



2020 ANNUAL REPORT



THE OHIO STATE UNIVERSITY
COLLEGE OF ENGINEERING

William G. Lowrie Department of
Chemical and Biomolecular Engineering

MESSAGE FROM THE CHAIR

Spring 2021



Friends and Colleagues,

Amidst the challenges of 2020, I am grateful that we enjoyed some unexpected bright spots, particularly in the area of funding!

- In a nearly unprecedented event, the Department won two NSF Emerging Frontiers in Research and Innovation (EFRI) grants—rare for a single university, and practically unheard of for a single department.
- In addition, two projects were funded in the cutting-edge NSF 2026 Idea Machine competition.
- We were also excited to be the first program at Ohio State to win support from the facebook-funded Chan Zuckerberg Foundation.
- Due to its economic viability, Winston Ho's carbon-capturing membrane technology is the only carbon-capture project the Department of Energy is choosing to support this year for engineering-scale testing.
- The NIH funded research on blood substitutes and optimizing viral disease testing, both efforts highly relevant to the Covid-19 outbreak.

Details about these awards are on page 12 if you would like to know more.

I hope we can all relish a more normal life of teaching, research and service this coming year, and best wishes for all of your upcoming endeavors and triumphs.

A handwritten signature in black ink that reads "Umit S. Ozkan".

Umit S. Ozkan
Department Chair
Distinguished University Professor
College of Engineering Distinguished Professor

TABLE OF CONTENTS

4.....	College News
6.....	Program Overview
8.....	Faculty Highlights
12.....	Grant Highlights
14.....	Research Highlights
18.....	Alumni Highlights
22.....	Student Highlights



Ayanna Howard Named Dean, College of Engineering



Sitting in his wheelchair with a robot-equipped stuffed animal, the boy beamed when he realized his movements caused a character in the game to react. He was in control. It was a gift—for the boy with cerebral palsy and for Ayanna Howard. “At that moment, I realized we were doing the right thing,” she said.

Howard, who traces her love of engineering to a childhood fascination with the TV show “Bionic Woman,” is the new dean of Ohio State’s College of Engineering.

“I was a total science fiction nut, so anything that flew, had robots or superheroes, I was there,” she said in an NBC4 interview. And what was once the premise of a sci-fi TV show is now the life’s work of an accomplished roboticist and educator.

Howard’s career spans higher education, NASA and the private sector. Most recently chair of Georgia Institute of Technology’s School of Interactive Computing and founder/director of the Human-Automation Systems Lab (HumAnS), she is also an entrepreneur whose company, Zyrobotics, develops

robots to help children with special needs achieve educational and therapy goals.

Dr. Howard joined Ohio State March 1, succeeding David B. Williams, who led the College’s unprecedented growth over the last decade.

“I’m thrilled to join Ohio State at a time in which there is so much potential to strengthen and build new partnerships in order to expand access and enhance opportunities for the next generation of students, alumni, and for economic development throughout Ohio,” said Dr. Howard.

“Dr. Howard is an innovator whose skills and passion are a perfect fit with Ohio State’s focus on convergent research and discovery,” said President Kristina M. Johnson. “To attract a leader of her caliber shows both the strength of our engineering program and the acceleration of the university’s overall research mission.”

Ayanna Howard’s robotics research center around the concept of humanized intelligence—embedding human cognitive capability into the control path of automated systems. Her Georgia Tech HumAnS Lab uses techniques such as sensing and learning to enhance the autonomous capabilities of robots and computerized systems. The HumAnS Lab has generated more than 250 publications and \$8.5 million in principal investigators-led research funding. After finding that humans can unwittingly pass on their racial and sexual biases to their AI creations, Howard authored “Sex, Race, and Robots-How to be Human in the Age of AI,” describing the danger.

Earlier in her career, Howard worked in NASA’s Jet Propulsion Laboratory as senior robotics researcher and deputy manager in the Office of the Chief Scientist. She was involved in developing SmartNav—an autonomous, next-generation Mars rover—and SnoMotes, toy-sized robots that can explore icy terrain that is too dangerous for scientists.

She founded her company, Zyrobotics, in 2013, based on a patent for a device that could enable children with disabilities to interact with tablets. During her work with Zyrobotics, Dr. Howard discovered a passion for teaching. This led to her coming to Ohio State, where she has become the first woman to serve as dean.

