WHAT’S INSIDE:
Investing in excellence, cancer research, p. 8-9
Alumni win awards, p. 10
Piece of cake: A career in food science, p. 12-13
Faculty advance projects with grants, p. 16-20
Tapping indigenous knowledge, p. 20-21
Dear Alumni and Friends,

I hope this finds you and your loved ones in good health. Like all of you, we have had to make adjustments in response to the pandemic, but I am pleased that many things have gone surprisingly well. It has been a busy time as we modified almost all our courses for online teaching. In addition, we had to reconfigure the scheduling and operation of our Unit Operations lab for 200 of our students who took it this semester.

We managed to keep our research labs operational, with our graduate students showing utmost vigilance in following the safety protocols to keep themselves and each other safe.

Our faculty have been especially productive, submitting a record number of proposals and receiving several prestigious grants and awards.

Our students, particularly those in our undergraduate AIChE chapter, continued to show real leadership, organizing several virtual events (from coffee chats to interview advice panels) for their members to help them feel connected. Graduate students who organized this fall’s Graduate Research Symposium also demonstrated enormous creativity and resourcefulness in organizing a virtual symposium, with record attendance from alumni and industry.

Of course, our alumni continue to impress us with their diverse accomplishments and activities. This fall we celebrated two of our alumni, Linda Broadbelt (’89) and Bill Dawson (’81), who received College of Engineering Distinguished Alumni Awards.

In this issue, we also feature the career of Chansel David (’03), whose childhood desire for an “EZ Bake Oven” was finally fulfilled by a career in food science at Rich Foods, where she works with every size, shape and style of oven imaginable!

Also in this issue, we are introducing an alumni Career Corner, where we offer a sampling of alumni jobs and recent promotions we “harvested” from LinkedIn. We hope you will find it interesting and may even find out about some of your classmates. Please let us know when you have career updates you would like to share! We would love to include them in the next newsletter.

Best wishes to you all for a Happy Holiday Season and a Happy New Year.

Take good care and keep in touch.

Emeritus Faculty

Robert Brodkey
Martin Feinberg
Morton Friedman
Eldin Hoang
Harry Hershay
L. James Lee, Helen C. Kurtz Chair Emeritus
Michael Paulatis
Thomas Sweeney

Staff

Angela Bennett, Graduate Program Coordinator
Brian Endres, Manager of Academic Advising
Leigh Evard, Design Engineer
Lynn Flanagan, Grants Manager
Kristol Forsch, Academic Advisor
Sean Gallagher, Sr. Director of Development
Geoffrey Hulse, Director of Computer Services
Scott Osborne, Department Business Officer
Susan Teplitz, Fiscal Associate
Wenda Wiliamson, Editor
Michael Wilson, Laboratory Supervisor
Peter Znidarsic, Building Coordinator

We continue to seek ways of improving the environment in the department for our students, so they all feel valued, cared for, and nurtured for success. As an effort in this direction, we are initiating an alumni mentoring network, where we will team up individual students from our sophomore class with our alumni for a long-term mentoring relationship. In the next months, we may reach out to some of you asking if you would be interested in mentoring one of our sophomores.

Faculty

Aravind Astrophugi, Professor and Assoc. Chair
Bhavik Bakshi, Richard M. Morrow Endowed Chair / Professor
Nicholas Brumelli, H.C. Slip Slider Associate Professor
Jeffrey Chalmers, Professor
John Clay, Professor of Practice
Stuart Cooper, Distinguished Professor
Paul Dubetz, Adjunct Assistant Professor
Ihham El-Monier, Assistant Professor of Practice
Li-Shih Fan, Distinguished University Professor / C. John Easton Professor
Lisa Hall, Associate Professor
Winston Ho, Distinguished Professor of Engineering
Kurt Kaelling, Professor
Isamu Kurakka, Associate Professor
Li-Chiang Lin, Umil S. Ozkan Assistant Professor
Andrew Maxson, Assistant Professor of Practice
Umit Ozkan, COE Distinguished Professor / Chair
Andrea Palmer, Ohio Eminent Scholar and Professor
Joel Paulson, Assistant Professor
James Rahman, Professor
Eduardo Restrepo, Assistant Professor
Kathryn Swindle-Reilly, Assistant Professor
David Tomasko, Associate Dean, Undergraduate Education and Services / Professor
Andrew Tong, Assistant Professor of Practice / Research Assistant Professor
William Xiaoguang Wang, Assistant Professor
Xiaoxue Wang, Assistant Professor
Jessica Winter, Professor
David Wood, Professor
Barbara Wyslouzil, Professor
Shang-Tian Yang, Professor

Alumni

WINSTON HO: DOE P. 16
BUCKING THE NORM P. 17
BAKED-IN TALENT P. 18
FACEBOOK GRANT P. 19
HELPING STUDENTS P. 8
RESEARCH SUPPORT P. 9
ALUMNI AWARDS P. 10
CAREER CORNER P. 11
K-12 MENTORING P. 14
COLLABORATING FOR A CURE P. 18
IN MEMORIAM P. 21
K-12 MENTORING P. 22

Students

LOCALS KNOW BEST P. 21
COLLABORATING FOR A CURE P. 22
FACEBOOK GRANT P. 23

NEWS BRIEFS P. 07
The K-12 research experience offered despite pandemic

Along with teaching and research, Professor L.-S. Fan goes out of his way to perform another duty he deems important to the field of chemical engineering: Outreach.

Every summer, the Fan Lab provides high school students with a chemical engineering research experience, and this summer was no different—except in the details. Instead of meeting in a laboratory, sessions were offered online via Zoom.

“Despite our circumstances this summer, I felt it was still important to proceed with the class in order to provide students with an experience that promotes critical and creative thinking in the field of chemical engineering,” Fan explained.

The plan was to give students a taste of chemical engineering by providing them with a small team project that would be of value to the students.

St. Charles Preparatory High School students Anish Gupta and Noah Kistler, sophomores, and Garrett Nerone, a junior, participated in the project.

David Breckenridge, St. Charles’ college liaison, coordinated the sessions. “Chemical engineering is clearly beyond the norm for a high school student. The internship helps them get familiar with things they will encounter in college,” he said.

Students were receptive. “This was a unique new experience that will help me be better prepared for the future,” Garrett said.

The seven weekly sessions provided a robust introduction to chemical engineering and current research in chemical looping, with interactive sessions to gauge the students’ interests and bring out maximum value.

“It was very interesting to learn what chemical engineers do,” said Noah. “I liked seeing how stuff in school is applied in the real world.” All the students agreed on that point. “It wasn’t just a test. It applied to the real world,” Anish said.

Fan Lab mentors included Professor L.-S. Fan, Dr. Mandar Katehe, Pinak Mohapatra, Sonu Kumar and Rushikesh Joshi.

Students were given enough tools and examples to enable them to apply the principles learned to new, independent situations, explained Katehe.

After several classes, the team discussed possible projects. With the current COVID situation, disinfectants are of prime importance, so the separation of cresols was thought to be a challenging and interesting problem for the students. The remaining lectures introduced the required knowledge, such as distillation, and students had three weeks to work on their projects, culminating in a final presentation.

“The class helped me see how to work as a team,” Noah said. “It was a good test, breaking a problem into smaller parts to find solutions,” Garrett added.

Other research groups in the department have also mentored students. Gauri Nabor, who is currently working on a project for Drs. Jessica Winter and Lisa Hall, mentored a student via Zoom. High school student Natalie Cuevas had expressed interest in the work being done in the Winter Lab. “Working with high school students in a win-win for the students as well as Ohio State,” Nabor said. “We are happy to provide training for the next generation of scientists, engineers, entrepreneurs. In turn, the students ask good questions and contribute to our research.”

Jackelyn Galardi, who mentored students in Dr. David Wood’s lab, says that “the ultimate takeaway from the experience is for students to discover what excites and interests them.”


