UNIVERSITY *of* DELAWARE

Chemical & Biomolecular Engineering **NEWS**

2014

100 *Centennial Celebration*

MESSAGE FROM THE CHAIR

Our annual Alumni Newsletter integrates a rich variety of updates that we think will be of interest to you as alumni, but because of our celebration of the centennial of chemical engineering at Delaware, this year we have especially sought to engage our alumni.

Our celebration has included both cause and effect of our being a leading chemical engineering department – the history of how an unexceptional early program in chemical engineering was catapulted into the upper echelons of the profession, leading to a stream of scholarship and people with an enormous impact on the chemical engineering profession and beyond. As a result this year has been especially gratifying to us in including extensive interactions with our alumni near and far.

The centennial has also distorted our calendar somewhat: although the Newsletter normally reports on events occurring between July and June of the previous academic year, this year we have stretched the window to include an update on the highlight of the centennial celebrations, namely the *Centennial Reunion* that was held on campus in September (pages 4 and 5), and there is a rich variety of audiovisual content on the Centennial section of the Department's web site at www.che.udel.edu/100. Both at the reunion and at several other regional events that we held over the course of the year, the highlight for many in the Department was to meet up with alumni from a period of about seven decades and to have the gratifying and rewarding experience of celebrating their career accomplishments. My personal favorite insight is in the article on page 6, based on the report on the reunion on the UD web site, where **PHIL REISS**, class of 1958, and **NICK MARTIN** and **JON GALLARAGA**, class of 2016, describe remarkably similar experiences in the undergraduate program more than half-a-century apart.

We have appreciated experiences such as these all the more, for the new window that we have on how the Delaware tradition of excellence in chemical engineering came about, starting especially with our visionary and dedicated leaders Allan P. Colburn and Robert L. Pigford. This course of history is now accessible to all via the book, by historian **REGINA BLASCZYK**, that was published this year; copies are obtainable through the Centennial web site. We can trace some of our "that's just the way we do things here" practices back to the early years, and marvel at how much was accomplished in so short a time and under such challenging circumstances.

A particular highlight of the *Centennial Reunion* was the announcement of the endowment by **BOB** and **JANE GORE** of a Centennial Chair in the Department, as a major lead gift to the *Centennial Campaign*. The purpose of the Campaign is to secure the resources that will allow us to maintain the exceptionally high quality of education and scholarship that became our norm during our first century. While I have always found the great generosity of our alumni gratifying, since becoming chair I have become much more aware of the large number of donors and their level of generosity. Bob is a co-chair of the Campaign, together with **MORT COLLINS** and **TOM GUTSHALL**, and all three of these distinguished alumni have made recent gifts that, in one or more ways, make a profound qualitative difference to our programs. We are grateful to all of you who have donated and continue to support our programs, and hope that those of you who have been considering a focused gift will see the *Centennial Campaign* as a suitable opportunity.

Meanwhile our normal educational and research programs continue with their usual high levels of vigor and accomplishment. Our 2014 graduating class comprised more than 70 students and we are expecting over 90 to complete their undergraduate degrees in 2015. Our 2013-14 entering undergraduate class was again a large one and the offers accepted for 2014-15 will make this our largest entering class ever. While we are delighted to see such a high level of interest in a Delaware chemical engineering degree, we are well aware that further increases in the class size would make it increasingly difficult for us to maintain the tradition of excellence to which we are accustomed. We are, however, confident that the graduates now beginning their professional careers will achieve the same levels of success as in previous classes.

We also welcomed a class of 21 new graduate students in 2013-14, which will keep our total graduate population at around 150. New faces are appearing in our faculty ranks as well, with **ARTHI JAYARAMAN** joining us as an Associate Professor and **BERT DIEMER** and **JIM MICHAELS** as our first ever *Professors of Practice*. Bert and Jim's principal role is to coordinate our new M.Eng. program in Particle Technology, an area of immense industrial importance of which the coverage in educational programs is severely deficient. This program is therefore an innovative one that offers not just an educational opportunity for students but also an opportunity for Delaware to lead the way again in defining the intellectual structure of this critical field. A new staff face is that of **NEIL GARRETT**, who joined us as an electronics technician to fill the void left by the retirement of **GARY WELLMAKER** after his 29 years of service.

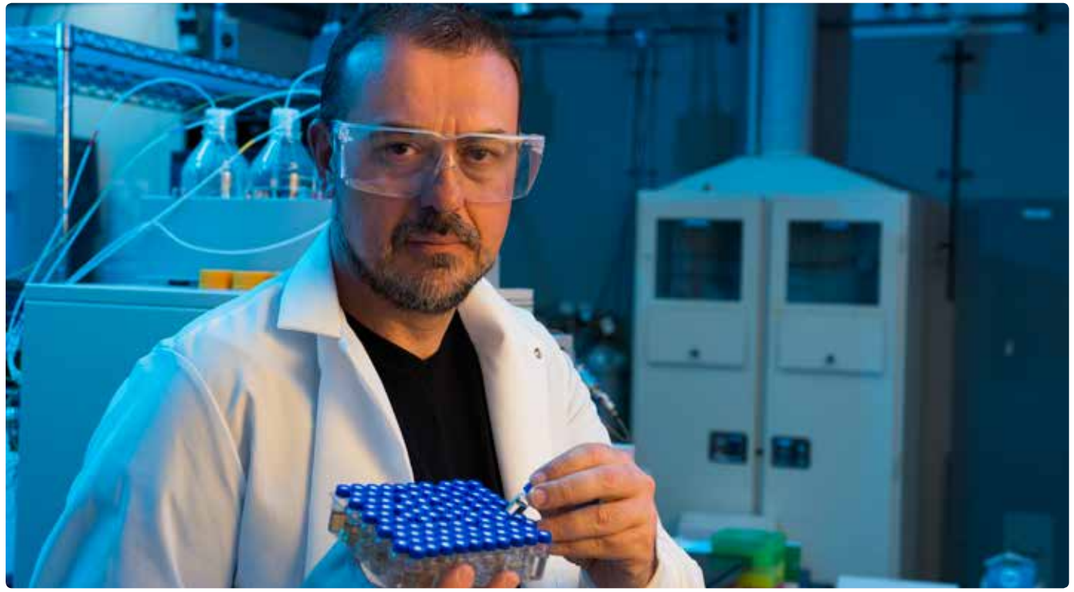
As we embark on our second century, we thank you for your continued interest in the Department and UD overall. One of the many pleasures of our centennial celebrations was the opportunity for current students to interact with alumni who had preceded them.

This is an experience that both the students and the alumni enjoy, we would welcome visits from any alumni. We plan to continue to hold regional alumni events and like hearing from alumni who may be interested in participating.

Best wishes,

Bramie Lenhoff,
Allan P. Colburn Professor and Chair

WELCOME



What's Inside

Check us out on Facebook:
University of Delaware Chemical Engineering

WE'RE ON facebook

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Chemical engineering turns 100

Chemical and Biomolecular Engineering celebrates centennial

The University of Delaware Department of Chemical and Biomolecular Engineering celebrated 100 years on campus with a centennial reunion Sept. 19-21. Current and former students came together with faculty to celebrate the department's past accomplishments and future plans.

While much has changed over the past century, the department's core values remain the same: to prepare students to become problem-solvers who can contribute solutions to the grand challenges and great debates of our time.

UD alumnus **PHIL REISS**, a graduate of the class of 1958, referred to his decision to study chemical engineering at UD as a "wonderful accident" that afforded him "a fantastic education."

Reiss explained that his UD professors worked their students hard, driving them to their fullest potential, all of which prepared him for a successful 27-year career working for Shell Oil Company. He remembered fondly that there was a great spirit in the department, and that he had great relationships with his professors – both during, and in the years after, his four years on campus.

