left) wth Jill Seebergh during her visit for his 50th anniversary celebration in 2014.

2025 Leadership Seminar Series

Oct 5	**Amanda Montero**	(ChemE B.S. '18)	Chief of Staff & Product Quality, Intuitive Surgical
Oct 22	**Kovas Palunas**	(ChemE B.S. '16)	Software Developer, Google
Oct 29	**Lindsey Boles**	(ChemE B.S. '11)	Chief Product Officer, Zenopower
Nov 12	**Mark Friedl**	(ChemE B.S. '99)	Vice President, Wego Chemical Group
Nov 19	**Tae Han**	(ChemE B.S. '98)	Co-Founder, Profound Bio
Dec 3	**Janet Matsen**	(ChemE Ph.D. '16)	Data Scientist, Benchling

Early Career Award

Katie Weigandt (Ph.D. '12)
Instrument Scientist
National Institute of Standards and Technology (NIST) Center for Neutron Research

Chemical engineer Katie Weigandt is working to change and expand the way scientists study materials using techniques like small angle neutron scattering. Weigandt earned her Ph.D. in 2012, and was advised by Lilo Pozzo. Since graduating from UW she has worked at NIST, taking a permanent position in instrument science in 2015 after three years of working as a guest researcher.

She has led two research and development projects funded by NIST's internal Innovation and Measurement Science competition, which provides five years of funding to complete selected projects. Weigandt's first project implemented new instrument changes that enabled more complex structural characterization under more extreme conditions using SANS, advancing the ability to measure complex fluid at high shear rates. The second funded project, still ongoing, employs a new method of neutron measurement called neutron far-field interferometry, an imaging technique that also provides nanoscale structural data. This method gives researchers unprecedented insight into heterogeneous and hierarchical materials that are challenging for established neutron scattering measurements.

Moulton Distinguished Alumnus Award

Walker is an avid outdoorsman and fly fisherman, and balances his role at GentiBio with owning and operating Ross Lake Resort in the North Cascades.

Andy Walker (B.S. '96)
President and CEO
GentiBio

After graduating from the University of Washington, Walker went on to complete a Ph.D. in chemical engineering at the University of California, Berkeley in 2001. He started his industry career working as a technical staff member at a national laboratory, and has since held several senior leadership positions for various companies focused on biotherapeutic and cell therapy research, development and manufacturing. In 2020 Walker co-founded GentiBio, a company focused on developing regulatory T-cells optimized for use in the treatment and management of autoimmune diseases.

In reflecting on his time in ChemE, Walker expressed his appreciation of the camaraderie, passion and overall collaborative experience of being a student in Benson Hall with faculty that were so intent on providing impactful undergraduate education. Throughout his career, Walker has stayed involved with ChemE and currently serves as chair of the External Advisory Board, helping to identify and explore opportunities to build industry connections and advocate for the department and its programs.

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