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Undergrads capture gold medal in Paris
Dear Alumni and Friends,

They say that the only thing one can count on is change. That certainly seems true, but it doesn’t make it easy.

This year we have had significant changes in our beloved CBE family. In the last issue of Koffolt News, we remembered Professor Emeritus Harry Hershey, who died in February 2022. In June of 2022 we bid farewell to Professor Emeritus Bob Brodkey. And now, in October of this year, we part with our department namesake and dear friend William G. Lowrie. Each of these individuals left legacies that make us proud and help us to remember them for the enormous contributions they made to all of our lives.

Another change this year is that Professor Kurt Koelling, who had been with the department since 1993, decided to retire. While we will miss Kurt, we wish him well in his next chapter.

A warm, welcome wave has washed in against the receding tide, however. We are grateful that we’ve been able to bring six new faculty into the fold this year. Rebecca Harmon, Mandar Kathe, Blaise Kimmel, Margaret Liu, Joshua Sangoro and Davita Watkins all bring unique and special talents to the department. I hope you will get a chance to meet them at some point in the future.

We are also delighted to welcome Kimberly Ramsay as our new Program Assistant!

Alumni and students continually make us proud. We are happy that Elizabeth Biddinger ’10 PhD, Ivan Pires ’19 BS, Preshit Gawade ’12 PhD, ’11 MS, and Deeksha Jain ’19 PhD each received awards or professional recognition this year.

I want to say it again—Please let us know when you or your peers have special achievements to share! We do not always hear about them, and would like to celebrate with you. I love to hear from you.

In other news, alumni from the Class of 1967 enjoyed a reunion on campus this fall, as well. It was wonderful seeing everyone!

Recent faculty successes include Bhavik Bakshi being named an AIChE Fellow, and L.-S. Fan winning AIChE’s pinnacle education award, the Warren K. Lewis Award for Chemical Engineering Education. Professor Fan was also elected an ACS Fellow.

Katelyn Swindle-Reilly was named an Emerging Investigator by Biomaterials Science, and William Wang was selected for the DARPA Risers program, featuring him as a speaker in one of the six DARPA Forward conferences held nationally. Jessica Winter had a perspective piece published in Science magazine.

For the third year in a row, a team of Ohio State University undergraduate students earned a gold medal at the annual iGEM Giant Jamboree. Ryan Burrows and Elijah Lothrop traveled to Paris for the competition, which was held in late October.

Thanks to Melissa Carrier ’95 and undergraduate Anjali Tewari, the department hosted its first Women in Engineering Leadership Symposium, keynoted by AIChE President Christine Grant! Melissa Carrier started the Better Together Fund, which co-sponsored the event with the department, to grow initiatives that help create a greater sense of belonging, celebrating differences, and enriching the diversity of the CBE department.

In the graduate program, students Megan Allyn, Dishari Basu, JeeYee Chen, Anagha Hunoor, Anuj Joshi, Faiz Khan and Xilal Rima all received national recognition. This year’s Graduate Research Symposium was another success, with a keynote by Walmart International’s Senior Vice President/Chief Technology Officer Sravana Kumar Karnati ’94 PhD. Also, faculty members Barbara Wyslouzil, Nicholas Brunelli, Jeffrey Chalmers, and graduate students Faiz Khan and Xian Wu conducted some interesting research at the Argonne National Laboratory.

I hope you have a wonderful 2023. Come visit us!

With warmest regards,

Umit S. Ozkan
Department Chair
Distinguished University Professor
College of Engineering Distinguished Professor
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John Clay, Professor of Practice
Stuart Cooper, COE Distinguished Professor of Engineering
Paul Dubetz, Adjunct Assistant Professor
Ilham El-Monier, Associate Professor of Practice
L.-S. Fan, Distinguished University Prof. / C. John Easton Professor
Lisa Hall, Professor
Rebecca Harmon, Assistant Professor of Practice
W.S. Winston Ho, COE Distinguished Professor of Engineering
Mandar Kathe, Assistant Professor of Practice
Blaise Kimmel, Umit S. Ozkan Assistant Professor
Isamu Kusaka, Associate Professor
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Umit Ozkan, Distinguished University Professor, College of Engineering Distinguished Professor and Chair
Andre Palmer, College of Engineering Associate Dean for Research, Ohio Eminent Scholar and Professor
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It is a sad time for CBE as we must say goodbye to someone who has been integral to the life and future of the department.

William G. (Bill) Lowrie, for whom our department is named and who generously gave enormous amounts of his time, talent, and treasure to benefit his alma mater, passed away on October 8 at the age of 78.

Without Mr. Lowrie, we would not be able to celebrate the many department successes that have come as the result of the new facilities and programs that he established. He was a cornerstone of the department; a bedrock of guidance; and we will miss his warm-heartedness and the outstanding personal example he provided to all of the students, faculty, alumni, and staff of the department, and anyone who was lucky enough to know him.

It is a comfort that the Lowrie Legacy will endure. If only there were more people like him in the world, who could make so huge an impact and leave such a positive mark on everything they endeavored to do, as he did. We will never forget him.

A graduate of Riverside High School in Painesville, Ohio, Lowrie arrived at The Ohio State University in 1961 to study chemical engineering. Immediately after graduation in June 1966, he joined Standard Oil (renamed Amoco Corporation) as an engineer. While working in New Orleans in 1969, he met and subsequently married his wife and life partner, Ernestine (Ernie).

In 1979, Lowrie was transferred to Chicago and rose through levels of corporate management to become president of Amoco Corporation until 1998 when the company merged with British Petroleum. He then served as deputy CEO of BP Amoco in London until his retirement in 1999.

Bill and Ernie Lowrie have been Ohio State fans, donors and volunteers since his earliest days as an Ohio State alumnus. His record of university service was outstanding. He provided leadership on a variety of Ohio State committees and made generous financial contributions. He chaired the National Committee for New Koffolt Laboratories, served on the department of chemical engineering’s Industrial Advisory Board, the College of Engineering’s Dean’s Advisory Council, and the university’s Foundation Board of Directors, among other roles. His dedication to his alma mater was recognized with the College of Engineering’s Texnikoi Outstanding Alumnus Award, the
Distinguished Alumnus Award, the Benjamin G. Lamme Meritorious Achievement Medal and the Lifetime Achievement Award for Leadership. Lowrie is the only engineering alumnus to receive all four awards.

In 2005, the university recognized his years of dedicated service as chair and volunteer to the Foundation Board with the Everett D. Reese Medal. In 2008, Lowrie received the Alumni Medalist Award, the highest honor accorded by the Ohio State University Alumni Association. And in recognition of his exemplary involvement and personal investment in fundraising at Ohio State, Lowrie earned the university’s 2017 John B. Gerlach, Sr. Development Volunteer Award.

As the Lowries saw their gifts to Ohio State bear fruit, they considered how they might make further impact. In 2009, they made a transformative financial commitment to support the construction of the new and critically-needed Koffolt Laboratories, which became a joint project with Chemistry to create the Chemical and Biomolecular Engineering and Chemistry Building (CBEC). The funds from the Lowries’ gift, the largest gift made towards the construction of CBEC, also created the H.C. “Slip” Slider Professorship and other initiatives.

When he made the gift, Lowrie had said, “At this stage of my life, I find myself in a position where I can help and give back in a meaningful way. I wanted to move on it now, regardless of what is going on in the economy, so that I could see it happen and partially repay the university and the Department of Chemical Engineering for the huge impact they have had on my life and the lives of so many others.”

In a tribute to Joe Koffolt, one of several Ohio State chemical engineering professors whom Lowrie admired and emulated throughout his life and career, Lowrie insisted that the building itself retain the Koffolt name. In recognition of the gift, the Ohio State University Board of Trustees thus approved the naming of the department itself as the William G. Lowrie Department of Chemical and Biomolecular Engineering. This made the chemical engineering department one of only a handful of named departments in the country.

In 2019, a gift from the Lowries established a second professorship—this time in honor of Chemical and Biomolecular Engineering Professor and Chair Umit S. Ozkan.