The Ohio State University’s College of Engineering and Comprehensive Cancer Center – Arthur G. James Cancer Hospital and Richard J. Solove Research Institute (OSUCCC – James) have launched a collaborative initiative to support postdoctoral researchers leading innovative studies.

The Cross-disciplinary Postdoctoral Scholars Program (CPSP) will recognize outstanding young researchers at Ohio State and help recruit highly-qualified postdoctoral researchers, who will become leaders in the research fields bridging medicine and engineering.

“The CPSP program is the result of a growing and concerted effort between Engineering and The James leadership to combine our assets and talents,” said College of Engineering Associate Professor Jessica Winter.

“The CPSP program can jumpstart our efforts to move the needle to advance cancer research in innovative ways to ultimately help patients with cancer in the region and worldwide.”

The program has selected four programs, including one led by Professor Jessica Winter.

Imaging enabling pathway analysis: Postdoc Silvio de Araújo Fernandes Júnior is working with Jessica Winter and Dr. José Otero (Neuropathology). They plan to develop imaging technologies that will enable pathway analysis in cell and eventually whole organism models. This work would include comprehensive development of imaging agents, super-resolution microscopy technology, and image analysis methods for cancer biology testbeds.

The other three projects involve post docs and researchers working collaboratively across a number of disciplines and programs.

Project goals include:

• Improve cancer treatment with predictive algorithms (Spine Research Institute, Neurosurgery, Radiation Oncology, Radiology, Neurology and Neurological Surgery);

• improve the production of magnesium alloys for skeletal hardware for the treatment of oral cancer (Materials Science and Engineering, Plastic Surgery and Oncologic Plastic Surgery); and

• Use 3D bioprinting and lab-on-a-chip methods to develop off-the-shelf cancer immunotherapies for blood cancers and beyond (Biomedical Engineering and Pediatrics, and Nationwide Children’s Hospital).

OSUCCC and director of the Division of Endocrinology, believes that engineering applied to medicine can advance research efforts.

“We believe that the CPSP program can jumpstart our efforts to move the needle to advance cancer research in innovative ways to ultimately help patients with cancer in the region and worldwide.”

Cancer Biology Program Co-Leader Matt Ringel
THE REWARDS OF TEACHING AND MENTORING

The desire to make a difference is often a prime motivator for teachers. The reward of seeing one’s students succeed is inherent, but it doesn’t hurt to be recognized for one’s efforts, either.

That is why the Office of Student Academic Success-Undergraduate Research & Creative Inquiry created the Excellence in Undergraduate Research Mentoring Award.

This year, two CBE teachers received the award: Professor Jessica Winter and graduate student Richard Hickey.

Jessica Winter, an established leader in the field of nanobiotechnology, was nominated by undergraduate National Science Foundation Graduate Research Fellowship winner Thomas Porter, who last year was named both a Goldwater and an Astronaut Scholar.

One person who may have been the most surprised by this amount of success was Thomas himself.

“Professor Winter demonstrated a lot of belief in me, and encouraged me to apply for opportunities I did not think I was qualified for,” Thomas explained. “This ultimately gave me a lot of opportunities and connections I could not have imagined.”

Thomas also credits Dr. Winter and her receptiveness to new ideas with helping him develop as a researcher. “She has an exceptional ability to take almost any idea and nurture it within the context of our lab. She did everything in her ability to help me gain a wide breadth of experience and opportunities to help me toward my goals,” said Thomas, who is now at MIT pursuing a doctoral degree in chemistry.

Richard Hickey, a former paramedic who was inspired to pursue graduate studies after reading about hemoglobin-based oxygen carriers (HBOCs), commonly referred to as ‘artificial blood,’ also received the Excellence in Undergraduate Research Mentoring Award.

He was nominated by undergraduate researcher Emily McDonel, a biological engineering student who hopes to work in either the food or pharmaceutical industry.

At least, that was the plan. Her research experiences and Hickey’s mentorship led to a passion for research and the belief that a doctoral degree would help her to make an even bolder impact when she inevitably enters into industry.

Emily credits Hickey with encouraging her to be the best by drawing out her own thought-processes, reasoning ability, and conclusions, which helped to increase her confidence. “Rich is a very tell-it-to-you-straight kind of guy and will not spoon feed you the answer when you have a difficult question or are curious how to run a piece of equipment,” she said.

With Rich’s support, Emily was able to take her research to a level appropriate for publication and presentation at conferences.

“Richard Hickey is a fantastic guide on research projects, ideas, or even hunches to make sure you have considered other points of view and set you on the best path for success.”

-Undergraduate researcher Emily McDonel

“The final podcast featured Winter’s work on quantum dots to detect biomarkers for cancer. Watch it at: go.osu.edu/podcast2

The first podcast highlighted Winter’s work using quantum dots to detect biomarkers for cancer. Watch it at: go.osu.edu/podcast1

In podcast number two, Winter discussed her experiences with NSF’s i-Corps program; the challenges she faced launching her company; and her advice to new entrepreneurs. Watch: go.osu.edu/podcast2

The STEAM Factory promotes interdisciplinary collaboration between Ohio State departments and community members.

Jessica Winter

The National Nanotechnology Initiative (Nano.gov) created a three-part series of interviews between Lisa Friedersdorf, director of the National Nanotechnology Coordination Office, and Jessica Winter, professor of chemical and biomedical engineering and co-founder and chief scientific officer of Core Quantum Technologies.

The project, titled “The Scientist Next Door: Making STEM Accessible Through Storytelling,” taps the inherent response human beings have to storytelling and seeks to strengthen the science storytelling capacity within the Ohio State research community via professional development, live performance, video development and public outreach activities.

The project, titled “The Scientist Next Door: Making STEM Accessible Through Storytelling,” taps the inherent response human beings have to storytelling and seeks to strengthen the science storytelling capacity within the Ohio State research community via professional development, live performance, video development and public outreach activities.
Alumni couple supports INNOVATIVE CANCER RESEARCH

A chemical engineering alumni couple’s generosity is heating Ohio State engineer new ways to fight cancer, potentially transforming diagnosis and treatment of the disease.

A gift from Dean (’62) and Kay Snider (’63) will help fund the cancer-related research of three chemical engineering faculty. The Sniders’ support will provide each researcher with $10,000 annually for five years, a contribution they hope will shed light on the deadly disease.

“I think cancer is one of those medical mysteries because there are so many different forms, and while we know some things about some cancers, there’s so much more to know and learn,” said Kay. “It’s going to take a lot of people to chip away at that lack of knowledge.”

The liquid biopsy: Better for patients

One of those people is Assistant Professor Eduardo Reátegui. Reátegui’s research focuses on analyzing cancer biomarkers, such as circulating tumor cells (CTCs) or tumor extracellular vesicles (tEVs). CTCs are extremely rare cells shed from a tumor and can be found at very low frequencies in the peripheral blood of cancer patients. Additionally, tumors release tEVs, which are tiny particles carrying similar genetic material. With the Sniders’ gift, Reátegui is using CTCs and tEVs to develop a liquid biopsy, a less invasive procedure that could eventually replace traditional methods.

“Instead of performing a tissue biopsy as you typically would for the detection of cancer or to test if therapy is working properly, a liquid biopsy is a just a draw of blood or any other biofluid,” explained Reátegui. “Because solid tumors are sometimes located in areas that are difficult to access, including brain or lung cancers, obtaining a tissue sample can be very invasive for the patient. You can probably do it once. However, with these approaches that we are doing with blood or other biofluid, we can test cancer patients as frequently as we want.”

Reátegui’s team is working closely with clinicians from The Ohio State University Comprehensive Cancer Center – Arthur G. James Cancer Hospital and Richard J. Solove Research Institute to validate the technology, with the ultimate goal of taking it from the lab bench to the bedside. Early results have been very promising.