Juniors **NICK MARTIN** and **JONATHAN GALARRAGA**, president and vice president of the American Institute of Chemical Engineers (AIChE) Student Chapter, echoed these sentiments.

"Within chemical engineering specifically, there's a strong sense of family that you get that you won't find in other majors. We have close interpersonal relationships with graduate students, faculty members and peers," Galarraga said.

"There's a lot expected of us here," added Martin, "And I think that's what we need to be prepared for the real world. Nothing is handed to us here. If you want to do well, you have to work hard for it."

About 150 alumni returned for the weekend, and approximately 300 people were in attendance including the alumni, families and faculty. Weekend activities included an open house, campus tours, a welcome reception, interactive sessions on the past, present and future of the department, trips to local attractions and more.

A highlight of the weekend was a departmental history presentation featuring UD alumna **REGGIE BLASZCYK**, author of *100 Years of Innovation: A Legacy of Pedagogy and Research*, a book commemorating the department's history, people and accomplishments.

Department chair **ABRAHAM LENHOFF**, Allan P. Colburn Professor of Chemical and Biomolecular Engineering, called the weekend an opportunity to engage or re-engage alumni with the program.

"This is a privileged job," said Lenhoff. "There's a continuous stream of invariably smart but also invariably great young students that come through our programs. We hope that we influence their lives and their careers in a positive way. It is especially gratifying to us when they come back to visit."

For the next hundred years, Lenhoff said he is looking forward to continuing Delaware's tradition of excellence. The department, he said, strives to offer internships and mentorship for students to help them succeed in their careers after they leave UD.

"Our first century was a tough act to follow, and we'd like to maintain what we often refer to as 'the Delaware Tradition of Excellence,'" Lenhoff said. "I think a large part of that requires continued technical excellence but also the continued personal interest and individual attention we're able to give our students."

- Article by Cori Ilardi

100 Centennial Celebration

Bob and Jane Gore donate $3 million for faculty chair

Bob Gore, a 1959 graduate and 2010 honorary doctor of science recipient, and his wife, Jane, have contributed $3 million to establish an endowed faculty chair in the Department of Chemical and Biomolecular Engineering.

The ***Bob and Jane Gore Centennial Chair of Chemical and Biomolecular Engineering*** is a major lead gift to the Centennial Campaign. The Gores' gift addresses a need that is a top priority for the department and the entire University.

"Students coming to UD to study chemical or biomolecular engineering expect to learn from the best. It is a reputation we have earned over the last century, through the actions and teaching of chemical engineering legends such as Allan Colburn and Robert Pigford," says **Babatunde A. Ogunnaike**, dean of the College of Engineering and William L. Friend Chaired Professor.

"Funding to attract and retain top faculty talent is critical to maintaining the College of Engineering's reputation for excellence. I am grateful to the Gores for recognizing the ways in which supporting faculty enhances and improves student success. Their decision to honor the department's centennial by endowing a new faculty chair will have a lasting and positive impact on our students for the next 100 years and beyond."

the late 1950s, Gore was an undergraduate student in UD's department of chemical engineering. He is arguably one of their most notable alumni. As the former president and current chairman of the board at W.L. Gore & Associates, Gore used his talents as an inventor and entrepreneur to transform his family's company into a global industry leader.

He has also been a consistent and strong supporter of both his alma mater and his former department. In addition to donating millions of dollars in financial support — including a $10 million gift in 2013 to establish the Bob and Jane Gore Research Laboratories in the new Interdisciplinary Science and Engineering Lab — Gore has also given freely of his time, talent and expertise.

Gore serves as a member of the department advisory council, and is an emeritus member of the University's Board of Trustees. Most recently, he served as one of three alumni volunteer co-chairs for the department's Centennial Campaign and was one of the alumni guests who took part in the Centennial Celebrations.

"The department is such a wonderful investment," says Gore. "It's doing great and important things and is already recognized as being one of the very top departments in the country. So I am very pleased that I can encourage them to build on the excellence they have already established. It's a great way to continue a partnership with the department.

"I am hoping that some of my classmates, from way back in my era, have had successful careers and can now find a way to contribute to this campaign."

Centennial campaign

The accomplishments of the Department of Chemical and Biomolecular Engineering during its first century are rooted in the culture and practices established by inspirational leaders who built the Department, and our Centennial Campaign seeks to develop the resources to ensure that this excellence can be propagated to future generations. The quality of our programs is grounded in faculty excellence, student perseverance and creativity, innovative research programs, rigorous and enlightened teaching, and the availability of key facilities. A critical strength of our undergraduate and graduate programs is the synergy between knowledge creation in the laboratory and knowledge propagation in classroom. The final vital ingredient is the outstanding caliber of undergraduate and graduate students we attract, who develop into remarkably successful, engaged and supportive alumni.

Both designated and undesignated gifts help to catalyze the success of future generations of chemical engineers at Delaware. Examples of transformative gifts, from the Honorary Co-Chairs of the Centennial Campaign, are described on these two pages.

To learn more about supporting the Department and/or investing in specific projects, please contact **Barbara Maylath**, Director of Development for UD's College of Engineering, at **302-831-7273** or **bmaylath@udel.edu**.

The Centennial Campaign was also recognized as part of the senior gift campaign for the Class of 2014. A very large number of chemical engineering graduates and ***100% of the faculty*** contributed to a fund to enhance the available undergraduate student study space in Colburn Lab. These collective contributions will be recognized by a plaque to be placed in the space.

2013-14 Morton and Donna Collins Fellows

Marco Dunwell

Amber Hildebrand

Elisa Ovadia

Mahlet Woldeyes

MORTON COLLINS, B1958, and his wife, **DONNA**, have pledged an endowment to fill a longstanding need in the Department: to enable the support of all graduate students for their first year in the program. During this period students devote much of their time to course work and so cannot commit full-time to research, so the endowment will allow research grants to be directed to support students during their subsequent years of study, when they are more fully engaged in research. During 2013-14 the Collins endowment made possible the support of four first-year students.

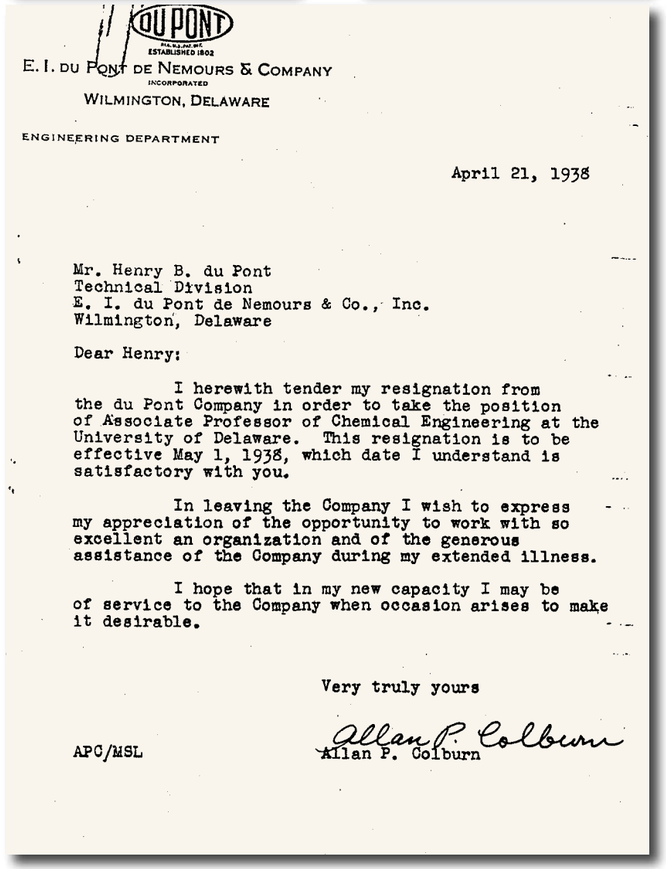
Career Development Chair

THOMAS L. GUTSHALL, B1960, and his wife, **KIPP**, endowed the University's first "career development" faculty chair to reward exceptional young faculty talent at the assistant or associate professor level. In 2012, **THOMAS H. EPPS, III** became the first professor named to the ***Thomas and Kipp Gutshall Career Development Chair***. As is apparent from the listing of faculty honors on p. 12, Epps continues to distinguish himself within the larger scientific and engineering community, and the support of the Gutshall Chair expands the scope of his research efforts.