Throughout her career, Howard has been active in helping to diversify the engineering profession for women, underrepresented minorities, and individuals with disabilities. “Community and inclusive excellence around students, research, and innovation are my passions,” said Howard.

Executive Vice President and Provost Bruce A. McPheron noted that Dean Howard joins Ohio State at an opportune moment: a \$100 million State of Ohio investment will increase convergent research initiatives, strengthen student-industry partnerships, and grow the number of STEM graduates.

Howard is a vocal proponent of “convergent research.” She describes it as ‘interesting solutions happening at the intersection of disciplines.’ But the right researchers need to be in the same room to think about problems in different ways, she said. “The hard problems we face as humans exist at the

interface, the intersection of multiple disciplines. Engineers are driven by exploration, we’re driven by knowledge — and convergent research provides both,” she said.

“I’ve stayed in academia because I love being challenged by new knowledge. For example, the company I started is the convergence of robotics, artificial intelligence, clinical therapy, science interventions and early education. Those intersections have enabled us to develop interactive STEM games and learning tools that adapt to each child’s capabilities,” she added.

Among many accolades, *Forbes* named Dr. Howard to its America’s Top 50 Women In Tech list. Recently, she became an Institute of Electrical & Electronics Engineers (IEEE) Fellow for her contributions to human-robot interaction systems, and was a Champion Award recipient of Silicon Valley Robotics Industry’s inaugural Good Robot Industry Awards. In addition, she is included in *Cell Mentor’s* list of “1,000 Inspiring Black Scientists in America.”



-Based on stories by College of Engineering Communications

Faculty

23 tenure-track



- **3** NAE members
- **4** endowed chairs
- **3** professorships
- **4** distinguished professors

research expenditures



- **\$8** million
- **86** active grants

entrepreneurial



- **2** companies launched
- **2** in pilot / engineering scale
- **4** patents received

awards & honors



- 9** national / international, including:
- ACLA: Education Leadership Award
 - IFAC World Congress: Best Paper
 - RSC: Emerging Investigator
 - Scialog Fellow
 - Univ of Macao: Visiting Scholar

publications



- **168** peer-reviewed articles
- **5** books edited
- **9** book chapters



lectures



- **36** invited lectures
- **6** keynotes, **4** distinguished

Graduate Program

awards & honors



- 11** national honors:
- **6** Fellowships
 - AGGRS Travel Award
 - **1** NSF Graduate Research Fellowship and **2** honorable mentions

Publication honors, including:

- *Chemical Engineering & Processing*
- *Chemical Engineering Science*
- *Nature Communications*

degrees



14 Doctoral, **20** Masters

Undergraduate Program

awards & honors

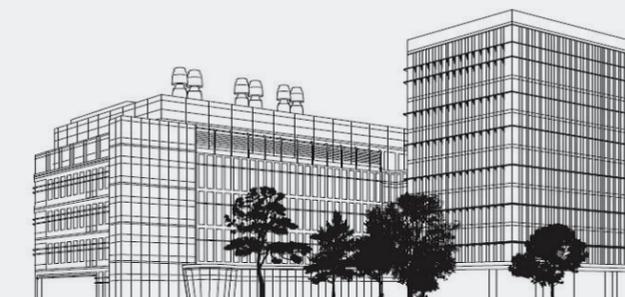


- 4** national honors:
- American Indian Science and Engineering Society
 - NSF Graduate Research Fellowship
 - Fulbright MITACS Globalink
 - US Dept of Energy Solar Cup

degrees



183 Bachelor degrees



USNWR **Rankings** (2021-22)



- **#28** ChE Graduate Program
- **#21** ChE Undergraduate Program (2021)
- **#16** College of Engineering Graduate Program



#1 College of Engineering Graduate and Undergraduate Programs

2020 National/International Awards

Bhavik Bakshi

- American Council for Life Cycle Assessment: 2020 Education Leadership Award

Nicholas Brunelli

- Royal Society of Chemistry, Molecular Systems Design and Engineering: 2020 Emerging Investigator Award

Stuart Cooper

- American Chemical Society: Elected Fellow, Polymers Division
- Florida State University: Named to Chemical Engineering Advisory Board.