Making an impact through philanthropy

The Sniders chose to support cancer research because they felt it would have the greatest impact on the largest number of people. A three-year engineering program from their former employer enabled them to quadruple the impact of their gift.

“This type of support is significant for us,” said Reátegui. “No matter if it’s a big federal grant or a smaller private contribution, it always goes toward something we really need in our lab.

The first year of funding will help Reátegui purchase the necessary equipment to establish a small biobank of CTCs for a pilot study on breast cancer. Not only will it support his research, the biobank will make the cells available to others to study as well, ensuring exponential impact on future research and patient lives.

Thanks to the generosity of Buckeyes like the Sniders, more patients in the U.S. and around the world will benefit from Ohio State’s interdisciplinary strength to fight cancer.

-By Meggie Biss

Professor Eduardo Reátegui’s less-invasive liquid biopsy could transform cancer diagnosis and treatment.

Helping students excel in BUSINESS

A new College of Engineering grad George Valcarcel ’20 begins working as a business analyst for McKinsey & Company, the experience he gained through Ohio State’s Integrated Business and Engineering (IBE) Honors Program is giving him confidence he’ll succeed in his future consulting career.

As part of their capstone project, Valcarcel and his IBE capstone teammate Nathan Platfoot worked on a yearlong project for Nexceris, a central Ohio-based energy storage company.

In addition to participating on the same capstone project, Aaron Penick had a summer internship at Nexceris, the company he founded in 1994 and for which he remains a member of its advisory board.

“We were very impressed with the work the product the students delivered, which will become the foundation of some of the development that will follow,” said Nexceris’ Sensors Business Unit Director Steve Cummins.

The students analyzed potential engineering and business, which I thought could have the most potential impact for supporting companies like mine locally,” Dawson said. “These are some of the brightest students at Ohio State and in our country, and they can have a huge impact.”

The students analyzed potential growth opportunities for Li-ion Tamer, which monitors the condition of lithium-ion batteries to make large battery systems safer and help prevent fires. They also created a prototype of an interface that will help technicians install the product in large systems.

“It was a really good experience,” Penick said. “Being able to work on a business-critical problem for a central Ohio company and give back to our home state, in terms of economic development, was a great experience.”

The project was also a win for the company, who found so much value from working with IBE students that they’ve signed up to do another one next year.

“We very impressed with the work product the students delivered, which will become the foundation of some of the development that will follow,” said Nexceris’ Sensors Business Unit Director Steve Cummins, a 2002 chemical engineering alumus. It’s a win-win for us and the student group.” -Based on a story by Candi Cleveinger

The longtime scholarship donor believes so strongly in the IBE program that he gave $150,000 to create the William and Diane Dawson Engineering Endowment Fund. It supports a real-world, design-build project within IBE.

For the inaugural project, Dawson suggested teaming up with Nexceris, the company he founded in 1994 and for which he remains a member of its advisory board.

“What I loved about the program at Ohio State was combining engineering and business, which Penick had a summer internship at Ohio State was combining engineering and business, which I thought could have the most potential impact for supporting companies like mine locally,” Dawson said. “These are some of the brightest students at Ohio State and in our country, and they can have a huge impact.”

The successful projects wouldn’t have happened without the support of chemical engineering alumnus William Dawson, ’81.

Ohio State’s Integrated Business Engineering Program is giving him confidence for McKinsey & Company, the experience he gained through the Sniders’ gift, Reátegui is using CTCs and tEVs to develop a liquid biopsy, a less invasive procedure that could eventually replace traditional methods.

“Instead of performing a tissue biopsy as you typically would for the detection of cancer or to test if therapy is working properly, a liquid biopsy is a just a draw of blood or any other biofluid,” explained Reátegui. “Because solid tumors are sometimes located in areas that are difficult to access, including brain or lung cancers, obtaining a tissue sample can be very invasive for the patient. You can probably do it once. However, with these approaches that we are doing with blood or other biofluid, we can test cancer patients as frequently as we want.”

Reátegui’s team is working closely with clinicians from The Ohio State University Comprehensive Cancer Center – Arthur G. James Cancer Hospital and Richard J. Solove Research Institute to validate the technology, with the ultimate goal of taking it from the lab bench to the bedside. Early results have been very promising.

Making an impact through philanthropy

The Sniders chose to support cancer research because they felt it would have the greatest impact on the largest number of people. A three-year engineering program from their former employer enabled them to quadruple the impact of their gift.

“This type of support is significant for us,” said Reátegui. “No matter if it’s a big federal grant or a smaller private contribution, it always goes toward something we really need in our lab.

The first year of funding will help Reátegui purchase the necessary equipment to establish a small biobank of CTCs for a pilot study on breast cancer. Not only will it support his research, the biobank will make the cells available to others to study as well, ensuring exponential impact on future research and patient lives.

Thanks to the generosity of Buckeyes like the Sniders, more patients in the U.S. and around the world will benefit from Ohio State’s interdisciplinary strength to fight cancer.

-By Meggie Biss

Professor Eduardo Reátegui’s less-invasive liquid biopsy could transform cancer diagnosis and treatment.
Two Ohio State chemical engineering alumni are among 21 recipients honored with The Ohio State University College of Engineering’s 2020 Excellence in Engineering and Architecture Alumni Awards.

Dean David B. Williams and award recipients celebrated virtually, with an in-person celebration of the 2020 winners planned for 2021 once it is safe to gather in person.

“We are delighted to honor these alumni who better their communities and our world through their extraordinary professional achievements, innovation and service,” said Dean Williams, the Monte Ahuja Endowed Dean’s Chair. “They represent the best and brightest graduates from across the College of Engineering and inspire us all.”

Distinguished Alumni Award for Academic Excellence

Renowned for her kinetic modeling expertise, Linda Broadbelt (BS ‘89) is the Sarah Rebecca Roland Professor of Chemical and Biological Engineering and associate dean for chemical engineering research at Northwestern University. She is a member of the National Academy of Engineering, a Fellow for both the American Association for the Advancement of Science and AIChE, the holder of AIChE’s R.H. Wilham Award and the American Chemical Society’s E.V. Murphree Award, and a Fulbright Distinguished Scholar.

Broadbelt is particularly noted for the development of automated mechanism generation techniques in kinetics modeling, and methods for specification of rate coefficients. She applies her computational expertise to areas as diverse as catalysis, metabolic networks, silicon nanoparticle production, atmospheric chemistry, synthesis of antibiotics, hydrocarbon conversion, degradation kinetics, and biological pathway identification. Much of her work has been adapted by industry.

Distinguished Alumni Award for Career Achievement

William J. Dawson (BS ‘81) spent his 38-year career conceiving, developing and improving processes and products designed for the clean use of energy. In 1994, he co-founded Nexceris LLC, an engineering and product launch company based in central Ohio whose vision is to create a better world through energy innovations. The company develops innovative sensor, power generation and catalyst solutions. As CEO, Dawson oversaw Nexceris’ successful commercialization of over 100 products globally in the fuel cell, battery and catalyst markets, and its growth to over 40 employees.

Career Corner

A sampling of jobs and recent promotions from LinkedIn, showing chemical engineering degrees.