Colburn *Celebration*

In October 2013 the Department hosted an event to celebrate the 75th anniversary of **ALLAN P. COLBURN'S** arrival at UD as an Associate Professor and Head of the Division of Chemical Engineering. Colburn led what became the Department of Chemical Engineering from a small underperforming program to one of the leading programs in the nation by the time he handed over the reins to **ROBERT L. PIGFORD** in 1947. This remarkable transition catapulted Delaware into the forefront of chemical engineering education and research in the US and is the reason that we continue to celebrate Colburn's arrival at UD.

Given the close technical links to the DuPont Company before but especially after Colburn's move, the 75th anniversary celebration was held jointly with the DuPont Company, particularly in the attendance of many alumni currently and previously employed by DuPont. The attendees also included Colburn's daughter, **LYNN COLBURN NARASIMHAN**, as well as **DOROTHY LEVIS MUNROE**, who was recruited to Delaware as a Masters student by Colburn. A presentation on Colburn's technical publications and his larger contributions to DuPont was made by **TOM KEANE**, now retired from DuPont, and a presentation on Colburn's career and legacy at UD was made by **BRAMIE LENHOFF**.



E. I. DU PONT DE NEMOURS & COMPANY
INCORPORATED
WILMINGTON, DELAWARE

ENGINEERING DEPARTMENT

April 21, 1938

Mr. Henry B. du Pont
Technical Division
E. I. du Pont de Nemours & Co., Inc.
Wilmington, Delaware

Dear Henry:

I herewith tender my resignation from the du Pont Company in order to take the position of Associate Professor of Chemical Engineering at the University of Delaware. This resignation is to be effective May 1, 1938, which date I understand is satisfactory with you.

In leaving the Company I wish to express my appreciation of the opportunity to work with so excellent an organization and of the generous assistance of the Company during my extended illness.

I hope that in my new capacity I may be of service to the Company when occasion arises to make it desirable.

Very truly yours

Allan P. Colburn
Allan P. Colburn

APC/MSL

UNIVERSITY *of* DELAWARE
CHEMICAL & BIOMOLECULAR ENGINEERING

100 YEARS OF INNOVATION

A LEGACY OF PEDAGOGY & RESEARCH

ABOUT THE BOOK | In 1914, the University of Delaware established a major in chemical engineering. A century later, the Department of Chemical and Biomolecular Engineering is one of the institution's leading academic departments and one of the top chemical engineering programs in the United States.

This centennial history of chemical engineering at the University of Delaware examines how the profession has evolved through the lens of an academic department, its relationship to important Delaware Valley chemical companies, and the changing dimensions of the American chemical industry.

100 Years of Innovation – History of Chemical Engineering at Delaware

As part of our recognition of the Centennial of chemical engineering at the University of Delaware, the Department commissioned a book on its first 100 years. The process was coordinated by a Heritage Committee comprising five faculty (**WAGNER**, **SANDLER**, **RUSSELL**, **OLSON**, **LENHOFF**), with the goal being to produce a book that was both historically rigorous as well as being enjoyable to read and peruse. The author, **REGINA LEE (REGGIE) BLASZCZYK**, has a PhD in history from UD and has written several previous books in this style, including one on the history of the Rohm and Haas Company. The book was in preparation for several years and was completed in mid-2014, with the design conceived and executed by the University's Communications office.

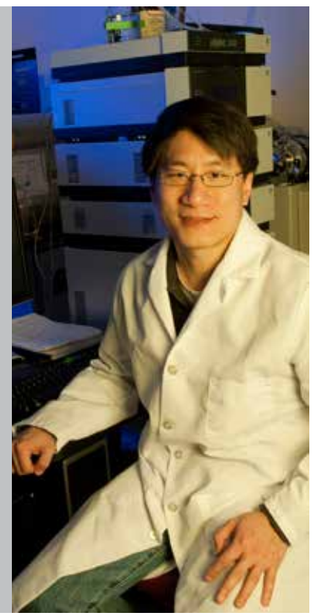
During a book launch held at the Chemical Heritage Foundation in Philadelphia in the summer, Reggie recounted her experiences and challenges in uncovering some of the long-forgotten chapters of the history of chemical engineering at Delaware. She found valuable troves of information in the University Archives, especially presidential files, as well as in long-hoarded departmental records kept in obscure nooks in Colburn Lab.

Families such as the **COLBURN** and **PIGFORD** families also generously contributed their family holdings. Reggie shared several interesting, entertaining and poignant vignettes and photos that came to light during her research.

In keeping with its scholarly rigor, the book is published by the University of Delaware Press, but it may be ordered directly from the Centennial part of the Department's web site www.che.udel.edu/100. The web site also includes many photos that are in the book as well as additional ones.

Regina Lee Blaszczyk

KELVIN LEE, Gore Professor of Chemical and Biomolecular Engineering, has been appointed to a second five-year term as director of the Delaware Biotechnology Institute beginning Sept. 1.



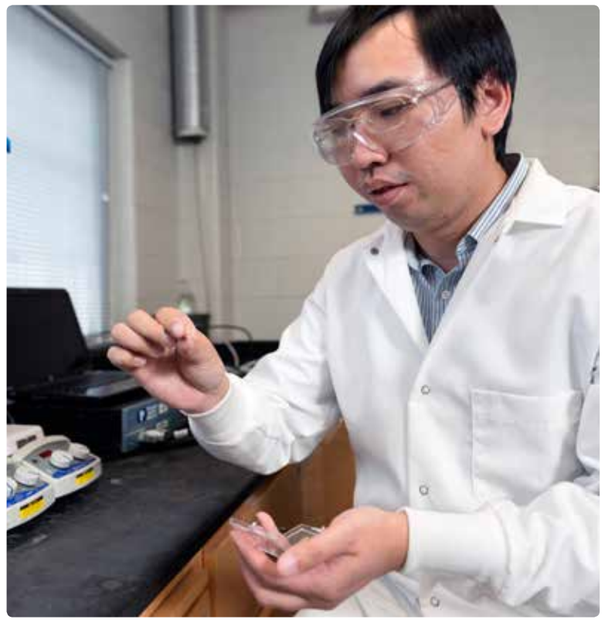
Projects, partners

Community engagement focus of lunchtime speaker series held Mondays in ISE Lab

May 19: **APRIL M. KLOXIN**, assistant professor of chemical and biomolecular engineering, is involved in a number of education, outreach and diversity activities with elementary and middle schools. She spoke about her work with the Delaware Museum of Natural History, where she is building an interactive biomaterials and bioengineering kiosk. Kloxin also is collaborating with **MELISSA JURIST**, UD's K-12 engineering program manager, to create a mini-camp for students in grades five through seven, to encourage careers in science, technology, engineering and mathematics.