W.S. Winston Ho

- National Taiwan University: 2020 Outstanding Alumnus Award
- Indian Institute of Technology: Honorary Faculty

Li-Chiang Lin

- Research Corporation for Science Advancement: Scialog Fellow - Negative Emissions Science

Joel Paulson

- IFAC World Congress: 2020 Application Paper prize

Jessica Winter

- Florida Association of Nanotechnology: Fellow

Shang-Tian Yang

- University of Macao: Distinguished Visiting Scholar (postponed).

Honorific Appointments

Jeffrey Chalmers

- Named the Helen C. Kurtz Chair

Andre Palmer

- Named Fenburr Ohio Eminent Scholar

National Media

Jessica Winter

- National Nanotechnology Initiative (Nano.gov), Three-part interview series with Lisa Friedersdorf, director of the National Nanotechnology Coordination Office on Winter's work with quantum dots / biomarkers / nanotechnology for detecting cancer earlier.
- New York Academy of Sciences webinar: "Science Advocacy: Communicating with Policy Makers." October 2020.

David Wood

- GenScript 2020 Webinar Series, GenScript Corporation, "A general capture and purification platform for tagless proteins," December 2, 2020.
- The Chain: Protein Engineering Podcast, Cambridge Healthtech Institute, Episode 19: "Developing a Novel Self-Cleaving Tag Technology while Learning from Both Success and Failure." June 2020.

Distinguished Lectures and Keynotes

Bhavik Bakshi

- Imperial College of London, Department of Chemical Engineering, Distinguished Seminar Series: "Technologies for Sustainable Development: How can Engineering Deliver?" April 2020.

Nicholas A. Brunelli

- Robert Augustine Award Lecture: "Mechanism Informed Design of Heterogeneous Catalysts." March 2020 (postponed).
- American Chemical Society Keynote: "Catalytic Site Design for Lewis Acid Zeolites for Epoxide Ring Opening with Alcohols." March 2020.

W.S. Winston Ho

- 12th International Congress on Membranes and Membrane Processes, London, United Kingdom, Keynote: "Facilitated Transport Membranes for H₂ Purification from Coal-Derived Syngas," Paper No. K13A.01. December 2020.

Li-Chiang Lin

- 16th International Conference on Inorganic Membranes, Keynote: (postponed).

Jessica O. Winter

- Florida Association of Nanotechnology, Distinguished Lecture Series (Inaugural Lecture): "Twenty Years Later: Why No Clinical Quantum Dot Imaging Labels."

David W. Wood

- PEGS Europe 2020, Cambridge Healthtech Institute, Keynote: "Evaluating a New Technology in the Context of Historical Successes and Failures: A Case Study on Self-Cleaving Tags." Lisbon, Portugal, November 2020.
- The Bioprocessing Summit 2020, Cambridge Healthtech Institute, Keynote: "Drivers and Disruptions for the Next Generation of Downstream Processes." Boston, MA, August 2020.

Shang-Tian Yang

- University of Macao Distinguished Visiting Scholars (MDS) Lecture: "Renewable biofuels and chemicals from food processing wastes using novel fermentation processes and metabolically engineered microbes." Macao, China, June 2020 (pandemic-postponed).
- International Symposium, Frontiers in Chemical Engineering and Global Chinese Chemical Engineering Forum, Invited Plenary: "Biofuels and chemicals production from renewable biomass and CO₂ for sustainable bioeconomy." Hamburg, Germany, August 2020 (pandemic-postponed).

Entrepreneurial Activities

Start-Ups

W.S. Winston Ho

The effort to commercialize Winston Ho's carbon-capturing membrane technology is moving to engineering scale. Ho's technology could help decarbonize flue gas from fossil fuel-burning power plants while providing the captured CO₂—which is 95% pure at bench scale—to industry. This is important because demand for quality CO₂ is growing in the oil, chemical and food industries.

Jessica Winter

With a ramp-up boost from an NSF SBIR phase II award, Winter's company, Core Quantum Technologies, began reagent sales of its magnetic nanoparticles in January 2020. The nanoparticles can be used for both diagnostics and cell separation and would help biobanks researchers to identify and isolate cell types.