1960s

John Rappach, ’61 BS
Owner
Rapach Resources
Cincinnati, OH

1970s

Larry Zwager, ’76 MS
VP, Legal and Pharma Products
SK Pharmeco
Rancho Cordova, CA

1980s

Rubén Alfonzo, ’80 BS
Rubén Alfonzo International Coaching
Miranda, Venezuela

1990s

Joel Duvall, ’97 BS
Regional Manager
Emerson
Hamilton, OH

Tim Stiel, ’91 BS
Project Manager
ABB Electrical & Electronic Manufacturing
Wickliffe, OH

James (Jim) Lombardi, ’90 BS
Principal Engineer
McNeil Consumer Healthcare
Oreland, PA

Max Macesich, ’93 BS
Senior Vice President Operations
ExactCare
Broadview Heights, OH

Dana Pasquali, ’97 BS
VP Product Management
Vertafore
Denver, CO

Bernard Wilkerson, ’90 MS
Department Engineer
Software Development
Enterprise Holdings
O’Fallon, MO

2000s

Greg Kaganovich, ’03 BS
Senior Director, Supply Chain
Meyers Industries
Solon, OH

Feras Alkhtali, ’10 BS
Innovation Manger
Linde
Munich, Germany

Claudia Berdugo, ’10 PhD
Director, Process Development
Catalent Pharma Solutions
Bloomington, IN

Kenyon Blake, ’01 BS
Completion Engineer
Gulf of Mexico at Chevron
Katy, TX

Michael Boehm, ’09 BS/PhD
Senior Physical Scientist
Moffitt Foodworks, Inc.
White Plains, NY

Theodore Carson, ’17 BS
Sr. Manager, Marketing Analytics
Root, Inc.
Columbus, OH

Gokhan Cakir, ’16 PhD
Assistant Professor
Middle East Technical University
Ankara, Turkey

Nicholas Coltinger, ’15 BS
Solutions Consultant at Secure
Columbus, OH

Emma Curtis, ’18 BS
Production Supervisor
Ops. Prof. Development Program
Abbott
Gurnee, IL

Abitahsa Dehanker, ’19 PhD
TD Module Etch Engineer
Intel Corporation
Hillsboro, OR

Anna Dorf, ’14 BS
Consultant
Boston Consulting Group
Chicago, IL

Michael Nilsen, ’10 PhD
Mgr. and Program Manager
Axtria-Ingenious Insights
New York City metro area

2010s

David Moomaw, ’85 MS
Quality Engineer-Rheologist
Brookfield AMETEK
Canton, MA

Paula Oren, ’88 BS
Quality Engineer
Andersen Corporation
Lake Elmo, MN

Corey Sceranka, ’19 BS
Floor Operator
Apollo Plastics, Inc.
Greater Cleveland area

Chad Abramson, ’08 BS
Senior Engineer
Linde
Munich, Germany

Clintae Burkes, ’09 BS
Director, Process Development
Lubrizol Corporation
Cleveland, OH

Edmund Hatala, ’15 BS
Supply Chain Engineer
PepsiCo
Friendswood, TX

Annamarie Hejlik, ’18 BS
Supply Chain Engineer
Unilever
Columbus, OH

Ryan Lyons, ’14 BS
Chemical Engineer IV
Battelle
West Jefferson, OH

Janet Tufts, ’17 BS
R&D Technican
PLZ Aeroscience Corporation
Eureka, MO

Mitchell Steindler, ’17 BS
Scientist
Gray Oak Pipeline at Phillips 66
Owings Mills, MD

Ingrid Schmittworz, ’16 BS
Superintendent
Battelle
New York City metro area

Want to be in a future Career Corner? Please email williamson.416@osu.edu with your ChE degree(s), title, employer, and City/State!
Baked-in Talent

Chanel David’s expertise
In food science is a recipe for success

What leads to a career where you can have your cake and eat it, too? If you’re Chanel David, it’s football.

Described as a trailblazer in her role as an R&D process development engineer at Rich Products Corporation, Chanel David (’03) has always loved football.

“As a kid, I used to always watch football with my dad,” she recalls, laughing about the time she joined him for a game wearing an Ohio State sweatshirt and Michigan sweatpants. “What are you doing?” asked her dad, a Bronze star Vietnam vet who takes his football seriously. “You can’t do that!”

Ms. David, whose parents are both social workers, has always loved science. Inspired by a TV show called Mr. Wizard, two things consistently led to a desire to be a pharmacist. “I have always loved baking and cooking, even though I never got my EZ Bake Oven,” she joked. “But of course that wasn’t important. Today I get to work in kitchens with all sorts and sizes of ovens,” she said.

Following graduation, Rich hired Ms. David to work in their research and development (R&D) department, where she has played a critical leadership role. Rich Products had never had an engineer, chemist or biologist in R&D before, so results at the plant were falling short of what could be done in the lab. Ms. David was the first to develop a product, work out a process to make it and scale it with the proper equipment for floor operators. Her plant production and process parameter optimizations improved the product performance and quality of one of Rich’s key products: the non-dairy whipped topping for which it is famous. “I faced with a challenge, I said, ‘OK, I’m in!’” Ms. David recalled.

It was a co-op internship at Rich Products Corporation that led her to food science. “I have always loved baking and cooking, even though I never got my EZ Bake Oven,” she joked. “But of course that wasn’t important. Today I get to work in kitchens with all sorts and sizes of ovens,” she said.

Ms. David’s expertise in food science is a recipe for success from the customer while working within parameters defined by the plant engineer. “In cross-functional teams, you have to take the brunt of criticism because your customer is your product developer,” she said. “I tell new engineers that they need to have thick skin and be flexible and adaptable. Products like food are very subjective and not everyone is going to be happy with the products we make,” she said.

Consumers demand more than just good-tasting products these days. The company is currently developing products that are completely plant-based and have no high fructose corn syrup or animal byproducts.

Ms. David has met other leadership challenges while at Rich. When she was first hired, she was the only black female of around 10,000 employees. “I have been really happy to be at Rich, because I was able to build my own path,” Ms. David said. “I could spearhead a lot of things, making and exploring new products and helping our department to grow.” Her initiatives included creating a coop program, hiring and mentoring seven Ohio State students and representing Ohio State at college fairs.

Ms. David is active as a community leader and role model for women in STEM. “It’s important to me to give back,” she said. She coordinates and hosts Rich’s hands-on-learning outreach event, “Success Looks Like Me,” and serves as president of Kaleidoscope, a networking group for associates of color. She has also shared her experiences with girls 12-18 through Invest Buffalo Niagara’s March 2020 video, “Buffalo’s Brightest Women in STEM,” viewable at go.osu.edu/ChanelDavid.

Ms. David has met other leadership challenges while at Rich. When she was first hired, she was the only black female of around 10,000 employees. “I have been really happy to be at Rich, because I was able to build my own path,” Ms. David said. “I could spearhead a lot of things, making and exploring new products and helping our department to grow.” Her initiatives included creating a coop program, hiring and mentoring seven Ohio State students and representing Ohio State at college fairs.

Ms. David is active as a community leader and role model for women in STEM. “It’s important to me to give back,” she said. She coordinates and hosts Rich’s hands-on-learning outreach event, “Success Looks Like Me,” and serves as president of Kaleidoscope, a networking group for associates of color. She has also shared her experiences with girls 12-18 through Invest Buffalo Niagara’s March 2020 video, “Buffalo’s Brightest Women in STEM,” viewable at go.osu.edu/ChanelDavid.

Ms. David’s expertise in food science is a recipe for success from the customer while working within parameters defined by the plant engineer. “In cross-functional teams, you have to take the brunt of criticism because your customer is your product developer,” she said. “I tell new engineers that they need to have thick skin and be flexible and adaptable. Products like food are very subjective and not everyone is going to be happy with the products we make,” she said.

Consumers demand more than just good-tasting products these days. The company is currently developing products that are completely plant-based and have no high fructose corn syrup or animal byproducts.

Ms. David has met other leadership challenges while at Rich. When she was first hired, she was the only black female of around 10,000 employees. “I have been really happy to be at Rich, because I was able to build my own path,” Ms. David said. “I could spearhead a lot of things, making and exploring new products and helping our department to grow.” Her initiatives included creating a coop program, hiring and mentoring seven Ohio State students and representing Ohio State at college fairs.

Ms. David is active as a community leader and role model for women in STEM. “It’s important to me to give back,” she said. She coordinates and hosts Rich’s hands-on-learning outreach event, “Success Looks Like Me,” and serves as president of Kaleidoscope, a networking group for associates of color. She has also shared her experiences with girls 12-18 through Invest Buffalo Niagara’s March 2020 video, “Buffalo’s Brightest Women in STEM,” viewable at go.osu.edu/ChanelDavid.