New Faculty Hire: Arthi Jayaraman

We are delighted to welcome new faculty member **ARTHI JAYARAMAN** as an associate professor. Arthi's research is computational and focused on three main areas, self-assembly in polymer nanocomposites and polymer-functionalized nanoparticles, designing conjugated polymer-based materials for organic photovoltaics, and designing soft materials for drug and gene delivery. Jayaraman received her bachelor's degree in chemical engineering from the Birla Institute of Technology and Science and her master's and doctoral degrees in chemical engineering from North Carolina State University, working with Carol Hall. She spent 6 years at the University of Colorado, Boulder, as an assistant professor and won numerous awards during her time there.



NSF Career Award

UD's Jiao develops new catalysts to convert greenhouse gas to chemicals

Assistant professor **FENG JIAO** has received a highly competitive Faculty Early Career Development Award from the National Science Foundation (NSF) to support his research to develop catalysts for converting greenhouse gases to useful chemicals.

Earlier this year, Jiao developed a highly selective silver catalyst capable of electrochemically converting carbon dioxide — a greenhouse gas — to carbon monoxide with 92 percent efficiency. He reported the findings in Nature Communications.

Now, with more than $400,000 in new funding, Jiao's research group is exploring the use of bimetallic catalysts for converting carbon dioxide (CO_2) to carbon monoxide (CO).

"Exploring an area no one else has considered is exciting," Jiao said. "It's not just about how we can reduce greenhouse gas emissions, but also about how we can use advanced technology to convert something with a negative impact into something positive that can improve how society generates and consumes energy."

Bimetals are materials composed of two separate metals that, when joined together, interact to produce properties not achievable with a single metal.

In previous work, Jiao used computational modeling to identify bimetallics for producing hydrogen fuel. He will use a similar approach to pinpoint combinations of metals useful for electrochemically reducing CO_2 to CO.

"In practice, it is impossible to the screen hundreds or thousands of possible combinations in the laboratory," Jiao said. "Computational modeling provides guidance on which elements are likely to work when paired together so that we can synthesize and test those combinations in the lab." He will begin by exploring combinations of copper-tin and copper-zinc.

"Based on our experience, copper is the only element that shows promise to convert CO_2 to something else. We want to see if by adding a second element and tuning the material's selectivity, can we activate the bimetal to convert CO_2 to CO at a high rate — or even whether we can go beyond CO and create other chemicals, such as formate or methanol," he said.

He also will develop new structural characterization methods and monitor the bimetal's surface reactions in real time using X-ray absorption spectroscopy and electrochemical liquid transmission electron microscopy. This, Jiao said, will create experiential evidence to explain what's happening on the metal's surface.

"Computational work provides the theory, the tools provide experimental evidence and then, put together, they provide the means to design a better catalyst," said Jiao.

As part of the work, Jiao will develop an education outreach program with the Delaware Museum of Natural History to help visitors between the ages of 3-10 understand solar energy concepts and the need for sustainable energy resources.

He also is working with Andrew Goudy, director of the Hydrogen Storage Research Center at Delaware State University, to improve participation of underrepresented students in science, technology, engineering and mathematics (STEM) through summer research internship opportunities in Jiao's lab.

FACULTY HONORS

THOMAS H. EPPS, III, the Thomas and Kipp Gutshall Professor of Chemical and Biomolecular Engineering, has been named a 2014 Young Investigator by Sigma Xi, an honor society of research scientists and engineers.

Epps was also one of 30 early-career engineers nationwide invited to attend the 2013 European Union-United States Frontiers of Engineering Symposium in Chantilly, France. Organized by the National Academy of Engineering and the European Council of Applied Sciences and Engineering, the symposium focused on nanosensors, big data, the future of transportation, and wireless broadband. Epps' research group is currently studying polymers that self-assemble into periodic and nanometer-scale structures for applications including conducting membranes, surface templates and drug delivery carriers. Potential uses for these systems include alternative energy materials such as lithium battery and fuel cell membranes; organic solar cells; templates for hard disc drives, integrated circuits and other electronics components; and drug and nucleic acid delivery carriers.

ERIC FURST, has been named a fellow of the American Chemical Society. The 2014 class of ACS Fellows includes 99 scientists who have demonstrated outstanding accomplishments in chemistry and made important contributions to ACS, the world's largest scientific society. They were recognized at the ACS Fellows Ceremony and Reception on Monday, August 11, 2014, during the Society's 248th National Meeting & Exposition in San Francisco.

Furst was also selected to receive the 2013 Soft Matter Lectureship at the International Soft Matter Conference, in Rome, Italy. The annual lectureship honors a younger scientist who has made a significant contribution to the soft matter field.

In addition, Furst received a NASA Space Station award for conducting experiments to understand how magnetic fields can impact kinetic barriers of colloidal self-assembly phase transitions.

His research group is recognized for their contributions to active and passive microrheology, biomaterial rheology, interfacial phenomena, directed self-assembly of colloids and nanoparticles, and colloid electrokinetics.

ABRAHAM LENHOFF, Allan P. Colburn Professor, received the 2014 Francis Alison Faculty Award. The University's highest competitive faculty honor, the Alison Award was established by the Board of Trustees in 1978 to recognize the faculty members who best demonstrate the combination of scholarship and teaching exemplified by the Rev. Francis Alison, founder of the institution that is now UD. Lenhoff is internationally recognized for his expertise in applying the principles of thermodynamics, transport phenomena, biophysics and colloid science to protein separations and phase behavior, especially chromatography and crystallization. He is the principal investigator on a multimillion-dollar Center of Biomedical Research Excellence (COBRE) program funded by the National Institutes of Health since 2000.

YUN LIU, research assistant professor and material physicist in the SANS group at the NIST Center for Neutron Research, was selected to receive the 2014 NIST-Sigma Xi Katharine B. Gebbie Young Investigator Award. Yun is recognized "for the discovery of dynamic cluster ordering in complex colloidal systems."

The American Institute of Chemical Engineers (AIChE) selected UD Dean of Engineering Babatunde Ogunnaike to receive the 2014 MAC Eminent Chemical Engineers Award. Given annually by the AIChE Minority Affairs Committee, the award recognizes outstanding chemical engineers for their role in fostering a diverse pool of talent in engineering and related disciplines. Ogunnaike shares the 2014 honor with Robert (Bobby) L. Satcher from NASA and Rosemarie D. Wesson of the National Science Foundation.

JON OLSON, who served as the first president of the Faculty Senate, was recognized at the May 5 Faculty Senate meeting with a plaque commemorating his 40+ years of service. In addition, the Senate honored him by creating the Jon Olson Faculty Senate Exemplary Service Award. The Faculty Senate was formed between 1968 and 1969 by a group of professors who recognized that the faculty had little input into the control of the academic programs at the University.

E. TERRY PAPOUTSAKIS, Eugene du Pont Chair of Chemical and Biomolecular Engineering and professor of biological sciences at UD, delivered the winning presentation at the 2013 Delaware Biotechnology Institute Research Symposium. His talk, "Another Man's Treasure: Biofuel from Biodiesel-derived Glycerol Waste," highlighted his partnership with Elcriton, a local start-up company focused on addressing sustainable energy and chemical production needs of the U.S. Their project is investigating whether glycerol, a waste product in biodiesel production, can be used to generate butanol, a second generation biofuel.

Papoutsakis also received the Delaware Bio Academic Research Award, sponsored by Delaware IDeA Network of Biomedical Research Excellence (INBRE), during Delaware Bio's 2014 annual awards gala. The award recognizes significant contributions to the advancement of life science research at an academic or medical research institution in the state.

In addition, Papoutsakis received the AIChE Daniel I.C. Wang Award for excellence in biochemical engineering.

STAN SANDLER, Henry Belin du Pont Chair, received the Career Achievement Award from the Engineering Alumni Association of the City College of New York. Sandler is a member of the National Academy of Engineering, and he has received numerous awards, including being named one of the top 30 chemical engineering authors by the American Institute of Chemical Engineers.