These professorships have been transformative tools in aid of the department's critically-important faculty recruiting efforts.

Visit go.osu.edu/Lowrie to read the wonderful obituary which Bill's family wrote about him. The obituary shares interesting details about his life, career, hobbies, and values.
James A. Wolfe (‘66 BIE) wrote the following in 2013. Wolfe, a lifelong entrepreneur, founded and served as CEO of Wolfe Safety & Security in Columbus, OH. He passed away on August 20, 2018.

Over the years, I have been involved with Ohio State in various ways. My father-in-law Garvin Von Eschen started and was Chairman of the Astro and Aeronautical Engineering Department at Ohio State. My brother-in-law is Art Bolz, the son of the former Dean Bolz of Engineering at Ohio State.

In 1980, my company engineered and provided the fire alarm systems in all 26 dorms at Ohio State. At the time it was the largest Fire Alarm Project in the USA with 8000 smoke detectors.

I have some stories about Professor Slip Slider that speak to his likeability and concern for others.

I was 12 years old in 1955 when my parents purchased their first home for $12,000 at 368 Loveman Avenue in Colonial Hills, a subdivision in Worthington, Ohio. Slip Slider lived across the street from us. The Slider family found out that I was just old enough to make a perfect baby sitter for their children.

At that time, baby sitters were paid approximately 50 cents per hour. I never charged for the service by saying, “what ever you think”. By saying that, I got more than 50 cents per hour from the Sliders! I continued to baby sit for the Slider family until I graduated from Worthington High School. While baby-sitting over the years, I and my family became good friends of the Slider family.

The way Slip answered the phone always intrigued me. He was hard of hearing and wore an amplifier box with earplugs. When the phone rang he would pick up the receiver and place the phone next to the amplifier box located around his waist and sit back in his chair to relax while talking on the phone.

I once got a date for the Junior/Senior Prom and asked my father if I could use the family car. He said no. I then got the idea of asking if I could use Slip’s car. When I called Slip, he said, “Yes, that would be great and we will have the car cleaned for you. When I told my father, he got mad, then embarrassed, and then decided to let me use the family car. When I called Slip to cancel the use of his car, I think he had a little chuckle as if he knew what would happen.

When the Science Fair was planned at Worthington High School, I went to Slip and asked his thoughts about a possible project. He popped up and said he had a great idea. It was how to determine the total oil in a core sample. I agreed. Next thing I knew Slip brought home all the equipment from Ohio State to test the core samples he provided. He explained how to set up the equipment, how to perform the test, and how to make the calculations. The judges at the Science Fair wanted new ideas rather than an explanation of old sciences. While the judges had one opinion, the general public was extremely interested and wanted to see how the oil was extracted from the core sample. The demonstration was requested many times during the science fair. Most people thought oil was in big pools under ground and not in porous rock.

When Slip found out I was going into engineering at Ohio State, I spent hours listening to him explaining the benefits of getting a degree in Petroleum Engineering. Very few colleges, if any, offered Petroleum Engineering degrees. The classes were small, and the graduates were in great demand, high salaries, as well as quick advancement within an organization.

I explained to Slip that Chemistry was very difficult for me. Slip kept trying to sell me on Petroleum Engineering saying I could easily handle the chemistry. The sales pitches kept coming up until we had to declare our field of study in the second year of the 5-year Ohio State engineering program.

While having a successful career with my BIE degree, I have thought many times over the years about the opportunity that I missed by not taking Slip’s advice. If I could go back in time, I would have taken Slip’s advice and become a Petroleum Engineer. Although, maybe, my decision was correct because Bill Lowrie would not have liked the competition. :-) I am sure that Slip’s advice guided many of us through life. Slip was a great friend and is missed by all who knew him.
As an early career engineer, I've been endlessly surprised by my own ability to influence within my organization and the overall corporation.

- Shrey Mahajan

Shrey Mahajan (19 BS), Low Carbon Project Engineer at ExxonMobil Global Projects, Spring, TX.

Since graduating, I've worked for ExxonMobil's Global Projects organization – with a focus on planning, designing, and constructing Low Carbon facilities. For the last year, I've been working on plans to build a world-scale Blue Hydrogen plant in the Houston area. This plant would produce up to 1 billion standard cubic feet of hydrogen with CO\(_2\) byproduct sequestered into geologic storage. This blue hydrogen would then be used to decarbonize heavy industrial end-users, including our own ExxonMobil Baytown Olefins Plant (affectionately called “BOP”).

In 2018 I had interned at BOP, where I gained valuable insights into how a typical industrial plant operates while I worked to produce plastic precursors. In retrospect, I also learned about the numerous challenges that decarbonization efforts pose. When driving by BOP, it's impossible to miss the dozens of 10+ story tall furnaces that provide the heat duty to crack hydrocarbons into useful molecules. I've since realized that trying to decarbonize anything that large, that energy-intensive, is a real challenge. It requires detailed engineering, significant capital, and a low carbon energy source – such as hydrogen.

This facility, and others like it (oil refining, concrete, steel, and other industries come to mind) need to have a reasonable pathway to decarbonization. Low carbon technologies are expanding and while some are commercially-demonstrated, others are nascent. All, however, are on the cutting-edge of process engineering – and academia and industry are looking to quickly expand both scale and economy over the next decade. With legislation like the Inflation Reduction Act (IRA) enacted, this pace should only intensify.

It needs to be said that I completely understand those who might see these efforts as ‘greenwashing’. But I do believe that decarbonization of the world’s industrial facilities will require a diverse set of solutions. It'll take not just one technology but many—hydrogen, battery storage, renewables, nuclear, etc.—to be able to provide a diverse mix of low-carbon energy for society.

I've personally been impressed by the resources that are being put forward to address climate change within ExxonMobil and industry as a whole. As a (very) early career engineer, I've been endlessly surprised by my own ability to influence within my organization and the overall corporation. In fact, it’s the very reason I became a Chemical Engineer. I always believed my ability to make even a single difference on a process, product, or value chain could result in significant benefits to the broader world. In my current role, making even a 1% improvement translates into more societal benefit than I could ever hope to accomplish elsewhere (or in my personal life). A 1% change in process could be thousands or hundreds of thousands of tons of carbon reduction because the scale of things is so large.

In college, if you had asked me what I'd be doing post-graduation, I would have said “designing the next plastics plant or refinery.” And that's completely fine – we certainly need chemical, oil-based and energy products for our daily lives. But I can decisively say, I never imagined I would be working to address climate change to the scale of millions of tons of CO\(_2\) annually. I can also say – I wouldn't be where I am today without my Ohio State education. The basic science – thermodynamics, especially – is fundamental to my daily work. In fact, coworkers might often catch me carrying around my TI-84 calculator and a steam table. It's certainly not what I imagined when I initially chose my major!

At Ohio State, we learn the science and the fundamentals. But we also learn how to learn. And how to address problems with no single, easy solution. As the scale of energy transition projects starts to quicken, a similar approach is needed – an engineering approach. A practical approach.

Read more about ExxonMobile's low-carbon hydrogen project at: go.osu.edu/LowCarbon
Elizabeth J. Biddinger ('10 PhD, chemical engineering) was named a 2022 Energy & Fuels Rising Star in a special virtual issue of Energy & Fuels. Her paper "Modeling Competing Kinetics between Electrochemical Reduction of Furfural on Copper and Homogeneous Side Reactions in Acid" was included in the October 20, 2022 issue.

The Energy & Fuels Rising Stars program was established to recognize early- and mid-career researchers who have made a significant impact. Early and mid-career researchers make up a significant portion of the research workforce and play critical roles in driving knowledge discovery and technological advances in an increasingly globalized research landscape.

Dr. Biddinger, a former member of the Umit S. Ozkan Laboratory for Heterogeneous Catalysis and Electrocatalysis, is an associate professor of chemical engineering at The City College of New York and deputy director of the Center for Decarbonizing Chemical Manufacturing Using Sustainable Electrification.