Ms. David’s expertise in food science is a recipe for success from the customer while working within parameters defined by the plant engineer. “In cross-functional teams, you have to take the brunt of criticism because your customer is your product developer,” she said. “I tell new engineers that they need to have thick skin and be flexible and adaptable. Products like food are very subjective and not everyone is going to be happy with the products we make,” she said.

Consumers demand more than just good-tasting products these days. The company is currently developing products that are completely plant-based and have no high fructose corn syrup or animal byproducts.

Ms. David has met other leadership challenges while at Rich. When she was first hired, she was the only black female of around 10,000 employees. “I have been really happy to be at Rich, because I was able to build my own path,” Ms. David said. “I could spearhead a lot of things, making and exploring new products and helping our department to grow.” Her initiatives included creating a coop program, hiring and mentoring seven Ohio State students and representing Ohio State at college fairs.

Ms. David is active as a community leader and role model for women in STEM. “It’s important to me to give back,” she said. She coordinates and hosts Rich’s hands-on-learning outreach event, “Success Looks Like Me,” and serves as president of Kaleidoscope, a networking group for associates of color. She has also shared her experiences with girls 12-18 through Invest Buffalo Niagara’s March 2020 video, “Buffalo’s Brightest Women in STEM,” viewable at go.osu.edu/ChanelDavid.

Ms. David’s expertise in food science is a recipe for success from the customer while working within parameters defined by the plant engineer. “In cross-functional teams, you have to take the brunt of criticism because your customer is your product developer,” she said. “I tell new engineers that they need to have thick skin and be flexible and adaptable. Products like food are very subjective and not everyone is going to be happy with the products we make,” she said.

Consumers demand more than just good-tasting products these days. The company is currently developing products that are completely plant-based and have no high fructose corn syrup or animal byproducts.

Ms. David has met other leadership challenges while at Rich. When she was first hired, she was the only black female of around 10,000 employees. “I have been really happy to be at Rich, because I was able to build my own path,” Ms. David said. “I could spearhead a lot of things, making and exploring new products and helping our department to grow.” Her initiatives included creating a coop program, hiring and mentoring seven Ohio State students and representing Ohio State at college fairs.

Ms. David is active as a community leader and role model for women in STEM. “It’s important to me to give back,” she said. She coordinates and hosts Rich’s hands-on-learning outreach event, “Success Looks Like Me,” and serves as president of Kaleidoscope, a networking group for associates of color. She has also shared her experiences with girls 12-18 through Invest Buffalo Niagara’s March 2020 video, “Buffalo’s Brightest Women in STEM,” viewable at go.osu.edu/ChanelDavid.
Did you know?

ALUMNUS MELVIN DEGROOTE WAS ONE OF NATION’S MOST PROLIFIC INNOVATORS

Distinguished chemical engineering alumnus Melvin DeGrote is recognized as one of America’s greatest inventors.

Honored by Time magazine in 2000 as being second only to Thomas Edison in the number of patents issued to him, DeGrote received patents on more than 950 of his inventions.

Most of his discoveries focused on chemical de-emulsifiers that separate crude oil from impurities, without which “most of the oil pumped in the U.S. for the last century would have been too corrosive for pipelines or tankers to transport,” noted Business Insider Australie. He also invented the chemical recipe that allows tankers to transport, “I don’t know how he got to Ohio State, but that education made him into a compassionate man.”

DeGrote’s family recently established the Melvin DeGrote Endowed Chemical Engineering Fund to honor his lifelong commitment to the university. It supports faculty work on global climate research and graduate students in the William G. Lowrie Department of Chemical and Biomolecular Engineering (CBE).

“Melvin DeGrote’s life story continues to inspire us all. It also shows how versatile our undergraduate education is,” said CBE Chair Unit S. Oxan. “The generous gift that his family endowed will continue supporting our faculty and graduate students, and be his everlasting legacy.”

After graduation, DeGrote began his professional career with Maxwell Motor Company and also worked as a flavorings expert at the Mellon Institute.

He retired in 1960 as vice president of research and development for the Tretolite Company, where he worked for 36 years.

His outstanding achievements won him the Ohio State College of Engineering’s Lammé Medal for meritorious achievement in engineering in 1956 and the American Chemical Society St. Louis section’s Midwest Award in 1959.

The devoted Buckeye also remained involved with his alma mater. DeGrote served as an alumni representative on the board of directors of the Research Foundation, was appointed to the Alumni Advisory Board in 1961 and was a constant contributor to the university’s development fund. He played a key role in fundraising efforts for the former Koffolt Laboratories building and is recognized for financially supporting numerous university events.

“I am obligated to Ohio State for so many things that I will never be able to discharge even a fraction of my obligations,” DeGrote wrote in a letter to the Ohio State Monthly alumni publication. “This becomes not a matter of holding interest but rather of making a feeble attempt to show my true appreciation.”

DeGrote died in February 1963.

In memoriam

Obituaries as of October 14, 2020

1940s

Dalton F. Drake, ’43 BS, ’47 MS, of Bloomfield Hills, MI, was a retired chemical engineer at El DuPont De Nemours. He passed away on April 18, 2020.

Marshall C. Kidd, ’44 BS, passed away on April 18, 2020. He was a retired manager of technical analysis at General Electric and had been living in Nashua, NH.

Roy F. Quinn, ’47 BS, had retired from his work in research and quality control at Akzo Nobel Inc., a subsidiary of Akzo NV Anhem, the Netherlands. He died on September 3, 2019 in Kalamazoo, MI.

H.L. Robinson, ’48 BS, of Logan, OH, passed away on December 24, 2019. He was a retired manager at Union Carbide Corporation.

1950s

Richard L. Scott, ’50 BS, was a retired director of chemical engineering at Lubrizol Corporation. He died on January 19, 2020. He was from Chesterland, OH.

Paul W. Izant, ’51 BS, of Old Saybrook, CT, passed away on February 18, 2020. He had worked at Georgia Natural Resources Department.

Gary B. Higinotham, ’52 BS, died on June 21, 2020 in Marysville, OH. He had been a manager of project engineering at The Scotts Company, LLC.

Lawrence G. Moody, ’54 BS, of Marietta, OH, was a retired principal engineer for Crompton Corporation. He passed away on September 7, 2019.

Albert C. Muren, ’56 BS, was a retired project engineer for Polaroid Corporation International who passed away on August 18, 2020. He had been living in Marion, MA.

James F. Wise, ’57 BS, died on May 18, 2020. He had worked as a sales manager for The Westfield Group and was living in Avon, OH.

Allen J. Raymond, ’57 BS, a retired chemical engineer with Lubrizol Corporation, passed away on May 26, 2020. He had been living in Kirtland, OH.

1960s

Kenneth D. McDaniel, ’61 BS, of Nashua, NH, passed away on December 6, 2019. He was a former realtor with The Maseillo Group Realty.

Michael C. Royer, ’65 BS, ’67 MS, a former stockbroker and principal at Hambrecht & Quist, passed away on July 11, 2020. He had been living in Moss Beach, CA.

A.D. Bare, ’67 BS, ’68 MS, a retired chemical engineer with Shell Oil Company, passed away on May 12, 2020. He had been living in New Albany, OH.

1970s

Marcis Daiga, ’71 BS, of Carmel, IN, the former president of Argo Consulting Engineering Inc., passed away on February 22, 2020.

Eric A. Gruke, ’71 BS, ’72 MS, ’75 PhD, passed away on November 29, 2019. He was the associate dean for research and graduate studies at the University of Kentucky College of Engineering and had been living in Lexington, KY.

1980s

Alan H. Smith, ’82 BS, who had also earned a bachelor of science degree in biological sciences at Ohio State in 1975, was a principal project manager at CH2M Hill, Inc. He passed away on June 2, 2020 and had been living in Loveland, OH.