David Wood

David Wood and Izabela Gierach founded Protein Capture Science (PCS), LLC to develop, manufacture and directly distribute biopharmaceutical manufacturing technology to potential users in industry, academia and government research laboratories. With additional startup grants from the university and state of Ohio, PCS hopes to launch the product summer 2021.

Patents

Nicholas A. Brunelli

"Zeolitic Materials Including Paired Lewis Acid Catalytic Sites," Brunelli, N.A.; Deshpande, N.; Parulkar, A. (U.S. 10,695,757; 2020).

Eduardo Reátegui

"Capture and Release of Particles from Liquid Samples," E. Reátegui, M. Toner, S. Stott. (U.S. 10,551,376; 2020).

Katelyn Swindle-Reilly

"Compositions and kits for treating pruritus and methods of using the same," Salamone JC, Salamone AB, Leung KXC, Reilly KE. (U.S. 10,688,159; 2020).

David Wood

"Split Intein Compositions," Wood, D. W. & Shi, C. (U.S. 10,669,351 B2; 2020).



Aravind Asthagiri
Associate Professor



Bhavik Bakshi
Professor



Robert Brodkey
Professor Emeritus



Nicholas Brunelli
H.C. Slip Slider Professor



Jeffrey Chalmers
Professor



John Clay
Professor of Practice



Stuart Cooper
Distinguished Professor



Paul Dubetz
Adjunct Asst. Professor



Ilham El-Monier
Asst. Professor of Practice



Liang-Shih Fan
Dist. Univ./CJ Easton Prof.



Martin Feinberg
Professor Emeritus



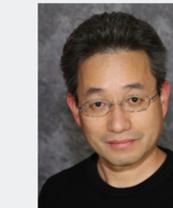
Lisa Hall
Associate Professor



W.S. Winston Ho
Distinguished Professor of Engineering



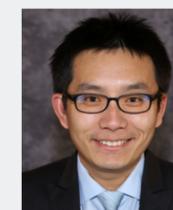
Kurt Koelling
Professor



Isamu Kusaka
Associate Professor



L. James Lee
Professor Emeritus



Li-Chiang Lin
Assistant Professor



Andrew Maxson
Asst. Professor of Practice



Umit Ozkan
Chair / Distin. University + Coll. of Engineering Prof.



Andre Palmer
Professor



Joel Paulson
Assistant Professor



James Rathman
Professor



Eduardo Reátegui
Assistant Professor



Katelyn Swindle-Reilly
Assistant Professor



David Tomasko
Professor



Andrew Tong
Research Asst. Professor



William Wang
Assistant Professor



Xiaoxue Wang
Assistant Professor



Jessica Winter
Professor



David Wood
Professor



Barbara Wyslouzil
Professor



S.T. Yang
Professor

Chan Zuckerberg Initiative (CZI)

\$900k – Inflammation research

Facebook's foundation makes its Ohio State debut with a grant to a team led by Assistant Professor **Eduardo Reátegui**. Founded by Facebook CEO Mark Zuckerberg and 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 help cure, prevent or manage disease. Reátegui will explore inflammation of the lungs, which could be highly relevant in the treatment of coronavirus patients.

Department of Energy (DOE)

\$4M - Economical carbon capture

Distinguished Professor of Engineering **Winston Ho** and Research Scientist Dr. **Yang Han** ('18) may be developing the most economical carbon capture method yet. The DOE has supported Ho's research with more than \$12M since 2012. This new funding supports an engineering-scale project. Ho's project is currently the only engineering-scale carbon capture project receiving new DOE support.

National Institutes of Health (NIH)

\$2.7M, 4 years – Blood substitutes

With blood shortages and supplies at risk due to infectious diseases such as COVID-19, safe and effective blood substitutes for use in transfusion medicine are more important than ever. Professor **Andre Palmer** has dedicated 20 years to this research, supported by multiple federal grants. Under Palmer's new NIH funding, Professor **David Wood** joins the effort to develop chemically well-defined red blood cell (RBC) substitutes that could help save lives.

\$1.8M, 2 years – Optimized Covid-19 testing

Assistant Professor **Eduardo Reátegui** and Professor Emeritus **L. James Lee** are leading interdisciplinary efforts to optimize Covid-19 testing to combat the coronavirus pandemic and address future viral outbreaks. The method uses existing microarray technology they initially developed for the characterization of single extracellular vesicles from biofluids. Once optimized, the new method could potentially improve accuracy up to 100x.