Her research focuses on electrochemical reaction engineering for green chemistry and energy concerns, with expertise in catalysis, electrochemistry, alternative solvents, green chemistry and sustainable engineering. In particular, she is interested in the electrification of chemical processes that transform wastes or renewable resources into valuable materials, chemicals and fuels for decarbonization and sustainability; and the use of ionic liquids and alternative solvents in electrochemical systems for improved performance and safety.

Biddinger was also recently honored at the College of Engineering's 25th Annual Excellence in Engineering and Architecture Awards on September 30, 2022.

The celebration recognizes alumni from across the College of Engineering who have achieved distinction in their fields or through their extraordinary service contributions since graduating from The Ohio State University.

Professor Biddinger was one of five alumni to receive the college's 2022 Texnikoi Outstanding Alumni Award, which recognizes younger alumni for achievements since graduation that exemplify qualities such as leadership, integrity and community participation.

“We are proud to recognize these esteemed alumni whose impactful efforts to improve our world are an inspiration," said Dean Ayanna Howard, the Monte Ahuja Endowed Dean's Chair.

Previously, Biddinger won the 2018 US Department of Energy Early Career Award to study the kinetics and reaction mechanisms for biomass electroreduction and the 2016-2017 Electrochemical Society-Toyota Young Investigator Fellowship to study switchable electrolytes for battery safety.
Alumnus Ivan Susin Pires ('19 BS), now a doctoral student at the Massachusetts Institute of Technology (MIT), was awarded the prestigious National Cancer Institute's (NCI) Predoctoral to Postdoctoral Fellow Transition Award (F99/K00), which helps outstanding doctoral candidates finish their doctoral degree and find a good postdoctoral position. Only one candidate can be nominated per institution.

The NCI F99/K00 Fellowship provides PhD and other Research Doctoral candidates with two years of graduate school support for completing their dissertation research training (F99 phase), transitioning to four years of mentored, cancer-focused postdoctoral career development research positions (K00 phase).

The Fellowship should provide Pires with more flexibility in finding a postdoctoral position of interest in which he can expand his knowledge set.

At MIT, Pires is co-advised between Paula Hammond and Darrell Irvine. His current project at MIT seeks to design layer-by-layer nanoparticles, which are versatile drug targeting and delivery vehicles, for controlled delivery of immunotherapeutic agents for cancer treatment.

Pires is a former undergraduate member of the Andre Palmer research group, where he explored the efficacy of using apohemoglobin to protect against heme toxicity as part of Professor Palmer's research to develop hemoglobin-based oxygen carriers for applications in transfusion medicine. Pires had several significant achievements at Ohio State prior to commencing his graduate work at MIT. In 2020, his first-author research paper "Novel Manufacturing method for producing apohemoglobin and its biophysical properties" was featured on the cover of the journal Biotechnology and Bioengineering. The same paper won the 2021 Gaden Award, which recognizes exceptional papers published in the Biotechnology & Bioengineering journal in the past few years. The paper was Pires' second undergraduate first-author publication.

In 2018 Pires participated in the highly-competitive Future Leaders in Chemical Engineering Symposium at NC State, which invites the top ~15 undergraduate researchers in the United States for a 1.5 day, all-expenses paid research symposium. In notifying Ivan of his award, symposium chair Michael Dickey of the North Carolina State University department of chemical engineering stated that there had been an overwhelming number of outstanding applications and that being selected meant that Pires was among the "best-of-the-best."

At Ohio State, Pires also won a Pelotonia Research Fellowship; first prizes in the Denman Undergraduate Research Forum and COE Undergraduate Research Forum; and was one of two students to receive The Ohio State University Board of Trustees' Student Recognition Award.
Oil and Gas Investor magazine, published by Hart Energy, began its "Forty Under 40" recognition program a decade ago, but this is the first time that the Class of 2022 includes an Ohio State chemical engineering alumnus. The Forty Under 40 project showcases extreme talent in the oil and gas industry and has so far honored and celebrated hundreds of incredible trailblazers in the energy sector.

Preshit Gawade ('12 PhD / '11 MS ChE), executive director of new energies at Baker Hughes in Houston, was hand-picked out of hundreds of nominations across the industry to be included in the "40" project because of his initiative, intelligence, persistence and the influence he is having in changing the future and furthering the goals of his organization and the energy industry.

Gawade, a self-proclaimed engineer at heart, is a former member of the Umit S. Ozkan Laboratory for Heterogeneous Catalysis and Electrocatalysis, and spent the first half of his career as a scientist before pivoting to the oil and gas industry. A published author with more than 400 citations, he credits his time spent in the academic world to his versatile approach to working in the energy industry.

In a taped interview* with Hart Energy, Gawade discussed how he is working to build a purpose-driven energy organization, deploying resources to accelerate an industry path to new energy and decarbonization.

Choosing the oil & gas industry as a career focus

“For me, energy resonates with prosperity that defines quality of life,” he said in the interview. "Hence, after completing chemical engineering, the energy industry was a natural choice. I started my career in technology and failed numerous times before delivering a sound product. I tell people that I am an engineer at heart and in business by choice. In later years of my career, I pivoted to more business-oriented roles—corporate strategy, market intel, deals and investment, portfolio management and financial planning."

"Our industry is very dynamic and we are brought up to think that risk can be managed. But instead of just managing it, we need to start embracing it. We need to re-evaluate and take a data-driven approach to cancel out the noise from reality. We need to collaborate more, because I think it will not only drive the business, but also customer value and also investor value. During this journey I was able to interact with stakeholders from the scientific and investment communities as well as industrial partners, and that diversity helped me to connect the dots. That is really important when trying to transform a business, invest in growth, and position for tomorrow. Fostering more diversity not only
helps the business, but it takes the community forward and works hand in hand to contribute to innovation, balance the portfolio, and help with risk management. I always tell my team ‘Think like an entrepreneur from a strategy point of view, a portfolio point of view, so that you meet your short-term plans but are also aligned with your long-term strategy.'”

**Maintaining passion and motivation**

“I see a lot of activities being undertaken in the industry to adapt, prepare and pivot the business to more sustainable solutions and decarbonization. For me, having a front-row seat and being able to participate in this transition for the next 20 years is exciting.”

“I started my professional journey in academia as a scientist and became a published author. Later, I pivoted to industry due to my interest in applied engineering. And in the past several years, I have leveraged prior learnings to translate technology value to the customers and investors through strategic business planning and investment. This nonlinear journey gives me a 360-degree overview in the oil and gas sector and has helped me to transform core capabilities, invest in growth and position for tomorrow through business planning and investment.”

**The importance of mentors**

“Whatever I have become, the good and the bad, it’s because I’ve stood on the shoulders of giants. People who mentored me over the years offered opportunities along the way and offered valuable advice. Some of the memorable advice I received: family first; reputation is everything; and listen to your mentors, but eventually do what is right for you. I do believe there is a strong link between achieving enterprise goals and one’s professional journey.”

**What transformations do you think the industry must undertake for it to thrive in the future?**

“Oil and gas remains relevant and crucial in energy security and for building a resilient economy. The industry has been known to reinvent, understand and manage the market risk over the years. As this industry transforms, a lot of market forces will start competing, such as energy security, the cost of clean energy, the fluctuating price of commodities, and intensifying climate pressure policies. This complexity is likely to result in more uncertainty, demanding the industry recalibrate its risk tolerance, investment approach, and reevaluate the playbook and position ourselves into the frontier market so we can help the energy industry going forward.”

**Developing leadership abilities**

“I live by two leadership rules: be humble and be hungry. First, acknowledge that there are a lot of knowledgeable people inside and outside your industry, so be open to learn from them and pivot as you learn new things (or unlearn old ways).

Second, be hungry to achieve success, to deliver the results and learn new things. Follow the facts and the conviction, and take decisive action—even if sometimes it is an unpopular decision.”

**What advice would you give other young professionals in the industry?**

“First, embrace the uncertainty, be resilient and enjoy the ride. Second, look to learn from others, repurpose the learning and expand your comfort zone. Third, know the industry rules [and] follow them...just know when to break them when necessary.”