William P. Haessly, ’82 MS, of Oberlin, OH, previously with Eastman Chemical Company, died on April 7, 2020.

Edward H. Bollinger, ’58 PhD, of Akron, OH, passed away on August 7, 2019. He was a retired technical manager for United Technologies Aerospace Systems.

Richard P. Kistler, ’58 BS, of Perry, GA, was a retired self-employed engineer who passed away on October 20, 2019.

David W. Jones, ’58 BS, passed away on November 4, 2019. He was a retired general manager with United Technologies Aerospace Systems. He had been living in Village Mills, TX.

1990s

Roy F. Quinn, ’47 BS, had retired from his work in research and quality control at Akzo Nobel Inc., a subsidiary of Akzo NV Anhem, the Netherlands. He died on September 3, 2019 in Kalamazoo, MI.

H.L. Robinson, ’48 BS, of Logan, OH, passed away on December 24, 2019. He was a retired manager at Union Carbide Corporation.

Edward H. Bollinger, ’58 PhD, of Akron, OH, passed away on August 7, 2019. He was a retired technical manager for United Technologies Aerospace Systems.

Richard P. Kistler, ’58 BS, of Perry, GA, was a retired self-employed engineer who passed away on October 20, 2019.

David W. Jones, ’58 BS, passed away on November 4, 2019. He was a retired general manager with United Technologies Aerospace Systems. He had been living in Village Mills, TX.

1990s

Roy F. Quinn, ’47 BS, had retired from his work in research and quality control at Akzo Nobel Inc., a subsidiary of Akzo NV Anhem, the Netherlands. He died on September 3, 2019 in Kalamazoo, MI.

H.L. Robinson, ’48 BS, of Logan, OH, passed away on December 24, 2019. He was a retired manager at Union Carbide Corporation.

Edward H. Bollinger, ’58 PhD, of Akron, OH, passed away on August 7, 2019. He was a retired technical manager for United Technologies Aerospace Systems.

Richard P. Kistler, ’58 BS, of Perry, GA, was a retired self-employed engineer who passed away on October 20, 2019.

David W. Jones, ’58 BS, passed away on November 4, 2019. He was a retired general manager with United Technologies Aerospace Systems. He had been living in Village Mills, TX.

1990s

Roy F. Quinn, ’47 BS, had retired from his work in research and quality control at Akzo Nobel Inc., a subsidiary of Akzo NV Anhem, the Netherlands. He died on September 3, 2019 in Kalamazoo, MI.

H.L. Robinson, ’48 BS, of Logan, OH, passed away on December 24, 2019. He was a retired manager at Union Carbide Corporation.

Edward H. Bollinger, ’58 PhD, of Akron, OH, passed away on August 7, 2019. He was a retired technical manager for United Technologies Aerospace Systems.

Richard P. Kistler, ’58 BS, of Perry, GA, was a retired self-employed engineer who passed away on October 20, 2019.

David W. Jones, ’58 BS, passed away on November 4, 2019. He was a retired general manager with United Technologies Aerospace Systems. He had been living in Village Mills, TX.
Professor Winston Ho, graduate student Kai Chen, and Research Scientist Yang Han (’18 PhD) adjust the membrane substrate on Ho’s membrane-manufacturing equipment. “Photo by Ben Fisher, Spring 2018.”

Winston Ho

PROGRESS TOWARDS COMMERCIALIZING CARBON-CAPTURING TECHNOLOGY

Y ang Han (’18 PhD) landed in exactly the right place at Ohio State to begin a career in decarbonizing flue gas from fossil fuel-burning power plants.

After obtaining his doctorate in chemical engineering at Ohio State, Han now works with Distinguished Professor of Engineering Winston Ho, who for more than 20 years has developed methods to reduce fossil fuel-generated pollution during a career at Exxon and on the faculty at Ohio State. Ho developed a membrane that can cost-effectively capture 90% of the CO₂ emitted from coal-fired power plants.

Now, Ho and Han have received an additional $4 million in R&D funding from the U.S. Department of Energy National Energy Technology Laboratory to standardize this membrane technology, first allowing the team to test the technology at progressively larger scales.

The energy department has supported Ho’s work with more than $12 million since 2012. The most recent funding will enable expansion of this research to a project 18 times the size of current bench-scale laboratory work, where he has proven that the purity of that captured CO₂ is at least 95%, which is important because demand for quality carbon dioxide is growing in the oil, chemical and food industries.

Han became interested in the research because of growing up in a coal-mining town. “My hometown of Shanxi, China, has a climate very similar to Columbus. We have many coal-fired plants there,” Han says. “In the wintertime in China, for residential areas we do not have furnaces in every household. We have centralized heating, where you take cooling water from power plants that is 80 degrees Celsius and circulate that water throughout the city. That residual heat keeps your home warm. The downside is the pollution issues you always have from the coal powder; the air pollution is very severe,” he said.

“I want to spend my career to invest in this area to further the technology,” said Han, “to hopefully have the technology not only in the States but worldwide so we can reduce the CO₂ emissions globally.”

The membrane technology that Han and Ho are perfecting relies on a chemical reaction. The membrane is a polymer matrix with a chemical quality that can react to capture and release CO₂.

Most significantly, the process meets the energy department’s goal of developing a carbon capture technology that costs less than $40 per metric ton. “We may have the only technology that can meet the DOE target,” Ho says. “We are the only one they have asked for the engineering-scale project.”

At the engineering scale, Ho and Han will work to prove that the membrane technology can be expanded for use with the production of 1 MW of energy, capturing 20 tons of CO₂ a day. To give that some perspective, Ohio State’s current power plant is about 10 MW — the size at which they expect to be able to design the membrane process about halfway through this four-year project. To continually receive funding for this work, they need to prove the technology works at progressively larger scales.

The $4 million energy department funding is part of a $13 million grant to construct a membrane skid, or test unit, that can be integrated into a power plant. When the project expands to the demonstration scale of 100 MW, it could be applied to a small commercial power plant. “We are still maybe another five to six years away from a commercial-size demonstration plant,” Ho says.

The National Science Foundation’s Emerging Frontiers in Research and Innovation (EFRI) program is extremely competitive. In rare instances, a single university is awarded two EFRI grants, but it is practically unheard of for a single department to win two EFRI awards — and on the same day.

Two CBE research groups did just that. Teams led by Professor Liang-Shih Fan and Professor Bhavik Bakshi each received $2 million in funding to support their four-year projects, which were deemed to offer transformative opportunities for a significant shift in fundamental and multidisciplinary knowledge with a strong potential for long-term impact on national needs.

Creating value from stranded natural gas
Fan’s project will develop a small-scale modular chemical processing system to convert stranded natural gas and carbon dioxide into value-added liquid fuel products. Stranded natural gas resources are currently flared due to economic limitations associated with prohibitive transportation costs and small reservoir sizes. Successfully transforming these remotely distributed gas resources to useful energy products will contribute significantly to the U.S. economy and its energy security.

The system will leverage Fan’s thermo-catalytic flared gas reforming (TC-FGR) technology and a novel pseudo-catalytic metal oxide (PMO) material. The successful integration of this innovative technology has the potential to be transformative for monetizing stranded natural gas while reducing the carbon footprint by simultaneously consuming carbon dioxide as a feedstock in the gas conversion process.

“With this collaborative project, we expect to contribute to finding solutions that allow society to benefit from the many attractive properties of plastics, while eliminating their environmental impacts such as those due to littering and greenhouse gas emissions,” Bakshi said.

Bucking the norm

IN RARE ACHIEVEMENT, DEPARTMENT WINS TWO HIGHLY COMPETITIVE NSF GRANTS

The team will conduct synergistic research in polymer chemistry, reaction engineering, and molecular simulation to determine properties of depolymerization and valorization processes under practical conditions of contamination. Valorization is the process of reusing, recycling or composting waste materials and converting them into more useful products including materials, chemicals, fuels or other sources of energy.