NORMAN WAGNER, recently named the Robert L. Pigford Chair, has also been selected a fellow of the Neutron Scattering Society of America (NSSA). He was nominated for "outstanding scholarship in neutron scattering methods applied to soft matter science" as well as education and academic leadership and service.

In addition, Wagner received the Thomas Baron Award at the AIChE national meeting, held from November 3-8, 2013, in San Francisco. Given annually, the award recognizes outstanding scientific or technical accomplishments that have had significant impact in the field of fluid-particle systems or a related field. Wagner, who directs the University's Center for Neutron Science, is a world-renowned expert in the area of colloidal suspension rheology. His research group is also well-known for their work in understanding and developing protective materials based on shear thickening fluid.

Wagner also received the 2014 Bingham Medal of the Society of Rheology. The Bingham Medal is an annual award for outstanding contributions to the field of rheology. It was instituted in 1948 by the Society of Rheology, in commemoration of Eugene C. Bingham (1878-1948), who was a pioneer in both the theory and practice of rheology.

Norm Wagner was a featured speaker at the Smithsonian's "Going to Extremes: The Protective Powers of High-Tech Materials" evening seminar on Jan. 27.

Wagner, discussed his research on liquid armor and its potential to protect soldiers in combat.

The Environmental Protection Agency has honored **RICHARD WOOL** with its Presidential Green Chemistry Challenge Award for his extensive work developing bio-based materials to support the green energy infrastructure.

Wool also received the 2014 World Green Design Award for his innovative "Eco-leather," which is derived from natural fibers and high oleic plant oils. The material is water resistant, but still breathable. The invention has drawn interest from well-known shoe companies and the automotive industry.

Fueling technological innovation

Catalysis Center for Energy Innovation to share in $100 million in DOE funding

The University of Delaware has received $12 million in funding from the U.S. Department of Energy to continue its Catalysis Center for Energy Innovation (CCEI), an Energy Frontier Research Center (EFRC) that is developing technologies to convert biomass to biofuels and chemicals.

UD was one of 32 EFRCs selected for funding totaling $100 million to further fundamental advances in energy production, storage and use, DOE announced in a press release. CCEI is one of 22 centers selected for continued funding from among the original 46 EFRCs funded in 2009, and one of 23 university-led projects.

"This new four-year funding will enable CCEI researchers to build upon the foundations set in the first funding period and further the catalytic technologies that can transform widely abundant plant biomass into renewable chemicals and fuels," said **DIONISIOS VLACHOS**, CCEI director and Elizabeth Inez Kelley Professor of Chemical and Biomolecular Engineering.

"CCEI's research has the potential to replace costly enzyme-based processes with more robust and economically viable solid catalysts. Expanding the portfolio of biomass-derived chemicals and fuels can have a major impact on the economy and the environment."

CCEI is a multi-institutional research center led by UD that is comprised of more than 20 faculty members from 10 academic institutions and two national research laboratories.

Breakthrough catalytic technologies to emerge from CCEI include a one-pot process developed in 2010 using Tin-Beta, the first heterogeneous catalyst to convert glucose into fructose and hydroxyl-methyl furfural. This is the first step in the production of a large number of targeted products including biofuels and biochemicals.

In 2012, a CCEI research team developed a new process to produce high yield (greater than 90 percent) p-xylene from renewable biomass. The p-xylene is used to produce a plastic called PET (polyethylene terephthalate), which is currently used in many products including soda bottles, food packaging, synthetic fibers for clothing and even automotive parts.

Significant advances by CCEI researchers in multiscale materials synthesis and multiscale modeling have enabled other technological breakthroughs including the production of phthalic anhydride — an industrial chemical — and alkylated furans for fuel additives from furanics with greater than 80 percent yield.

UD has received $12 million from the Department of Energy to continue its Catalysis Center for Energy Innovation.

Nano shake-up

Researchers demonstrate processing can affect size of nanocarriers for targeted drug delivery.

Significant advances have been made in chemotherapy over the past decade, but targeting drugs to cancer cells while avoiding healthy tissues continues to be a major challenge.

Nanotechnology has unlocked new pathways for targeted drug delivery, including the use of nanocarriers, or capsules, that can transport cargoes of small-molecule therapeutics to specific locations in the body.

The catch? These carriers are tiny, and it matters just how tiny they are. Change the size from 10 nanometers to 100 nanometers, and the drugs can end up in the wrong cells or organs and thereby damage healthy tissues.

A common assumption is that once a nanocarrier is created, it maintains size and shape on the shelf as well as in the body.

However, recent work by a group of researchers led by **THOMAS H. EPPS, III**, and **MILLICENT SULLIVAN** has shown that routine procedures in handling and processing nanocarrier solutions can have a significant influence on the size and shape of these structures.

Their findings are reported in a paper, "Size Evolution of Highly Amphiphilic Macromolecular Solution Assemblies Via a Distinct Bimodal Pathway," published in Nature Communications on April 7.

Sullivan explains that chemotherapeutic agents are designed to affect processes related to cell division. Therefore, they not only kill cancer cells but also are toxic to other rapidly proliferating cells such as those in hair follicles and bone marrow. Side effects can range from hair loss to compromised immune systems.

"Our goal is to deliver drugs more selectively and specifically to cancer cells," Sullivan says. "We want to sequester the drug so that we can control when and where it has an impact."

Although there are a number of routes to creating drug-carrying nanocapsules, there is growing interest in the use of polymers for this application.

"Molecular self-assembly of polymers offers the ability to create uniform, tailorable structures of predetermined size and shape," Epps says. "The problem lies in assuming that once they're produced, they don't change."

It turns out that they do change, and very small changes can have a very large impact.

"At 75 nanometers, a nanocarrier may deliver its cargo directly to a tumor," Epps says. "But with vigorous shaking, it can grow to 150 nanometers and may accumulate in the liver or the spleen. So simple agitation can completely alter the distribution profile of the nanocarrier-drug complex in the body."

The work has significant implications for the production, storage, and use of nano-based drug delivery systems.

The researchers used a variety of experimental techniques — including cryogenic transmission electron microscopy (cryo-TEM), small angle X-ray scattering (SAXS), small angle neutron scattering (SANS), and dynamic light scattering (DLS) — to probe the effects of common preparation conditions on the long-term stability of the self-assembled structures.

The work was carried out in collaboration with the University's Center for Neutron Science and the National Institute of Standards and Technology Center for Neutron Research.

The paper was co-authored by **ELIZABETH KELLEY**, **RYAN MURPHY**, **JONATHAN SEPPALA**, **THOMAS SMART**, and **SARAH HANN**.

Financial support for the research was provided from an Institutional Development Award (IDeA) from the National Institutes of Health, National Institute of General Medical Sciences (NIH grant P20GM103541).

Engineering bone repair

Researchers seek to develop non-viral carrier for gene therapy use in bone repair

A team of researchers from the University of Delaware and Thomas Jefferson University has been awarded a $1.4-million grant from the National Institutes of Health to explore the use of non-viral gene therapy to enhance bone repair.

The work will be led by **MILLICENT SULLIVAN**, while Theresa Freeman, associate professor of orthopedic surgery at Jefferson, will lead a collaborating team at TJU.

"Our hope is that this research will not only shed light on the mechanisms of histone-associated gene delivery, but also ultimately be useful as a general biomaterials platform applicable to bone repair, implant functionalization, and tissue engineering," Sullivan says.

The grant, "Histone Targeted Non-Viral Growth Factor Gene Delivery to Enhance Bone Repair," is funded for four years through the National Institute of Biomedical Imaging and Bioengineering.