**Three Fun Facts:**

1. He played several league cricket matches during his school/college days until his early 30s.

2. He likes to brew. Applying his chemical engineering knowledge, he has prepared a few customized operating procedures for brewing beer—for the betterment of humanity, of course.

3. He is a “nerd at heart” who has watched the “Lord of the Rings,” “Game of Thrones” and “Harry Potter” series several times.

*Visit go.osu.edu/Gawade40 to watch the interview with Hart Energy.*
The Catalysis and Reaction Engineering Division highlighted Deeksha Jain as one of the speakers in its Pioneers of Catalysis and Reaction Engineering session at the American Institute of Chemical Engineers’ 2022 Annual AIChE Meeting in Phoenix, AZ on November 15, 2022.

Dr. Jain’s topic was “Catalyst Development for Sustainable Technologies: From Fundamentals to Commercialization.”

Jain received her PhD in 2019 in the department of Chemical and Biomolecular Engineering as a member of the Umit S. Ozkan Laboratory for Heterogeneous Catalysis and Electrocatalysis. She earned a Bachelor’s in Chemical Engineering degree from Institute Of Chemical Technology (Mumbai, India) in 2014.

She has made outstanding contributions in building a fundamental understanding of the behavior of heteroatom-doped carbon-based materials and advancing their applications in electrochemistry and electrocatalysis.

Jain is now a Senior Research Specialist working in heterogeneous catalysis at The Dow Chemical Company in Freeport, TX and is involved in the discovery, development and scale-up of catalysts for Dow’s ethylene oxide technology.

Presently, she continues her service to the Catalysis and Reaction Engineering Division as a liaison for the Young Professionals Committee.

"Deeksha Jain’s impressive scientific record and her dedication to progressive initiatives within the division distinguish her as a thought leader and rising star in our community," said Randall Meyer, Chair of the AIChE Catalysis and Reaction Engineering Division.

During her time as a PhD student at Ohio State, Deeksha served the Catalysis and Reaction Engineering Division as a student representative on their board, providing the crucial perspective of a graduate student on division initiatives. She was also a member of the organizing team for the CBE department’s annual Graduate Research Symposium (2016-18), a Business Officer for the Chemical Engineering Graduate Council (2017-18), and a Laboratory Safety Officer and member of the Chemical Hygiene Committee (2016-19).

As a CBE grad student she earned a 2017 AIChE Catalysis and Reaction Engineering Travel Award, a 2018 Best Poster Award at Ohio State Materials Week (left), and a 2019 Hayes Graduate Research Forum Poster Award (second place). Her group also won several department and university safety awards.
The **Class of 1967** returned to campus on Friday, September 16 for their 55th reunion. Alumni enjoyed a tour of Koffolt Laboratories, marveling at how much the department has grown in recent years, and also visited old Koffolt, which is now Fontana and houses Biomedical Engineering.

The group also visited students in Unit Ops and had lunch with faculty. In the afternoon, they attended the Brodkey Memorial, which was held in the CBEC auditorium/lobby.

The day was capped off by a dinner at Muirfield Country Club, where the group was joined by Department Chair Umit Ozkan and alumni/development officers Sean Gallagher and Christina Patel. The following day, several alumni joined Dr. Ozkan and Sean for the game.

Attendees, most with spouses, included Jack Baker, John Dorsey, Keith Dunnigan, John Guy, Bill Hauschildt, Dennis Hurley, Graham Painter, Keith Robinson, Tony Santavicca and John Wood.
Becoming an effective problem solver is fundamental to any engineering degree. For alumna Melissa Carrier ’95, it’s the most valuable lesson she gained during her time as a chemical engineering student at The Ohio State University.

Today, Carrier develops innovation programs for college students and faculty, utilizing her engineering skills every day.

“I gained the confidence to ask insightful questions when I don’t understand something and to be able to connect the dots across different systems that I’m asked to think about in my work, which has been a powerful skill,” said Carrier, who is director of social innovation at the University of North Carolina at Chapel Hill. She’s also a professor of practice of public policy and co-founder of Radiate Works, a boutique consultancy that helps companies realize their impact potential through self-study and creative design.

“While I don’t work in any of the industries that we typically train chemical engineers to go into, my engineering mindset and approach is fundamental to everything I do,” she said.

That perspective and drive to solve complex problems motivated Carrier to establish the Better Together Fund, which supports diversity, equity and inclusion efforts within the William G. Lowrie Department of Chemical and Biomolecular Engineering (CBE). She was inspired by a conversation with her best friend’s daughter, who recently graduated with an engineering degree from another institution.

“She told me there still weren’t enough people that looked like her in the classroom. And that got me thinking about what I wanted to do with this philanthropic gift,” Carrier said. “I thought, if my children and my friends’ children are still having to fight for seats at the table, or still having to have conversations on what it means to be a woman or a person of color in engineering, we have not done enough yet.”

The goal of the Better Together Fund is to pilot and grow initiatives that help create a greater sense of belonging, honoring and celebrating differences, and enriching the diversity of the entire CBE department. The funds can be used to support student workers, events, programming and conference speakers, and other efforts that support diversity initiatives.

“Better Together is about everybody being able to see themselves in that particular field of work. As a young person, I always looked for and admired others that looked like me doing the work I wanted to do,” said Carrier, who remembers feeling emboldened in high school when she finally had a female physics teacher. “If we want to solve problems with more effective solutions, we’re going to have to bring more diverse views to the table and have those conversations,” she said.
Carrier’s vision is already coming to fruition. The fund sponsored the inaugural Women in Engineering Leadership Symposium on November 2-3 at Ohio State. Hosted by the CBE department, the student-led symposium featured information about graduate school for undergraduates and networking, small group discussions facilitated by Buckeye Engineering Women in Executive Leadership (BEWEL) members, wellness resources for students and postdocs, and a keynote address by North Carolina State University Professor Christine Grant, president of the American Institute of Chemical Engineers.

The event’s lead organizer was Anjali Tewari, a fifth-year chemical engineering student who is no stranger to community organizing. Anjali spearheaded the planning of the event along with her advisor, Professor Jessica Winter, Tewari promoted the Better Together Fund as a member of Ohio State’s 2022 Homecoming Court, to which she had recently been nominated. Each court member was asked to select a philanthropic cause to support and raise awareness.

“I am passionate about facilitating safe space discussions for my peers and encouraging them to connect with resources that would help advance their advocacy and professional development skills,” said Tewari. “As this is the first year that we are using the Better Together Fund to drive women empowerment initiatives at such a large scale, I can only see opportunities to move forward. Melissa’s contributions have allowed us to plan well and take care of our guests in addition to facilitating a safe space and learning environment for students, staff and faculty.”

For Carrier, seeing her gift turn into something tangible so quickly is thrilling, and she views it as just the beginning, with hopes that other donors are inspired to contribute.

“My gift is seed capital to kickstart a movement that gets people excited about what's possible when we intentionally fund our collective community,” she said. “The Better Together Fund starts with events and conversation, and can move forward to creating spaces for career exploration for students, for solving problems through innovative curriculum—there are so many interesting places a fund like this can go with student and alumni engagement.”

“The reason we wanted to name it ‘Better Together’ was to recognize that this is about everyone in our CBE community finding their place,” she continued.

“Let's celebrate the unique contributions and lived experiences that we each bring to the field of chemical engineering, and know that when we're at the table together, we have the power to make really good work happen,” she said.

To make a gift to the Better Together Fund, please visit go.osu.edu/BetTog

-By Meggie Biss, College of Engineering Communications
### 1930s

Charles E. Graham, ’35 BS, of Camp Hill, PA, passed away on December 21, 1993.