National Science Foundation (NSF)

Emerging Frontiers in Research and Innovation (EFRI)

It is rare for a single university to receive two EFRI, but practically unheard of for a single department; however, we did receive two awards -- and on the same day!

\$2M, 4 years – Creating Value from Stranded Natural Gas

Led by Distinguished University/C. John Easton Professor **L.-S. Fan**, the 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. Members of this team include Assistant Professor **Joel Paulson** and Research Assistant Professor **Andrew Tong**, both co-PIs.

\$2M, 4 years – Eliminating End-of-Life Plastics

Morrow Professor **Bhavik Bakshi**'s multidisciplinary team will develop methods and tools for the assessment, design, and innovation of 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. Assistant Professor **Li-Chiang Lin** is a co-PI.

NSF 2026 Idea Machine

\$300k, 2 years - Accounting for Nature

The NSF advanced 25 new projects to explore bold new ideas for transformative research -- including two zero-waste projects led by **Bhavik Bakshi**. Assistant Professor **Joel Paulson** joins Bakshi in researching how engineering systems can be designed to account for the role nature can play while respecting ecosystem limits and contributing to human well-being.

\$100k, 1 year - Envisioning Zero Waste

Bakshi's second project is a series of workshops to 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 group will explore integration of knowledge, methods, models, and data necessary to envision a zero-waste world that is economically feasible, socially desirable, and environmentally viable and creating and evaluating potential solutions.



THE OHIO STATE UNIVERSITY OFFICE OF RESEARCH

150 Years, 150 Innovations

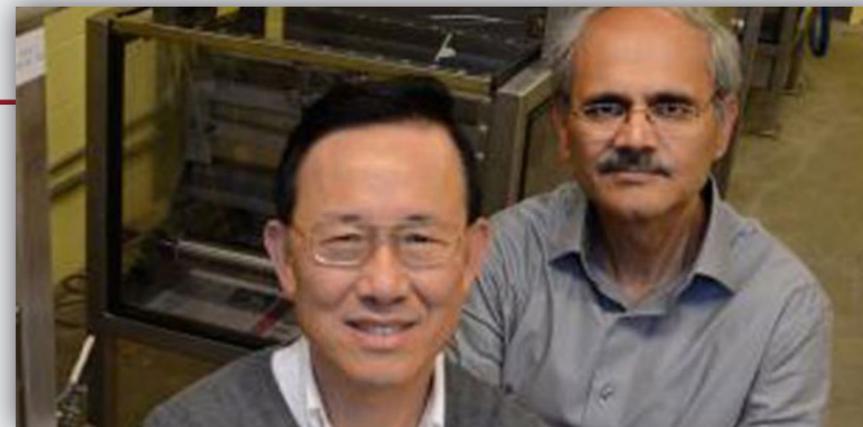
In recognition of the first 150 years of excellence in research and creative innovation at The Ohio State University, Ohio State's Office of Research gathered the names of 150 individuals over the last 150 years who have made their mark by taking on the world's issues as their direct challenges. The "150" project features seven current professors from the William G. Lowrie Department of Chemical and Biomolecular Engineering, and two now-deceased professors, Harry Drackett and Melvin DeGroot.



Liang-Shih Fan

Distinguished University Professor / C. John Easton Professor

L-S Fan is one of the world's leading authorities on particulates and multiphase reaction engineering (PMRE), which studies the flow behavior of particle material with gas, or gas-liquid mixtures and their accompanying chemical reactions. He invented several industrially-viable clean energy conversion processes and emissions control technologies, including the Ohio State Coal Ash Reactivation (OSCAR) process for SO₂ and heavy metal capture. The Carbonation-Calcination Reaction (CCR) process, for which Fan received the R&D 100 award, was developed to capture CO₂ produced from power and chemical plants and was commercially licensed for cement manufacturing. Fan also invented a novel non-invasive volume imaging technology known as Electrical Capacitance Volume Tomography (ECVT), which Tech4Imaging has sold successfully to clients such as the NASA Research program. Fan's redox chemical looping technologies for electricity, syngas, hydrogen, and chemical (e.g. methanol, acetic acid, and liquid fuels) produce under CO₂-emission neutral or negative conditions. His new company is commercializing the technology with clean hydrogen and power generation being the first industrial applications of interest.