From methanol to butanol

UD receives multimillion-dollar ARPA-E award for methane conversion research

The University of Delaware has been awarded a three-year grant totaling more than $3 million from the Department of Energy's Advanced Research Projects Agency (ARPA-E) to use an engineered microorganism to produce butanol, a useful transportation fuel, from methanol and carbon dioxide.

The work will be led by **TERRY PAPOUTSAKIS** at the Delaware Biotechnology Institute, with UD co-investigators **WILFRED CHEN**, Gore Professor of Chemical and Biomolecular Engineering, and **MACIEK ANTONIEWICZ**, DuPont Young Professor, along with professor **MATTHEOS KOFFAS** of Rensselaer Polytechnic Institute.

"This funding supports the very high-risk science needed to develop technology with transformational potential," says **BABATUNDE OGUNNAIKE**, dean of the College of Engineering. "The project not only aligns with our mission and focus on energy and sustainability, but also sets the stage for opening and exploiting new scientific frontiers in synthetic biology, genomic sciences, protein engineering, and metabolic engineering. Winning this award demonstrates the strength of our faculty and puts UD on equal footing with the best institutions in the country."

The research is aimed at engineering a synthetic methylotrophic organism that will use new metabolic pathways to convert methanol into butanol while capturing and reusing generated carbon dioxide.

Methylotrophic bacteria are organisms that use one-carbon molecules such as methane or methanol as their sole carbon and energy source for growth.

"These organisms grow aerobically and contain useful metabolic pathways that can be utilized in other organisms," says Papoutsakis, who is Eugene du Pont Chair of Chemical and Biomolecular Engineering at UD.

"We propose to use metabolic engineering and synthetic biology techniques to transfer the methanol utilization pathway to an organism that is able to grow anaerobically, which will allow this new organism to grow on methanol and use the available energy to produce butanol."

Butanol has a high energy content, and its chemical and physical properties are compatible with the current gasoline-based technologies for transportation, so it can be readily used in existing vehicles.

In addition to producing butanol, the team proposes to engineer the microorganisms to use carbon dioxide as an additional carbon source together with methanol.

"If successful, this project will enable the commercialization of cutting-edge technology that will transform the energy landscape by converting methane into ready-to-use fuel while also having a positive impact on the environment by reducing carbon dioxide emissions," says Papoutsakis.

Beyond the transformational practical applications, Chen points out that the project also tackles some longstanding fundamental issues: "Can we activate methane anaerobically and do so efficiently? Can we understand the molecular basis of how some cells carry out a set of primordial reactions that in principle look impossible? What clever tricks has nature devised to do so, and how do we uncover and use these tricks?"

The award to UD was one of 15 "breakthrough" projects totaling $34 million via the REMOTE program (Reducing Emissions using Methanotrophic Organisms for Transportation Energy). REMOTE seeks advanced biocatalyst technologies that can convert natural gas to liquid fuel for transportation.

Renewable energy resources

UD researchers report on new catalyst to convert greenhouse gases into chemicals

A team of researchers at the University of Delaware has developed a highly selective catalyst capable of electrochemically converting carbon dioxide — a greenhouse gas — to carbon monoxide with 92 percent efficiency. The carbon monoxide then can be used to develop useful chemicals.

The researchers recently reported their findings in ***Nature Communications***.

"Converting carbon dioxide to useful chemicals in a selective and efficient way remains a major challenge in renewable and sustainable energy research," according to **FENG JIAO**, assistant professor of chemical and biomolecular engineering and the project's lead researcher.

Co-authors on the paper include **QI LU**, a postdoctoral fellow, and **JONATHAN ROSEN**, a graduate student, working with Jiao.

The researchers found that when they used a nano-porous silver electrocatalyst, it was 3,000 times more active than polycrystalline silver, a catalyst commonly used in converting carbon dioxide to useful chemicals.

Silver is considered a promising material for a carbon dioxide reduction catalyst because of it offers high selectivity — approximately 81 percent — and because it costs much less than other precious metal catalysts. Additionally, because it is inorganic, silver remains more stable under harsh catalytic environments.

The exceptionally high activity, Jiao said, is likely due to the UD-developed electrocatalyst's extremely large and highly curved internal surface, which is approximately 150 times larger and 20 times intrinsically more active than polycrystalline silver.

Jiao explained that the active sites on the curved internal surface required a much smaller than expected voltage to overcome the activation energy barrier needed drive the reaction.

The resulting carbon monoxide, he continued, can be used as an industry feedstock for producing synthetic fuels, while reducing industrial carbon dioxide emissions by as much as 40 percent.

To validate whether their findings were unique, the researchers compared the UD-developed nano-porous silver catalyst with other potential carbon dioxide electrocatalysts including polycrystalline silver and other silver nanostructures such as nanoparticles and nanowires.

Testing under identical conditions confirmed the non-porous silver catalyst's significant advantages over other silver catalysts in water environments.

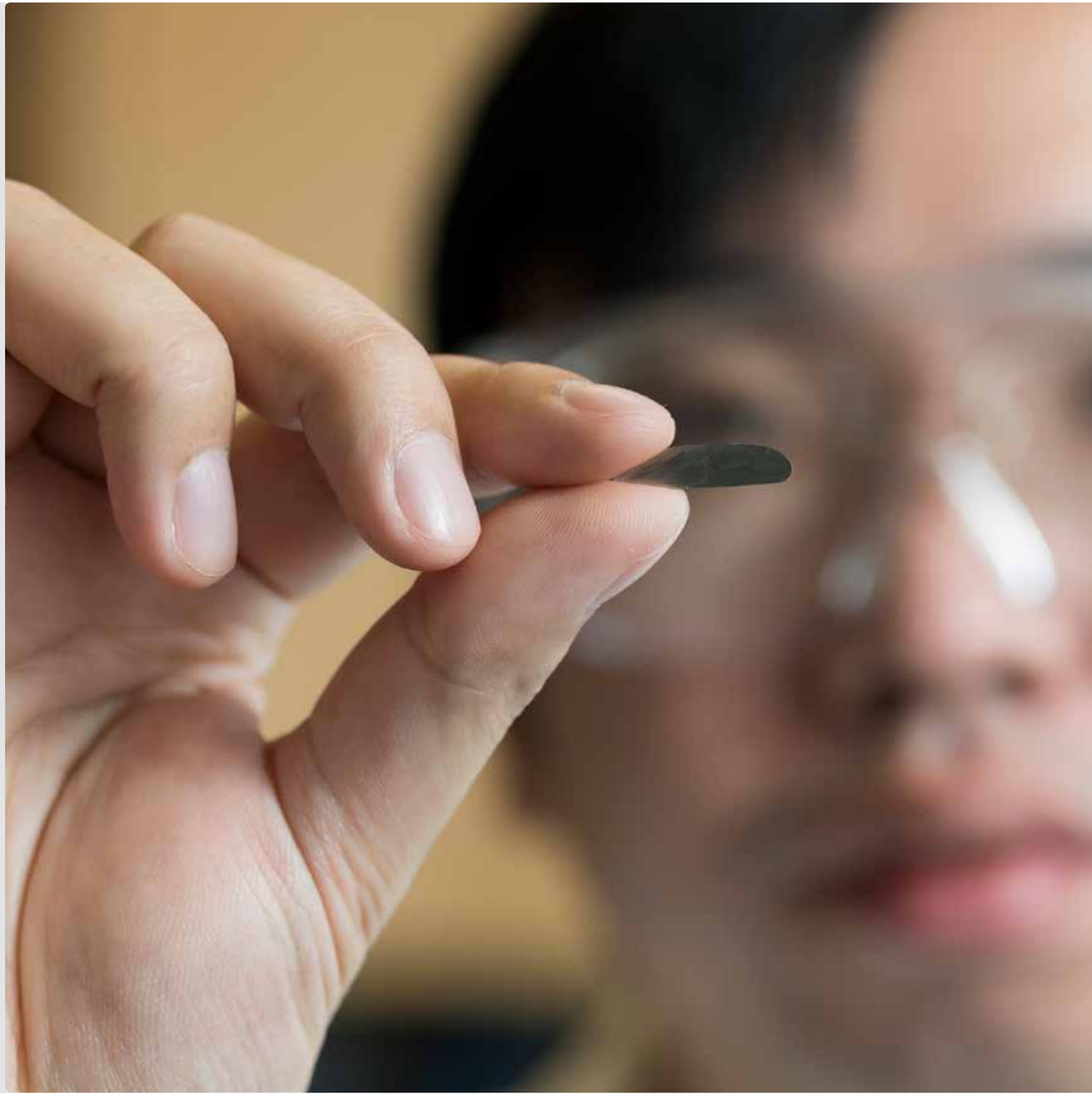
Reducing greenhouse carbon dioxide emissions from fossil fuel use is considered critical for human society. Over the last 20 years, electrocatalytic carbon dioxide reduction has attracted attention because of the ability to use electricity from renewable energy sources such as wind, solar and wave.