### 1940s

Fred Applegath, ’47 MS, of Conroe, TX, passed away on July 2, 2019.
Dr. Fred O. Barrett, ’40 MS, ’42 PhD, of Cincinnati, OH, died on April 21, 2018.
Dr. Lloyd T. Bunn, ’49 MS, ’51 PhD, of Bosdoinham, ME, died on October 28, 1997.
Frank F. Felkner, ’41 BS, of Green Valley, AZ, died on August 15, 2015.
William K. Fell, ’47 BS, ’48 MS, of Amherst, VA, died on December 10, 2018.
Marvi Garrett, ’43 BS, of Manhattan Beach, CA, passed away on March 22, 2011.
Hanford L. Gunnerson, ’48 BS, ’48 MS, of Akron, OH, died on July 18, 2021.
Daniel Hyman, ’48 MS, of Cos Cob, CT, died on November 11, 2016.
Keith S. Jacobs, ’47 BS, of Columbus, OH, passed away on December 1, 2017.
Henry B. Lange, ’48 BS, of St. Augustine, FL, died on September 1, 2021.
Dr. Bryce H. McMullen, ’47 MS, ’49 PhD, of Perrysburg, OH, died on July 13, 2015.
Donald E. Morgan, ’43 BS, of Amarillo, TX, died on January 9, 2020.
Robert M. Rownd, ’47 BS, of Montgomery, TX, passed away on December 26, 2021.
Roy E. Schneider, ’43 BS, ’47 MS, of Ravensdale, WA, died on April 4, 2012.
Maxwell P. Sweeney, ’47 MS, of Dunn, NC, died on March 20, 2005.
Lloyd D. Treleaven, ’46 BS, of Medina, OH, passed away on December 12, 2008.

### 1950s

Jerry R. Baker, ’52 BS, of Morris, IL, died on October 19, 1993.
Allen L. Barnes, ’55 BS-Petroleum Engineering, of McKinney, TX, died on June 9, 2021.
William J. Berk, ’50 MS, of Rochester, NY, died on September 27, 2001.
Mahendra N. Bhatt, ’55 BS, of Lake Forest, CA, died on February 28, 2018.
Jack W. Bodenheimer, ’55 BS, of Spring, TX, died on May 27, 2017.
Medro J. Brodeur, ’52 BS, of Lexington, SC, died on June 14, 2021.
Myron A. Chernin, ’51 BS, ’51 MS, of Cleveland, OH, passed away on May 16, 2019.
Howard A. Cox, ’55 BS, of Huntsville, AL, died on December 19, 2021.
Dr. Walter E. Donham, ’50 BS, ’50 MS, ’53 PhD, of Colorado Springs, CO, passed away on September 22, 2019.
Benjamin Entwisle, ’51 BS, of Lockport, IL, died on May 10, 2014.
Thomas A. Ferris, ’58 BS, of Beavercreek, OH, died on July 7, 2014.
William J. Garmus, ’51 BS, ’51 MS, of Galena, MD, passed away on December 19, 2021.
David H. Gartner, ’54 BS, of Beaumont, TX, died on November 6, 2019.
John S. Gordon, ’56 MS, of Vienna, VA, died on May 21, 2013.
James A. Gough, ’52 BS, of Honolulu, HI, died on October 24, 2021.
Galen A. Grimma, ’57 MS, of Houston, TX, died on April 19, 2012.
C. R. Heil, ’52 BS, of Miamisburg, OH, died on September 28, 2021.
Stanley P. Huchro, ’55 MS, of Queensbury, NY, died on September 21, 2022.
Peter K. Huester, ’57 MS, of Pinehurst, NC, died on March 30, 2017.
In memoriam

Notifications received as of November 18, 2022.

1960s

Paul R. Bigley, '61 BS, of The Villages, FL, died on March 5, 2022.
Dr. Ralph S. Cunningham, '64 MS, '66 PhD, of Houston, TX, died on November 7, 2020.
F. K. Hall, '60 BS-Petroleum Engineering, of Mayville, MI, died on December 27, 2020.
Milton J. Kenworthy, '60 MS, of Willis, VA, died on May 2, 2015.
William G. Lowrie, '66 BS, of Columbus, OH, died on October 8, 2022.
Dennis C. McAdams, '64 BS, of Georgetown, TX, died on November 23, 2019.
Phillip J. McAteer, '60 MS, of Cicero, IN, died on August 1, 2022.
Kenneth D. Negley, '61 BS, of Nitro, WV, passed away on December 10, 2021.
Dean Snider, '62 BS, '62 MS, of La Porte, TX, died on June 19, 2022.
Edward A. Vajnar, '64 BS, of Slidell, LA, died on January 7, 2021.
Suey T. Yee, '61 MS, of Alexandria, VA, died on January 1, 2015.

1970s

Bruce A. Scamoffa, '73 BS, of Milmay, NJ, died on October 22, 2021.

1980s

Gregory K. Johnson, '86 MS, of Russell, KY, died on February 1, 2022.
Timothy H. Robison, '83 BS, of Dublin, OH, died on December 10, 2021.

2000s

Dr. Patrick M. Bennett, '05 BS, '09 MS, '13 PhD, of Dublin, OH, passed away on July 23, 2022.
Tad E. Grubbs, '09 BS, of Granville, OH, died on February 18, 2021.
Jacob G. Lewandowski, '17 BS, of Woodville, OH, died on September 18, 2021.
Daniel R. Lundy, '08 BS, '11 MS, of Lewis Center, OH, passed away on December 11, 2021.

PAUL BIGLEY

Paul Bigley '61 was grateful for many things in his life, such as his Ohio State education and the support he received as a student. “Joe Koffolt is a champion to me,” Bigley once said of the former chemical engineering department chair. “He was on my side all the way.”

Even more than his education, Bigley felt that the greatest gift Ohio State gave him was the health of his daughter, Terri (pictured below), a cancer survivor who was treated at Ohio State. Terri’s care so impressed Bigley that he made several generous donations to Ohio State, including funds to support the work of Professor Jessica Winter, who is working to develop new diagnostics and therapies for one of the deadliest cancers—gliomas.
Professor Emeritus Robert S. Brodkey (1928-2022), who first joined the William G. Lowrie Department of Chemical and Biomolecular Engineering in 1957, passed away on June 18, 2022 at the age of 93.

Revered by his colleagues, he was seen to be exceptionally competent, fair, enthusiastic; possessing high character and a uniquely congenial and positive demeanor that brought a smile to the face of anyone with whom he interacted. An unforgettable character, brilliant scientist, and devoted teacher, his love of art and sense of humor added to his already-colorful personality.

This is truly the end of an era for Koffolt Laboratories. Bob Brodkey was the last faculty member to personally know and work for Joe Koffolt, who had been chair during Bob’s early career. Professor Brodkey had an office in three buildings used by Chemical Engineering: McPherson, the first Koffolt Laboratories building, and the current building. He was present at the 1959 groundbreaking for the first Koffolt Laboratories, as well as the 2012 groundbreaking for the current building.

"He left his mark on our profession indelibly, but he also touched the lives of many of us in a very profound way," said Department Chair Umit S. Ozkan, who has known Professor Brodkey throughout her career at Ohio State. "He will never be forgotten."

Former students also remember him fondly, admiring his humor, wisdom and spirit for his craft. They also enjoyed his down-to-earth, passionate, warm and friendly nature. "He enriched the lives of so many of us ChemE's," one alumna wrote. Brodkey was not only endearing and entertaining, he was very effective and thorough. "Once you got through his class, you were a chemical engineer," an alumnus stated.

Professor Brodkey taught momentum transfer to thousands of undergraduate students, and fluid mechanics to hundreds of graduate students. He served as advisor to nearly 45 Ph.D. students and over 40 M.S. students. In 2014, the first graduate-level scholarship ever created in the department was established in his honor.

"Dr. Brodkey was one of the people who made the Ohio State Chem E Dept seem like you were attending a small private school rather than a large public university," wrote Stephen Grant, ’76 BS. "He knew and greeted the students, both graduate and undergraduate. He was a giant in the profession."

Born in 1928, Professor Brodkey obtained an associate of arts degree in chemistry from San...
Francisco City College in 1948 and graduated with highest honors from the University of California-Berkeley in 1950 with a BS/MS degree in chemical engineering. He earned his doctorate in chemical engineering (Gulf Oil fellow) from the University of Wisconsin in 1952.