W.S. Winston Ho

Distinguished Professor

The research of Winston Ho and Prabir Dutta led to a more economical CO₂ capture membrane. Specifically, they developed an economical hybrid membrane that combines the separation performance of inorganic membranes with the cost-effectiveness of polymer membranes. This discovery is a key component in the global race for clean energy and has commercial potential for use for coal-fired power plants.

Ho is a member the National Academy of Engineering. Before serving as a professor at Ohio State he had nearly three decades of industrial research and development experience in membranes and separation processes.

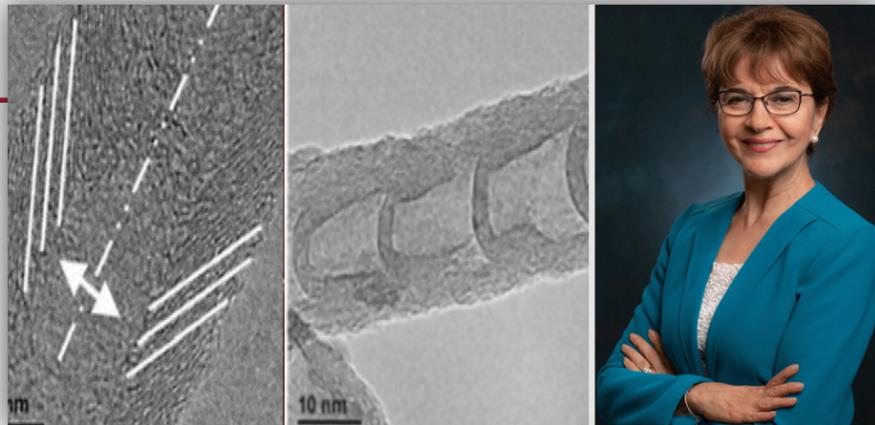


L. James Lee

Professor Emeritus

Jim Lee co-lead a study that developed a new regenerative medicine technology. Called Tissue Nanotransfection (TNT), this nanochip technology provides an electric spark to skin cells that is harmless to the body and reprograms nerve cells, blood vessels, and organs.

In research studies with mice and pigs, researchers were able to reprogram skin cells to become vascular cells and regenerated blood flow in injured areas that lacked blood flow previously. Not only does this technology have applicability in wound care, it has been able to reprogram skin cells into nerve cells that were injected into brain-injured mice to help them recover from strokes.



Umit S. Ozkan

Distinguished University Professor
College of Engineering Distinguished Professor
and Department Chair

Umit Ozkan's pioneering research into hydrogen fuel cell catalysts led to the development of the first heteroatom-doped carbon-nanostructures (CNx) to be used for the acidic oxygen reduction reaction in proton exchange membrane (PEM) fuel cells. The catalysts developed in her lab were patented and are being commercially produced by pH Matter, LLC.

The discovery of these CNx materials was a key milestone in the development of non-precious metal catalysts for a variety of electrochemical applications in renewable energy technologies. These materials could be synthesized with wide-ranging morphologies such as graphitic sheets, stacked cups and nanotubes. CNx can also be used in direct methanol fuel cells (DMFC) and air-metal batteries.



Andre Palmer

Professor

Andre Palmer is a world-renowned blood substitute researcher. Through his research he is developing safer, more commercially viable red blood cell substitutes that can provide patients valuable time until they receive a human blood transfusion.

He is a fellow of the American Institute for Medical and Biological Engineering and has received the College of Engineering's Harrison Faculty Award for Excellence in Engineering Education. In addition, he was named an Ohio Eminent Scholar by the Ohio Department of Higher Education for his groundbreaking work.



Jessica O. Winter

Professor

Jessica Winter is an established leader in nanobiotechnology who has invented materials used in cancer detection and research. Her method of tightly packing multiple nanoparticles in polymer carriers so that their properties can be multiplied led to her development of MultiDot, a group of semiconductor nanoparticle quantum dots that allow researchers to track tagged molecules. In biomedical applications, researchers can attach the MultiDot to specific cell structures and better identify and understand disease progression.