They will also analyze cost and physical flows of current and emerging technologies, model supply networks to determine the effects on the wider chemical industry, conduct behavioral studies to discern and influence the role of consumers, and assess life cycle and circularity to estimate environmental effects across global value chains.

Velocys, Inc., and Jan Lerou Consulting will contribute as industry partners. The team will use a data-driven approach to integrate the reactor system components and further the fundamental understanding of the gas upgrading chemistry by identifying an efficient catalyst to promote the reactions.

Eliminating end-of-life plastics
Only a fraction of plastic is ever recycled. The rest ends up in landfills or the ocean. Professor Bhavik Bakshi’s multidisciplinary team, which includes CBE’s Assistant Professor Li-Chiang Lin, will develop methods and tools for assessment, design, and innovation toward Sustainable and Circular Engineering for the Elimination of End-of-life Plastics.

A linear model of resource consumption includes resource extraction, manufacturing, distribution, and use, followed by disposal. Conversely, in a circular economy, goods are reused, repaired, or remanufactured, thereby taken back into the product cycle.

“With this collaborative project, we expect to contribute to finding solutions that allow society to benefit from the many attractive properties of plastics, while eliminating their environmental impacts such as those due to littering and greenhouse gas emissions,” Bakshi said.

The team will conduct synergistic research in polymer chemistry, reaction engineering, and molecular simulation to determine properties of depolymerization and valorization processes under practical conditions of contamination. Valorization is the process of reusing, recycling or composting waste materials and converting them into more useful products including materials, chemicals, fuels or other sources of energy.

They will also analyze cost and physical flows of current and emerging technologies, model supply networks to determine the effects on the wider chemical industry, conduct behavioral studies to discern and influence the role of consumers, and assess life cycle and circularity to estimate environmental effects across global value chains.
Bhavik Bakshi
NSF SUPPORTS TWO MORE CUTTING-EDGE PROJECTS

Two projects to be led by Principal Investigator Bhavik Bakshi, were selected in the National Science Foundation’s 2026 Idea Machine competition, a program that supports “bold ideas for transformative research” on the cutting edge science. Twenty-five awards were made out of 800 entries received from nearly every state in the United States.

Spatio-Temporal Design of Techno-Ecological Synergies for a World Without Waste and Resilient Landscapes: Bhavik Bakshi, principal investigator, will join with Joel Paulson (CBE) and Gil Bohrer (Civil Environmental and Geodetic Engineering) with support from the NSF-CCNET Environmental Sustainability program to research the ecological capacity to provide goods and services in the face of demands imposed by a technological society.

To meet sustainability goals, most engineers design and operate manufacturing processes to minimize resource use and emissions, but they may not account, for example, for the capacity of a watershed to provide fresh water to all users (including non-human users) or of the atmosphere to absorb emitted CO2. Similarly, economists may exclude consideration of the impact on ecosystems.

The vision of this research is that through appropriate design, human activities can explicitly account for the provisions supplied by ecosystems, and can be designed to respect ecosystem limits while contributing to human well-being.

The research seeks to provide a framework for designing industries and ecosystems simultaneously to operate in a mutually beneficial or synergistic manner. The resulting Techno-Ecological Synergies (TES) will rely on designing ecosystems of the future, that in fundamental concept include the built environment, to enrich other NSF2026 Idea Machine winning entries in a “World without Waste,” and “Large Scale Resilience by Design.”

The project will receive $300,000 in funding for two years beginning January 1, 2021.

Convergence Around a Sustainable World Without Waste: Also led by Bhavik Bakshi with co-PIs Thomas Theis (University of Illinois, Chicago), Timothy Gutzwiller (MIT), Valerie Thomas (Georgia Tech), Dusan Sekulic (University of Kentucky), Melissa Billec (University of Pittsburgh), Cynthia Isenhour (University of Maine), and Elena Irwin (OSU, Agricultural, Development and Environmental Economics), this project envisions a zero-waste world that is economically feasible, socially desirable, and environmentally viable.

To transcend boundaries and move toward deeply convergent research approaches, a series of workshops will be held that bring together a diverse group of stakeholders across many disciplines (engineering, economics, social sciences, environmental science), and sectors (academia, industry, government and non-governmental organizations).

The multidisciplinary teams will explore integration of knowledge, methods, models, and data necessary for creating and evaluating potential solutions. The team also plans to develop curricula for a Masters program that will train students to work toward achieving a world without waste. The project received a one-year grant of $100,000 to begin work in September, 2020.

In November 2020, Bakshi won the American Council for Life Cycle Assessment (LCA) Education Leadership Award.

The NSF 2026 Idea Machine was launched in 2018. The program ventures beyond traditional paradigms to ensure that future research that has the potential for great impact by meeting pressing grand challenges in fundamental research or STEM education.

A team led by Chemical and Biomolecular Engineering Assistant Professor Eduardo Reátegui has earned The Ohio State University’s first-ever grant from the Chan Zuckerberg Initiative (CZI).

A color scanning electron microscopy image of ex vivo human neutrophils swarming on a microparticle array device. A color scanning electron microscopy image of ex vivo human neutrophils swarming on a microparticle array device. The $350,000 awards will support efforts to decode inflammation through immune cell behavior, specifically neutrophils. CZI’s co-investigator is Tim Læmmermann of the Max Planck Institute of Immunobiology and Epigenetics in Freiburg, Germany.

Inflammation is a natural defense that helps our bodies maintain a healthy state and rebound from injury. But it also plays a role in organ failure, neurodegenerative diseases like Alzheimer’s, and severe infectious diseases like COVID-19.

Founded by Facebook CEO Mark Zuckerberg and his wife, Priscilla Chan, CZI recently announced $14 million in funding to support 29 interdisciplinary teams and build a network of researchers to increase understanding of inflammation, and thus improve the ability to cure, prevent or manage disease.

Chemical and Biomolecular Engineering Assistant Professor Eduardo Reátegui plan to extend their project to develop a device that can be designed to respect ecological capacity to provide goods and services in the face of demands imposed by a technological society.

Failure to shut down these pro- and anti-inflammatory responses is considered critical in non-healing wounds and at the onset of chronic diseases such as cancer, diabetes and autoimmune diseases.

The team will utilize a combination of a miniature lab-on-a-chip device, intravital microscopy and advanced molecular techniques to systematically define the mechanisms controlling neutrophil swarming during inflammation and infection. Reátegui said he and Læmmermann plan to extend their model to explore inflammation of the lungs, which would have great relevance in the wake of the COVID-19 pandemic.

“The new generation of in vitro tools we have developed promises to advance our understanding of many diseases and improve our ability to cure, prevent and treat them,” said CZI’s Head of Science Cori Bargmann.

“We look forward to collaborating with these interdisciplinary teams of researchers studying inflammation.”

The current CZI cohort includes a total of 142 active awards on projects, 75% of which are led by early-career scientists within six years of starting their independent position. Grantee teams are made up of two to three investigators with distinct areas of expertise, including physicians, experimental biologists, technology developers, and computational scientists. The awarded project teams represent 11 countries.

“Knowing more about inflammation at the level of affected cells and tissues will increase our understanding of many diseases and improve our ability to cure, prevent and treat them,” said CZI’s Head of Science Cori Bargmann.

“We look forward to collaborating with these interdisciplinary teams of researchers studying inflammation.”
When Michael Charles was a senior undergraduate, an assignment for a one-credit module in a sustainable engineering elective turned into a pivotal moment in his academic career.

Students were given a case study: design an energy system for a community learning center in rural India that was preparing meals for nearly 400 students a day using open-fire cooking methods in enclosed spaces, leading to health concerns such as lung disease.

Charles and two classmates submitted a proposal for a biogasifier system. The proposal, which utilized the manure and urine from the on-site dairy farm to produce bio-syngas as cooking fuel, quickly turned from a graded assignment into a funded international research experience to construct the design.