In his early career, Dr. Brodkey was a research chemical engineer at E.I. Du Pont de Nemours and at Esso Research and Standard Oil.

He joined Ohio State Chemical Engineering in 1957, became an associate professor in 1960, a full professor in 1964, and professor emeritus in 1992, remaining active with the department ever after.

In 2014, he and long-time colleague Jack Zakin (1927-2018) became inaugural members of The Ohio State University’s Emeritus Academy, which represents just three percent of emeritus professors at Ohio State. Jack and Bob were special friends, whose typical greetings consisted of "Jackie Baby!" and "Bobby Baby!"

Research

Professor Brodkey’s research focused on thermodynamics, a branch of physics that studies how heat changes to and from other energy forms and which applies to many areas of everyday life, from the heating and cooling systems in our homes, to engines that power motor vehicles. He was a giant in the profession, particularly in the specialized areas of fluid mechanics/fundamental turbulent fluid flow, mixing, rheology, and two-phase flow.

He is best known for his work in the field of coherent structures in turbulent shear flows. His early work on flow visualization (1969, with Edward R. Corino (‘65 PhD, ‘61 MS) is a classic paper. Few contemporary papers on turbulence research fail to cite this landmark contribution on coherent structures, and the descriptive notation now commonly used when referencing turbulence (ejections, sweeps, etc.) was developed by him. The work emphasized visual techniques and developed ingenious multi-dimensional visualization methods, providing one of the first insights into the structure of turbulence that added much to understanding the structure of turbulence and the connection to events of the flow. Dr. Brodkey and his co-workers also introduced the method of quadrant splitting of turbulence signals, which became a major means of analysis for the study of turbulence.

His research extended to studies of turbulent motion, mixing, kinetics and reactor design where he measured turbulence and mixing in the same flow field and demonstrated that mixing could be predicted from the turbulence.

Works

Dr. Brodkey obtained ten patents and is the author of 138 research papers and several books, including the longstanding graduate text, The Phenomena of Fluid Motions (1967). The undergraduate text, Transport Phenomena: A Unified Approach, with Dr. Harry C. Hershey, was published in 1988 by McGraw-Hill as part of their prestigious Chemical Engineering Series.

Honors

He was a fellow of the American Association for the Advancement of Science, the American Institute of Chemical Engineers, the American Physical Society, the American Institute of Chemists, the American Academy of Mechanics; and a member of the American Chemical Society, Society of Engineering Science, Society of Rheology, Sigma Xi, Phi Lambda Upsilon, Alpha Gamma Sigma, and Phi Beta Delta.

He was a Senior NATO Fellow (1972), an Alexander Humboldt Senior US Scientist (1975) and a Visiting Professor of the Japanese Society for the Promotion of Science (1978) and received the Senior Research Award and the Chemical Engineering Lectureship Award from the American Society of Engineering Education (1985, 1986). In 1994 he held the W.W. Clyde Chair of Engineering at the University of Utah and received the 1994 North American Mixing Forum’s award for Outstanding Research.

At the November 2022 AIChE Annual Meeting, members of the professional community joined Ohio State in honoring Dr. Brodkey with two special plenary sessions. The sessions included sixteen invited talks on Turbulence and Mixing.
REBECCA HARMON
Assistant Professor of Practice
Harmon joined CBE on October 1, 2022. She was a Data Science Fellow at Northwestern University and obtained a joint doctorate in the Department of Chemical and Biological Engineering at Northwestern University and the Van ’t Hoff Institute for Molecular Sciences (Amsterdam). Her PhD advisor at Northwestern was CBE alumna Linda Broadbelt (’89 BS), currently the Rebecca Roland Professor at Northwestern.

JOSHUA SANGORO
Professor
Sangoro was previously an associate professor and associate department head in the University of Tennessee-Knoxville’s chemical engineering department who began his CBE appointment as a tenured professor and associate chair on August 15, 2022. His research in “the areas of energy and sustainability, ionic liquids, and deep eutectic solvents has been supported by the National Science Foundation, the Department of Energy, and the Army Research Office. He received his PhD in experimental physics in 2010 from the University of Leipzig (Germany).

X. MARGARET LIU
Professor
On June 1, 2022, Liu joined CBE as a tenured professor and is now also affiliated with Ohio State’s Comprehensive Cancer Center. Formerly an associate professor in biomedical engineering at The University of Alabama at Birmingham, her research focuses on developing, producing and evaluating new targeted anti-cancer therapies. These projects have been supported by NIH and DOD grants and have led to three patents and a licensing agreement. She earned a PhD in chemical engineering at The Ohio State University in 2005.

BLAISE KIMMEL
Assistant Professor
Kimmel will join CBE on January 1, 2024. He is currently a PhRMA Foundation Postdoctoral Research Fellow in Drug Delivery at Vanderbilt University’s Department of Chemical and Biomolecular Engineering. He obtained chemical engineering degrees from Northwestern University (’21 PhD) and Ohio State (’17 BS). Upon joining CBE, he will also be affiliated with Ohio State’s Comprehensive Cancer Center.

MANDAR KATHE
Assistant Professor of Practice
Previously an assistant professor of chemical engineering at Tuskegee University, Kathe assumed the position of assistant professor of practice in CBE in August 2022. He received both his master’s degree and his 2016 PhD in chemical engineering from The Ohio State University. He also earned a master’s degree in data science from the University of British Columbia’s Computer Science Department in 2021.

DAVITA WATKINS
Associate Professor
Watkins began a joint appointment with CBE and the Department of Chemistry and Biochemistry on August 15, 2022. Her research focuses on establishing design guidelines towards novel functional materials with tunable properties through molecular self-assembly. The nanomaterials produced in her laboratory are designed for use in applications ranging from therapeutics to electronic devices. Previously, she was an associate professor at the University of Mississippi. She obtained a PhD in chemistry in 2012 from the University of Memphis.
Faculty awards and honors

Richard M. Morrow Professor  BHAVIK BAKSHI

Bakshi's research and leadership skills were recognized by the American Institute of Chemical Engineers (AIChE), which named him a Fellow, the highest grade of membership in AIChE. As a Fellow, he will be an important resource in providing experience-based guidance to members and other leaders.

C. John Easton Professor  LIANG-SHIH FAN

Renowned for his research, Distinguished University Professor L.-S. Fan has also been recognized as an educator, earning the American Institute of Chemical Engineers' (AIChE) highest ChemE education award: the Warren K. Lewis Award for Chemical Engineering Education. He was also named an American Chemical Society Fellow.

Assistant Professor  KATELYN SWINDLE-REILLY

Katelyn Swindle-Reilly, assistant professor in the departments of chemical engineering and biomedical engineering, was named Emerging Investigator by the journal Biomaterials Science. Her interdisciplinary work exploring new protein therapeutics and their delivery via polydopamine nanoparticles appeared in the November 28, 2022 issue.

Assistant Professor  WILLIAM XIAOGUANG WANG

The Defense Advanced Research Projects Agency (DARPA) partnered with Ohio State, one of six universities nationwide, to host the DARPA Forward research conference on campus. One of the researchers who presented was William Wang. Wang was selected for the DARPA Risers Program, which focuses on up-and-coming researchers whose work is related to national security and demonstrates the potential to lead to technological breakthroughs. Risers Program researchers present their ideas directly to DARPA.

COE Distinguished Professor  JESSICA WINTER

The July 21, 2022 issue of Science Magazine features a perspective by Jessica Winter on high-throughput screening approach to improve cancer nanomedicine.
In college, **Katelyn Swindle-Reilly** planned to use her engineering skills to save the environment. But as she furthered her education and began her professional career, she uncovered a passion for curing diseases and improving the lives of patients.

Since joining Ohio State in 2016, Swindle-Reilly’s research has focused on designing polymeric biomaterials for soft tissue repair and drug delivery with focused applications in ophthalmology and wound healing.