Ideally, Jiao said, one would like to convert carbon dioxide produced in power plants, refineries and petrochemical plants to fuels or other chemicals through renewable energy use.

A 2007 Intergovernmental Panel on Climate Change report stated that 19 percent of greenhouse gas emissions resulted from industry in 2004, according to the Environmental Protection Agency's website.

"Selective conversion of carbon dioxide to carbon monoxide is a promising route for clean energy but it is a technically difficult process to accomplish," said Jiao. "We're hopeful that the catalyst we've developed can pave the way toward future advances in this area."

The research team's work is supported through funding from the American Chemical Society Petroleum Research Fund and University of Delaware Research Foundation. Jiao has patented the novel application technique in collaboration with UD's Office of Economic Innovation and Partnerships.



Puncture-resistant gloves

Health care workers in the United States suffer an estimated 385,000 needlestick injuries per year, according to the Centers for Disease Control.

Up to 90 percent of these injuries occur in the hand and can expose surgeons, nurses and other health care staff to infection from blood-borne pathogens such as HIV and hepatitis B and C. The average cost of a needlestick injury to a hospital is $2,500.

Researchers at STF Technologies LLC, a spin-off company from the University of Delaware, are working to develop a puncture-resistant surgical glove, according to the company's co-founders **NORMAN WAGNER** and **RICHARD DOMBROWSKI**.

STF Technologies grew out of federally funded research by Wagner. Wagner co-invented shear thickening fluid (STF) armor technology — a smart material that can change from a liquid to a solid in response to ballistic and puncture threats — in collaboration with **Eric Wetzel** at the U.S. Army Research Laboratory in Aberdeen, MD. Under mechanical stress or "shear," tiny ceramic particles in the STF are driven together, causing the material to behave as a solid. Adding this STF to a fabric creates a nanocomposite material that can harden rapidly to form a temporary protective shield before becoming flexible again. The technology is already under development for use in multi-threat body armor employed to protect soldiers, police and first responders.

Now, with funding from the National Science Foundation's Small Business Technology Transfer (STTR) program, Wagner's research team will apply the STF technology to early product development and testing for puncture-resistant surgical gloves designed to protect medical professionals in orthopedic, trauma and general surgical specialties.

"Surgical gloves are a billion-dollar market and despite the high number of needlestick injuries to the hand, there is no effective puncture-resistant medical glove on the market," said Wagner.

Typical latex and nitrile gloves, for example, offer minimal puncture protection while other proposed puncture protection technologies use hard materials such as ceramics, metals or woven textiles that are stiff and expensive, rendering them impractical in a surgical setting.

"Our concept is to develop a cost-effective glove that protects against accidental needlestick injury while providing medical professionals the dexterity and comfort to effectively do their work," he added.

The STF Technologies team includes **Lauren Piascinski**, a registered nurse and UD alumna who also is a graduate nursing student, and **Erik Hobbs**, a UD undergraduate chemical engineering major who was hired as a laboratory assistant.

Piascinski will gather data about specific types of needles and needlestick injuries that are prevalent in these fields. As a nurse herself, she also can provide the product engineers with a perspective on the product's advantages and disadvantages. Dexterity and comfort of the gloves will ultimately be evaluated through a review with nurses and surgeons.

Wagner and Dombrowski worked with UD's Office of Economic Innovation and Partnerships to apply for patents to protect the use of STF-textile composite materials. In addition, prior to completing the NSF STTR grant proposal, Dombrowski attended a University-sponsored seminar on how to write an STTR/SBIR grant through OEIP's Small Business and Technology Development Center.

"STF Technologies LLC is an example of the technology transfer that can emerge from a tier-1 research university like the University of Delaware with the proper resources and support," said Dombrowski, a UD chemical engineering alumnus and associate scientist who specializes in developing and patenting advanced protective materials and products.

"OEIP is providing resources to researchers and in our case, those resources have come back to pay dividends — both for STF Technologies and for the University."

Under the STTR program, more than $67,000 in federal funding comes directly to the University. Other applications for the technology could include advanced personal protective equipment for industrial work.

White House reveals the stuff superheroes are made of

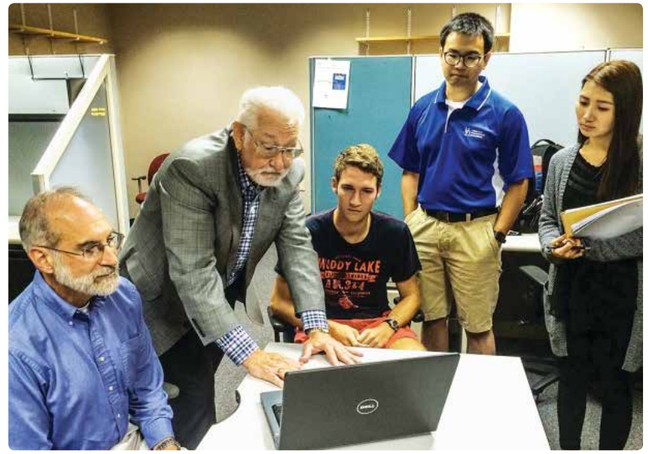
For those who couldn't make it to San Diego for Comic-Con, the White House had a solution: a Google+ Hangout exploring the stuff superheroes are made of, including invisibility and super-strength. In one of the hangout's most dramatic moments, University of Delaware chemical engineering professor **NORMAN WAGNER** showed how the liquid armor "transitions from a fluid-like state to a solid-light state under impact," allowing it to resist assaults from small, powerful objects. Wagner actually stabbed a swatch of Kevlar containing the liquid armor, to demonstrate how the material could turn rigid quickly.

MEPT

New Master's Degree Program in Particle Technology

Nontraditional master's programs aim to give students a foot in door

Extracted from an article in Chemical & Engineering News | BY MITCH JACOBY



Faculty members **JAMES MICHAELS** *(from left) and* **BERT DIEMER** *with students in the new particle technology master's degree program.*

Chemical engineers at the University of Delaware are also seeking to fill an unmet industry need. But their focus is rather particular—literally. Delaware's department of chemical and biomolecular engineering just launched a program offering a master of engineering degree in particle technology (MEPT).

"Particle technology is ubiquitous in essentially all industries that employ chemical engineers," says Delaware's **JAMES N. MICHAELS**. For example, nearly every aspect of pharmaceutical development and manufacturing involves particles in one way or another, he says. Crystals, powders, and other particulate forms also play central roles in making bulk and fine chemicals, agrochemicals, and other products.