The beauty of this experience was not in the fact that things went according to plan. Quite the contrary. The value was in learning how even a well-researched proposal with solid design equations derived from the chemical engineering literature paled in comparison to derived from the chemical engineering literature paled in comparison to the results yielded by the on-site collaboration with the local population, ultimately leading to a successful implementation.

“Working with local experts in India was eye-opening because it was the first time I observed that these two worlds do not have to be separate,” he said. This led Charles to an immediate interest in understanding the balance and harmony of his indigenous cultural knowledge and the science of the academy.

As a doctoral student in Dr. Bhavik Bakshi’s lab, exploring this balance led to his research on the inclusion of ecological models and the services of nature within computational sustainable design.

Charles asserts that in Dine (Navajo) culture, the concept of hózhó—a way of life that has been related to the English words of balance, beauty, and harmony—must be included in solutions addressing today’s environmental predicaments, like climate change. Hózhó encourages academics and scientists to involve a balance of voices that includes indigenous sources of knowledge.

Within the research of Bakshi’s Sustainable Engineering Research Group, the hózhó concept can parallel the framework that has been published as Techno-Ecological Synergy (TES), which aims to design systems in which technology operates within the capacity of nature.

Charles has continued advocating for ways to incorporate indigenous knowledge, and on a very visible platform. In December 2019, he co-led the first United States Indigenous Youth Delegation to the United Nations Climate Negotiations. He first attended these negotiations in 2017 and quickly became involved in the International Indigenous Peoples’ Forum on Climate Change, a group that aims to represent the different perspectives and impacts of climate change on Indigenous Peoples across the globe.

By having observed conditions such as deforestation, wildfires, and climate change that are rooted in the harmony between indigenous knowledge and western science.

His efforts continue to bring results. At the October 2020 American Indian Science and Engineering Society National Conference—which attracts over 2,000 members and American and Canadian attendees from as far away as Alaska and Hawaii—he won second place in the graduate poster research competition. To learn more:


STUDENT NEWS BRIEFS

AIChe plows ahead

Students worked hard this semester to fulfill AIChe objectives, hosting a number of activities online, including a “murder mystery” scavenger hunt, videogame and fitness sessions, and Networking Night offered via Zoom, attended by representatives from Dow, LyondellBasell, and Marathon.

“We’re very excited for some big changes and additions this year as well, like expanding our Mentorship Program,” President Matt Greenwaldt said. “We are also beginning to host events to teach interested students about instilling the values of embracing diversity and inclusivity within themselves and their communities.”


2020 Undergraduate Awards

American Institute of Chemical Engineers (AIChe) Central Ohio Chapter Awards: Thomas Porter, Outstanding Student; Margaret Vaillancourt - Donald F. Othmer Sophomore Academic Excellence Award; AICHe Student Chapter Awards: Adam Benway - Outstanding Support of Undergraduate Education Award; Christina Janes - Community Outreach Award; Bryce Pember - Exemplary Service and Leadership Award; CBE Department Research Awards: Melanie Gross, Josh Goetze, Broderick Lewis, Brian Wynne.

2020 Graduate Student Awards

American Institute of Chemical Engineers (AIChe) Central Ohio Chapter Awards: Thomas Porter, Outstanding Student; Margaret Vaillancourt - Donald F. Othmer Sophomore Academic Excellence Award; AICHe Student Chapter Awards: Adam Benway - Outstanding Support of Undergraduate Education Award; Christina Janes - Community Outreach Award; Bryce Pember - Exemplary Service and Leadership Award; CBE Department Research Awards: Melanie Gross, Josh Goetze, Broderick Lewis, Brian Wynne.

AICHe Sustainability Award

Graduate student Kyuha Lee and now-alumnus Tapayioti Ghosh ’19 won the SEF Best Student Paper Award for their work on sustainable process design.

The research, which was co-authored with their advisor, Bhask Bakshi, was published in Chemical Engineering Science in 2019.

Standout STEM research

At the American Indian Science and Engineering Society (AISES) National Conference, Michael Charles earned 2nd place in the graduate poster research competition for his work on achieving campus carbon neutrality with both technological and ecological solutions. Charles received an NSF ASSIST grant to attend the conference.

Freshman Anna Grondolsky won the undergraduate oral research presentation for her work on reversible fuel cell technology done at her all-Native Hawaiian school, Kamehameha Schools’ Kapalama High School, which has a strong research program.

Also, the oral research presentation of Xilal Rima (above, left) was recognized at the 2020 SACSNA’s National Diversity in STEM Conference. Rima (Eduardo Restegui Group) studies dormant cancer cells with the goal of understanding what causes them to reactivate in order to prevent relapse.

---

“Society for the Advancement of Chicanos/ Hispanics and Native Americans in Science.”

Next Generation Innovator

New PhD graduate Pengfei Jiang’s work with Prof. Katelyn Swindle-Reilly seeks to reduce the need for eye injections in patents with age-related macular degeneration from once a month to once a year (Watch: bit.ly/ JiangResearch). Jiang was a finalist in Ohio State’s Next Generation Innovator of the Year competition. Her research was recently featured on the cover of Journal of Controlled Release.

Research Cover Feature

Frank (Fanhe) Kong’s research was featured on the cover of Chemical Engineering & Processing: Process Intensification, a 2019 Special Issue honoring Robert Langer.

2020 GRS attendees scale up

September’s 9th annual Graduate Research Symposium, held virtually, featured keynote speaker Dr Jian Zou (’07 PhD).

Zou, a senior manufacturing engineer in new product introduction at Baker Hughes who led more than 85 new product and production process scale-ups at Momentive Performance Materials, described the steps required for successful scale-up.

A key challenge is identifying the correct equipment needed for each stage, from lab R&D, to pilot plant, to commercial scale production. A lot of analysis is needed to accommodate all those differences, he said. For example, heat and mass transfer in a lab is much easier to attain than in a commercial scale reactor.

Zou has four scale-up mantras: Be safe; Be present; Be diligent; and Be kind. He emphasized the latter with an explanation that scale-up is teamwork and everyone’s support is needed.

“Show your appreciation in various ways, such as bringing in donuts, and don’t forget the third shift,” he said. “No donut, no scale-up!” he laughed.

As a former student and alumnus of the William G. Lowrie Department of Chemical Engineering, you worked hard to become a chemical engineer.

That’s why we are proud of each and every one of our alumni. Whether you are a teacher or professor, researcher, entrepreneur, medical professional, sales engineer or a CEO - the training you received as a chemical engineer most likely contributed to your success.

We hope you will remember your CBE and the role it may have played in your life, and consider how you might help to foster the success of others who came after you.

With 200 graduates annually and 800+ undergraduates, we simply can’t do it all without you. Your support helps us to overcome challenges as we strive to hire outstanding faculty, support our graduate and undergraduate students, and provide the best possible educational outcomes for the next generation.

Whatever size gift you make has an impact. Together, we all make a difference.

Director of Development Sean Gallagher can provide information about the many giving options, from supporting Unit Ops to providing support for faculty research. Some giving vehicles, like estate or planned gifts and IRA charitable rollovers of the required minimum distribution, can provide significant tax benefits.

HOW TO GIVE

- Online: Visit go.osu.edu/GiveToCBE and click on the magnifying glass to search for ‘chemical engineering’
- By Check: Payable to The Ohio State University Foundation, P.O. Box 710811, Columbus, OH 43271-0811
- Increase your impact with matching gifts! See if your company participates at go.osu.edu/MatchingGifts.

Popular funds include:
- Jewels Club-310335
- Unit Ops-305659
- Scholarships-314757
- Graduate Program Support-316080
William G. Lowrie Department of Chemical and Biomolecular Engineering

314 Koffolt Laboratories
CBEC Building
151 W. Woodruff Avenue
Columbus, OH 43210-1350
614.292.4000

cbe.osu.edu