Ultimately, she hopes to develop new treatments to help patients struggling with vision loss.

“The ocular drug delivery space is a small, untapped field,” explained Swindle-Reilly, who is an assistant professor of biomedical and chemical engineering. “There are not many people focusing in that area, but I see a lot of challenging problems that could use the help of scientists and engineers.”

One of those problems—age-related macular degeneration (AMD)—is the third leading cause of blindness and currently has no cure.

Damaging the retina and the back of the eye, AMD can cause permanent vision loss and inhibit reading, driving and other daily activities. One available treatment that helps patients with AMD maintain vision requires an expensive intravitreal injection directly into the eye up to 12 times per year. After learning about the burden these injections cause for patients from Ohio State ophthalmologist Dr. Matthew Ohr, Swindle-Reilly developed a tiny extended-release capsule that, while still injected into the eye, has the potential to reduce the frequency of injections to once or twice a year.

“The research in my lab has shown that we can fine-tune our extended-release capsule to sustain drug release for at least six months to over one year,” she explained. “The ultimate goal is for people like my parents to see first steps of grandchildren, read a favorite book, do crossword puzzles or play a round of golf. This technology can improve their quality of life and help them live a fuller life in later years. My hope is that these drug delivery devices will also be able to be used for the other form of AMD and retinopathies, which currently have no cure.”

Her technology has been licensed by Vitranu, a startup focused on applying it to AMD treatments. Swindle-Reilly is chief technology officer for the company, which aims to begin clinical trials at the end of 2024, with expected FDA approval in 2027. Currently, the Vitranu team is working on manufacturing and conducting preclinical studies of the extended-release capsule.

“None of this would have happened had I not been at Ohio State,” she explained. “My research has evolved because of the collaborators I have here and conversations with clinicians in ophthalmology, but also colleagues in optometry, veterinary medicine and other science and engineering disciplines.”
In 2022, Swindle-Reilly was named The Ohio State University’s Early Career Innovator of the Year in recognition of her achievements in promoting university intellectual property. She also received the College of Engineering’s Innovators Award and is one of three Ohio State faculty members featured in a video series presenting innovative discoveries from Ohio’s university entrepreneurs.

Many of Swindle-Reilly’s other research projects also focus on using polymeric biomaterials to treat eye diseases. She is developing an antioxidant-filled substitute for the vitreous humor—the clear gel that fills the inside of the eye and liquifies as people age—to prevent cataracts in the 95% of patients who develop one after having vitrectomies to treat problems with the retina or vitreous.

She’s also creating new therapeutic approaches to mitigate oxidative damage and inflammation caused by aging and eye injuries, and to treat optic neuropathy.

Swindle-Reilly found the support needed to commercialize her discoveries early in her career thanks to the university’s REACH for Commercialization program, which helps guide Ohio State innovators through the process. She now has five U.S. patents and 18 U.S. patent applications, with associated worldwide patents and applications.

“I was looking at it as something I would do after tenure—many years down the line,” said Swindle-Reilly, who participated in the program in 2017. “But then I realized I have a lot of ideas right now. They told me how to submit invention disclosures and then it just took off from there.”

She is also driven to ensure students consider entrepreneurship as a possibility—something she wasn’t exposed to until after launching her career.

Infusing her classes with entrepreneurial-minded learning concepts, she mentors the student researchers working in her lab in the patent application and intellectual property process. As a guest lecturer in a biomedical engineering professional development course, Swindle-Reilly leads students through the R&D process from initial idea through FDA approval. This summer she is also mentoring two undergraduate researchers as part of the Summer Experience for Entrepreneurial Development (SEED) program.

“I never thought I would have a patent or invent things,” Swindle-Reilly said. “It’s really important to teach these skills and serve as a role model to show that there are other routes beyond the traditional one. Even if someone does go work for a well-established company, it's good to know some of these entrepreneurial skills. Creativity and innovation are being rewarded more than they used to be.”

Swindle-Reilly obtained major funding with a two-year, $403,763 R21 NIH grant titled “Lens Epithelial Cell Response to Biomaterial Interfaces” for which she is serving as co-PI. The overall objective of this project is to mitigate a common complication following cataract surgery by determining how substrate viscoelasticity and curvature impact lens epithelial cells' behavior and epithelial-to-mesenchymal transition by using copolymers and hydrogels that mimic implants and the native lens microenvironment, respectively.

She was also recently one of three engineering faculty who earned pilot grants from The Ohio State University Center for Medical and Engineering Innovation (CMEI) for interdisciplinary research projects. The $25,000 pilot grants support collaborations between Ohio State researchers that initiate promising ventures at the medicine-engineering interface. The objective is to obtain preliminary data that will result in a collaborative federal grant application or lead to an entrepreneurial endpoint such as a patent.

Professor Swindle-Reilly and Optometry Associate Professor Timothy Plageman will use ocular hydrogels, cell culture and tissue engineering methods to generate novel eye lens-like organoids. This work will provide a new pathway to develop an alternative and animal-free model system for ocular lens research and a platform for studying lens-directed therapeutics.

-by Candi Clevenger, College of Engineering Communications
The research of doctoral student Megan Allyn, performed under the guidance of her advisors Katelyn Swindle-Reilly and Ohio Eminent Scholar and Professor Andre Palmer, was recognized by the journal Biomaterials Science, which named Professor Swindle-Reilly a Biomaterials Science Emerging Investigator. Allyn was also recognized in June 2022 for winning First Place, 42nd Annual Ophthalmology Research Symposium sponsored by The Ohio State University Havener Eye Institute. In 2021 she won the Prevent Blindness Research Fellowship from the Ohio Affiliate of Prevent Blindness.

Anagha Hunoor (Umit Ozkan Group) was selected for the North American Catalysis Society 2022 Kokes Travel Award, given every two years. Her paper was titled “On the dual role of the reactant during aqueous phase hydrodechlorination of trichloroethylene (HDC of TCE) using Pd supported on swellable organically modified silica (SOMS).”

In November, Anuj Joshi (L.-S. Fan Group) received the Best Student Poster Research Award in Particle Science and Technology at the 2022 AIChE Annual Meeting in Phoenix. His paper was titled “Exploring LaFeO3 oxygen Carriers for Reactivity Enhancement through Structural Changes in Chemical Looping Partial Oxidation System.”

Faiz Khan (Jessica Winter Group) won 2nd Place, Graduate Student Poster Competition, Nanoscale Engineering & Science Forum for his poster "Controlled nanoparticles synthesis using microreactor mixing and residence time distribution."

Ashin Sunny (L.-S. Fan Group) received the Phi Kappa Phi Love of Learning award. The award is for members of Phi Kappa Phi, the most selective honor society for all academic disciplines.

Xilal Rima (Eduardo Reátegui Group) was chosen to participate in NextProf Nexus, a nationwide effort to strengthen and diversify future academic leaders in engineering.

He also received a scholarship to attend the October 2022 National Diversity in STEM Conference.
All gone to Argonne

Last July, faculty members Barbara Wyslouzil, Jeffrey Chalmers, and graduate student Xian Wu from the Chalmers Lab visited the Argonne National Laboratory in Lemont, IL to better understand how 5 - 15 nm nanoparticles respond in the presence of a magnetic field gradient. They conducted Small Angle X-ray Scattering (SAXS) experiments because these give much better insight into whether particles are agglomerating, or forming structures or not, or if they remain as isolated entities.

The experiments gave Chalmers and Wu (pictured left) quantitative concentration measurements not possible with visual observations made in the Ohio State laboratories, using the computers at Argonne to control the X-ray beam, collect the data, and do some of the analysis. They used the 12-ID-B beam line at Argonne’s Advanced Photon Source facility, working with beamline scientist Soenke Seifert.

Xian Wu reports, "We investigated the magnetic separation of 5, 15 and 30nm superparamagnetic iron oxide nanoparticles (SPIONs) by applying external magnetic fields and gradients (provided by quadrupole magnetic sorters, QMS, and Cell Tracking Velocimetry, CTV magnet). Our preliminary results show that there’s concentration gradient of particle suspensions after applying magnetic field. The image recording setup at Ohio State is not good enough for accurate analysis.