A product variation called Magdot adds magnetic particles to enable separation and manipulation of cellular biomarkers. Her company, Core Quantum Technologies, focuses on a nanoparticle diagnostic that matches cancer patients to therapies, allowing patients to become fully informed about the best possible



Barbara Wyslouzil

Professor

Barbara Wyslouzil is credited with creating the world's most cubic ice. Because of her research, computer models showing how clouds interact with sunlight and the atmosphere, can be improved. Additionally, her studies have provided valuable information pertaining to theories on climate change and its role on our planet.

Wyslouzil was elected a lifetime Fellow of the American Association of Aerosol Research (AAAR) for her significant contributions within the field of aerosol science. In addition to receiving this prestigious award, Wyslouzil's work has been published in numerous publications, including *Journal of Chemical Physics* and *Chemistry World*.



Melvin DeGroot

Melvin DeGroot (1895-1963) has been recognized as one of America's greatest inventors of all time and has been listed on over 900 U.S. patents. In 2000, TIME magazine's millennium issue recognized him as one of the most prolific inventors in the United States in regards to the number of patents issued to him. In fact, he was second on the list only to Thomas Edison.

DeGroot invented and patented many of the de-emulsifying agents that separate crude oil from impurities crucial to the process of oil production. He also invented the chemical recipe that allows chocolate to stick to ice cream, leading to the creation of the Eskimo Pie.

He graduated with an Ohio State degree in chemical engineering in 1915 and received his MS and honorary doctorate of science degrees from Ohio State in 1942 and 1955, respectively.



Harry Roger Drackett

Harry Drackett (1885-1948) graduated from The Ohio State University in 1907 with a bachelor of science in chemical engineering

He eventually went to work for the company his parents founded, P.W. Drackett & Sons, which developed industrial and home care cleaning products, based in Cincinnati. In 1933, Drackett developed Windex, which because of its convenience and successful advertising soon became the first successful glass cleaner on the market.

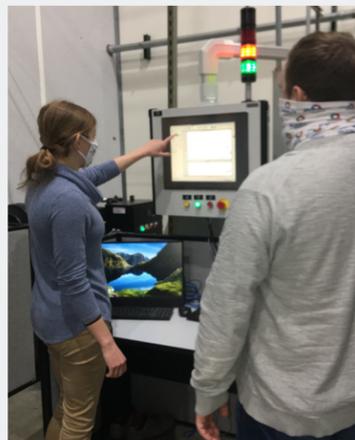
Drackett remained active with Ohio State after his graduation and served on many boards and committees, including as chair of the Alumni Advisory Board for ten years. Drackett Tower, a residence hall which opened in 1965, was named for him in recognition of his service to the university.



ALUMNI HIGHLIGHTS



Aisha Barry



Modality Solutions



Fanxing Li



Bhavesh V. (Bob) Patel



Elif Miskioglu



Prasad Ramanathan



Janani Sampath



Ah-Hyung Allissa Park

Alumna Named President

Advanced Sterilization Products (ASP), a global leader in infection prevention, named **Aisha Barry** ('95 BS) president of the company.

Barry is a former vice president and general manager for the Patient Monitoring at both Philips and Medtronic.

Earlier this year, Barry was appointed to the Kaman Corporation Board of Directors.

Crucial Work, Critical Timing

Biopharmaceutical cold chain engineering firm Modality Solutions, owned by **Dan Littlefield** ('86 BS, '88 MS) and recently featured on the *Today* Show, played a major role in supporting distribution of COVID-19 vaccines.

The firm's Ohio State CBE alumni employees include **Robert Battista** ('16), **Rachel Sawyer** ('19), and **Andrew Larrigan** ('16).

Alcoa Professorship

Fanxing Li ('09 PhD) was named *Alcoa Professor* at North Carolina State University.

Professor Li's research interests include energy and environmental engineering and particle technology.

He recently completed a sabbatical as a visiting scholar in the group of Professor Christoph Muller at ETH Zurich.

Fortune's "Most Admired"

LyondellBasell, led by CEO and Chairman **Bob Patel** ('88 BS), was named to *Fortune* Magazine's list of "World's Most Admired Companies®" for the 4th year in a row.