"In order to better understand the separation mechanism, we used Small Angle X-ray Scattering using 12-ID-B beamline at Advanced Photon Source at Argonne National Laboratory. SAXS is to examined the possible aggregation behavior of SPIONs in solution. X-rays can provide the correct wavelength radiation to probe the structure of the nanoparticle clusters.

"We conducted in-situ SAXS experiments by placing the SPIONs within the magnet separators in the beamline for different lengths of time. 9 position resolved measurements were made. Below is the SAXS patterns of 30nm SPIONs exposed to CTV magnet for 30mins. 3D crystalline superstructure of magnetic particles was formed, indicating the self-assembly behavior."

In early November, Wyslouzil made another journey to the same beam line with Nicholas Brunelli (left) and graduate student Faiz Khan (center left; right).
Alumni, students, faculty, and staff gathered on Friday, September 23 for the 11th Annual Graduate Research Symposium, sponsored by The Dow Chemical Company. Nine alumni industry representatives from Carmen Ventures, LyondellBasell, Dow, Kenexis, and Procter & Gamble participated in the in-person event at The Ohio State University Faculty Club.

Keynote speaker Sravana Kumar Karnati ('94 PhD), who gave his address virtually due to illness, discussed his career path and how chemical engineers can follow multiple pathways.

Karnati, currently the senior vice president/chief technology officer of Walmart International, had started out working for a computing firm in India after having obtained his bachelor's and master's degrees in India. However, after several years, he felt that his full potential was not being used, so he enrolled in Ohio State's chemical engineering doctoral program and focused his studies on AI applications in chemical engineering, working under Professor Jim Davis.

Following the completion of his doctoral degree, he worked in computing for Mobile Oil and another company before moving to Amazon to work on solving problems related to supply chain, website technology and payments products.

Six years later he moved to Disney, where he was "kept on his toes" working in media and cloud technologies. He also held leadership roles at Sterling, Egencia, Oracle and other companies.

In his role as SVP/CTO for Walmart International, he leads a team that develops solutions for everything from POS (point of sale) to eCommerce to power a $100B+ business spanning 5,200+ stores and 550,000+ associates in 23 countries.

The logistics of supply chain are more complicated than one might initially think, Karnati explained. There can be thousands of components to make a product, such as an aircraft, and the mathematical models to solve such problems involve millions of variables. Optimal operation in Retail requires optimally sourcing supply, optimally designing and operating transportation networks, efficiently picking and packing the trucks so as not to waste space, optimizing stock/storage capacities, and determining the right mix of products, organized in the store for maximum efficiency and customer satisfaction.

Karnati started at Walmart right before the pandemic began and got a first-hand look at why ensuring surety of supply across multiple sources is critical to meeting customer demand.

Karnati reflected on how his background in chemical engineering informs his work today, which heavily involves math.

"Process calculation and accounting have a lot in common, as does process plant design and software system architecture," Karnati said. "Linear algebra, process control, simulation and operations research apply everywhere," he continued. "The only thing I wish I had learned more about when I was at Ohio State is probability and statistics. As I got deeper into it, I found that probability is even more beautiful than calculus."

He believes that problem-solving tools are important, but not as much as solution strategy. "Draw connections between things. One must continuously learn. It is said that it takes around 10,000 hours to master something. If you commit, you can learn anything," he said.

Karnati also discussed the importance of having people skills, "Ask, don't assume; agree to disagree," he said. Mentoring can be helpful in this regard. "Find someone you trust and ask them if they see any gaps in your skills, then listen to the feedback," he said. Long ago, someone at Ohio State gave him advice that he heeded. "Dr. Jack Zakin had told me that I spoke too fast," he recalled. "After that, I made a conscious effort to slow down so that it was easier for other people to understand me."
Outstanding Oral Presentations:

Ten graduate students gave oral presentations on their research in biomedical and biotechnology; catalysis and reaction engineering; and energy, fuels and sustainability.

Winning first place was Anuj Joshi with Jee-Yee Chen and Dishari Basu earning second place. Xilal Rima came in third.

Outstanding Poster Presentations:

Twenty-four graduate students gave poster presentations on their research in biomedical and biotechnology; catalysis and reaction engineering; and energy, fuels and sustainability; and polymers and membrane technology.

For this category, the judges named Jingying Hu (Ho Group), Sai Vivek Prabhala (Wood Group) and Leah Ford (Brunelli Group) the top three presenters, coming in first, second, and third, respectively.
Attendees at the Chemical Engineering Graduate Council (CEGC)’s department Halloween Party enjoyed crafts, food, games, fellowship and lots of fun.
Another Gold Medal in Paris

For the third year in a row, a team of Ohio State University students earned a gold medal at the annual iGEM Giant Jamboree. Food, agricultural and biological engineering majors Angela Szilvas and Satvik Kethireddy and chemical engineering majors Ryan Burrows and Elijah Lothrop travelled to Paris for the competition in late October.

The International Genetically Engineered Machine (iGEM) is a non-profit organization that is dedicated to the advancement of synthetic biology, education and competition, and the development of an open community and collaboration. The iGEM Grand Jamboree is an annual event that showcases over 300 international teams. This year’s competition was in-person for the first time since 2019.

The Ohio State team’s project, called “Phinder & Phighter,” is a continuation of their 2021 project, which seeks to treat sepsis by neutralizing the invading bacteria, allowing the immune system to not overreact, which can cause harmful side effects and even death.

They have developed a phage, which targets certain types of bacteria and transcribes proteins that bind or modify the lipid A molecule so that it is not detected by the immune system. The team was judged on their presentation to a panel of judges and a wiki website completed in early October. To learn more, visit their team’s wiki at go.osu.edu/Phinder.

“This year’s team overcame many struggles that took the members’ time away from working on the actual project,” said Lindsey Shimoda, team advisor, former team member and recent graduate. “They had to find a principal investigator, advisor, lab space and funding. The hard work and dedication from the team members paid off, and it shows on their wiki and gold medal.”

Check out the rest of the iGem Grand Jamboree results and learn more about the organization at go.osu.edu/iGEM.
Undergraduates

COE Undergraduate Research Forum Awards

Undergraduate researchers Adam Pelfrey and Sahiti Tamirisakandala earned recognition at the College of Engineering’s 13th Annual Undergraduate Research Forum for Engineering and Architecture, which was held virtually during the first week of April 2022.

Adam Pelfrey earned second place for his project, titled "Blending Polylactic acid with Natural Rubber and Chain Extenders as a Sustainable Packaging Solution."

Sahiti Tamirisakandala won third place for her project, titled "Molecular Dynamics of Block Copolymer Electrolytes: Effect of Tethering Anions."

Homecoming Court

In September, undergraduate Anjali Tewari was nominated to The Ohio State University 2022 Homecoming Court. Court members are chosen based on their leadership qualities, spirit, integrity, and achievement through their contributions and involvement at Ohio State. Anjali is a dedicated community member who gives 110% to everything she does. Her community involvement includes service as the Women in Chemical Engineering events coordinator (see p. 15 for an example). She engages not only women in chemical engineering, but the entire College of Engineering and STEM students, faculty and staff.

Through the events she organizes, Anjali brings diverse perspectives to attendees, providing them with techniques to be better listeners, value the input of all team members, and become more well-rounded engineers.

Society of Women Engineers' Guiding Star Award

Honors chemical engineering undergraduate Rachel Varughese, executive board treasurer for Ohio State’s Society of Women Engineers (SWE), earned the SWE 2023 Guiding Star Award. The award, given for outstanding contributions to SWE and the community, is only given to 15 students nationwide.

Rachel represented Ohio State at the SWE 2022 National Conference in Houston, Texas this past fall. "It was such a rewarding experience making new connections, developing professionally, and engaging in various networking opportunities," Rachel said.
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...It's not ALL hard work! The 2022 Halloween Party was amazing!