Patel credits his team, which includes CBE alumni **Dr. Hrishikesh (Rishi) Munj** ('12 MS, '14 PhD), **Nicholas Braun** ('16 BS), **Brennan Muha** ('20), **Rick Watson** ('01 PhD), and **Bradley Woledge** ('95 BS).

AICHE's "35 Under 35"

AICHE named Bucknell University's Assistant Professor **Elif Miskioglu** ('15 MS/PhD) to its "2020 35 Under 35" list.

To improve inclusivity, Professor Miskioglu studies the development of engineering expertise via the construct of intuition and its role in on-the-job judgements, as well as evidence-based methods for improving the support structures of underrepresented minorities in STEM.

A Distinguished Fellow

Dr. **Prasad Ramanathan** ('92 PhD) was named *Fellow*, holding the *M.M. Sharma Distinguished Visiting Professorship in Chemical Engineering* at the Institute of Chemical Technology in Mumbai, India.

An expert in AI and cognitive automation, Ramanathan is Senior Director of Capgemini India, where he leads the automation drive academy in Group Industrialization & Automation.

Newly-Minted Academic

Dr. **Janani Sampath** ('18 PhD) started her independent career in academia at the University of Florida as an assistant professor.

Dr. Sampath completed her postdoctoral fellowships at the University of Washington and Pacific Northwest National Laboratory.

Her research areas are polymers, proteins, and hybrid next-generation soft materials.

A Four-Time Fellow

Columbia University's **Alissa Park** ('05 PhD), Lenfest Earth Institute Prof. of Climate Change; Chair, Dept. of Earth and Env. Engineering; and Dir. of the Lenfest Center for Sustainable Energy, was named an *AICHE Fellow*. She became a fellow of AAAS, ACS and RSC last year. Dr. Park is a world leader on CO₂ emission control whose honors include the U.S. C3E Research Award, the AICHE PSRI Lectureship and ACS ENFL Emerging Researcher awards.

Awards and Honors

American Indian Science and Engineering Society (AISES) National Conference

- **Michael Charles:** *Second Place, Graduate Poster Research Competition*, “Achieving Campus Carbon Neutrality with both Technological and Ecological Solutions.” Charles attended the conference on an NSF ASSIST grant. (Bakshi Group).
- **Anna Grondolsky:** *First Prize, Undergraduate Oral Research Presentation*, “Reversible Fuel Cell Technology.”

Fulbright-MITACS Globalink Grant

- **Jacob Belding**

National Science Foundation:
2020 Graduate Research Fellowships

- **Thomas Porter** ‘20, *Fellowship*
- **Vasiliki “Aliko” Kolliopoulos** ‘18, *Fellowship*
- **Sabat Gonzalez-Serrano** *Honorable Mention*
- **Xilal Rima** *Honorable Mention*

North American Membrane Society (NAMS)

- **Ting-Yu Chen:** *2020 Elias Klein Founders’ Travel Award*, “Synthesis of Sterically Hindered Polyvinylamine and Its Application in Facilitated Transport Membranes for CO₂ Capture from Flue Gas.”

Society for the Advancement of Chicanos/Hispanics and Native Americans in Science, National Diversity in STEM Conference

- **Xilal Rima:** *Oral presentation award* for his research on the role of extracellular vesicles (EVs) in dormant circulating tumor cells in metastasis.

U.S. Department of Energy

- **Zahra Amin, Rupal Jindal:** *2020 Solar District Cup - Collegiate Design Competition.*

Student Publication Honors

American Institute of Chemical Engineers (AIChE), Sustainable Engineering Forum (SEF)

- **Kyuha Lee** and **Tapajyoti Ghosh** (‘19 PhD): *Best Student Paper*, originally published in *Chemical Engineering Science*. “Toward Multiscale Consequential Sustainable Process Design.” 207, 725-743, 2019. (Bakshi Group).

Biomicrofluidics: Biomicrofluidics

- **Xilal Rima:** *AIP Publishing “Scilight”* for ‘most interesting research across AIP Publishing Journals.’ “Surface Engineering Within a Microchannel for Hydrodynamic and Self-Assembled Cell Patterning.” (Reátegui Group).

Biotechnology and Bioengineering

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