For those industries, technical know-how is essential to controlling crystallization to ensure that crystal purity, size, and shape meet consumer needs, **R. BERTRUM DIEMER JR.** explains. Diemer, who is also in Delaware's chemical engineering department, adds that after solids are manufactured, they often need to be blended, milled, and compacted for formulation procedures or processed in other ways. "Yet, despite the vast importance of particle technology, it is almost entirely absent from the chemical engineering curriculum," he stresses.

So Michaels and Diemer are doing something about it. Both men came to Delaware after long industry careers that provided them with substantial experience working with particulate matter. Diemer retired after serving 40 years at DuPont, and Michaels, after 21 years at Merck & Co. The engineers drew upon their knowledge of industry needs to design the MEPT program. And they work directly with the students to train them in this critical technology area. The program's first cohort includes six students.

The academic program, which is designed to be completed in one year, exposes students to a range of particulate engineering topics. For example, the students take courses covering particle-system kinetics and rate processes, particle transport in fluids and powders, and mathematics required for calculating properties of particulate systems.

In addition to course work, the program's "capstone element," as Diemer and Michaels refer to it, is an industry internship. That piece of the program is still under development. But the pair's aim is to facilitate summerlong paid internships in which MEPT students will be able to apply what they have learned to important industrial problems.

The Delaware engineers note that their industry colleagues, who have for years bemoaned the lack of training in particle technology, are enthusiastic about the new program. This education will enable the students to graduate with practical expertise in a technologically important area and excellent employment prospects, Diemer says.

Journal Covers

PUBLISHED

Teachers & bioenergy

Delaware Biotechnology Institute hosts bioenergy training for teachers

Eight Delaware high school teachers were provided focused training in bioenergy and bioproducts through a special educational program held last month at the Delaware Biotechnology Institute (DBI).

The program is a new initiative that builds upon an existing partnership involving Cornell University, Delaware State University (DSU) and DBI to educate teachers about alternative energy technologies and foster student interest in science, technology, engineering and mathematics (STEM) careers.

In Memoriam

STEVEN M. GALATON, a longtime resident of Doylestown, died Wednesday, May 7, 2014, at his home. He was 63 and the husband of Diane L. Galaton.

Born in Brooklyn, New York, Steve was the son of Martin and Eileen Safalow Galaton of Del Ray Beach, Florida.

Steve graduated from Cherry Hill West High School and received his Bachelor's in Chemical Engineering from the University of Delaware. He received his Master's degree from the University of Pennsylvania.

He was employed by several regional chemical companies including Air Products and Arkema. Most recently he headed A-Gas Performance Chemicals based in Doylestown. Steve had many international friends from years of travel in Europe, Mexico and the Far East. He was an avid golfer and wine connoisseur.

RUSSELL WESTON HAWES, B'64, followed his UD studies with an MS in chemical engineering from Pennsylvania State University in 1968. He then fulfilled his military obligation by serving two years as a First Lieutenant in the United States Army, including one year in Vietnam, where he was awarded, among other medals, a Bronze Star for Valor. Russell was employed for thirty years at Mobil Oil (now ExxonMobil) in a number of positions, including front-line refinery operations, environmental and safety auditing, global planning, and environmental management. At the time of his retirement Russ was Mobil's Environmental Manager for US Manufacturing Operations, overseeing five US refineries. Russ founded and operated a successful environmental consulting firm until he fully retired in 2000. On June 6, 2014, Russell died at home after a short illness due to complications from multiple sclerosis, which had manifested in 1999 while he was training for the Marine Corps Marathon. Despite suffering from MS for fifteen years Russell conducted his retirement with the courage, dignity and integrity that were the hallmarks of his life. He rarely let MS interfere with his objectives, believing it might take him a bit longer to get something done, but he would nonetheless get it done. He is survived by his wife of 25 years, Vickie Jones Hawes of McLean, VA, and by his daughter, Sarah Elizabeth Hawes of Philadelphia. Russell greatly valued his time at Delaware and was proud of the education he received and the friends he made there. When Sarah was accepted at Delaware and several other excellent schools, Russell counseled her to go to Newark for a strong education. That was an excellent choice for her and laid the foundation for her MS, recently received from the University of Pennsylvania.

JAMES F. KEARNS, age 85, of Greenville, DE, passed away on Saturday, March 8, 2014 at Stonegates.

Jim was born in Cleveland, OH, son of the late Allen and Mildred Kearns. He graduated from P.S. duPont High School in 1946 and received his bachelor's degree from the University of Delaware in 1950.

Jim worked for the DuPont Company for 41 years. He began his career in 1950 at the Waynesboro, VA textile fibers plant and held various positions in sales, marketing, business management and sourcing, spending the bulk of his career in the Textile Fibers Department. In 1988 he was appointed to the position of Executive Vice President and a member of the DuPont Company Executive Committee. He retired from DuPont in 1990.

Jim generously volunteered his time and skills to helping others. He was a past member of the Boards of the University of Delaware, Philadelphia University, and the Independence School. He also was a member of the Board of Christiana Care Health System, as well as the Chairman of the Board and Founding Director of Exceptional Care for Children. Jim was particularly devoted to Easter Seals of Delaware & Maryland's Eastern Shore, where he served as Chairman of the Board and was honored with both the National Easter Seals Volunteer Award and, in 2013, the Delaware Easter Seals Lifetime of Service Award.

Jim is predeceased by his beloved wife of 53 years, Rita Lawless Kearns, his brother Donald and his grandchildren Matthew and Molly Connell. He is survived by his daughter, two sons, and their families.

EDWARD J. QUIGLEY III, B'91, was killed in a car accident on November 18, 2013 on his way to work near San Diego, CA. After working briefly as an engineer at a flooring manufacturer, Ed returned to UD and completed a PhD in sports biomechanics. He directed research labs at the Tampa Shriners Hospital and at the San Diego Children's Hospital, and at the time of his death was a research administrator at Rady Children's Hospital. He is survived by his wife, Tristan, and three young daughters.

JOHN ALBERT ROTHROCK, 87, of Wilmington, passed away Sunday (June 16, 2013) at New Hanover Regional Medical Center in Wilmington, N.C. www.mariettatimes.com/page/content.detail/id/552478/John-Albert-Rothrock.html?nav=5009

JACK WEAVER, 76, of Meadowbrook, a chemical engineer, died Wednesday, Dec. 11, of bile duct cancer at Holy Redeemer Hospital's hospice.

Born and raised in Philadelphia, Mr. Weaver graduated from Central High School, and from Cornell University in 1959 with a degree in chemical engineering. He spent most of his career with Rohm & Haas Co., starting in research in 1969 and retiring in 1990 as vice president for environmental, health and safety, and engineering.

Congratulations to the CLASS OF 2014

Erica Addonizio
Jayavignesh Arivalagan
Peter Attia
Jamie Bakri
Matthew Benjes
John Birmingham III
Adam Bivens
Lauren Carberry
Clayton Carr
Yi Chen
Jamey Copeland
Courtney Davidson
Andrew DiPietro
Ryan Downs
Michael Dummeldinger
Rebecca Ellis
Matthew Enterline
Qi Feng
Shuting Feng
Benjamin Fogal
Shijin Gong
Nathaniel Grande
Timothy Hagenbach
Brianne Henry
Tyler Hockman
Kevin Hutter
Robert Kennedy
Lynn Kostas
Austin Kotch
Sarah Lawrence
Rachel Lehr
Runru Liu
Xiaoke Liu
Donald Lloyd III
Kenneth Loprete
Sean Mack
Samantha Mannino
Benjamin Matsuura
Michael Merves
Jeffrey Meyer
Christopher Micale
Edwin Miller
Christine Muzzelo
Christopher Nunn
Michael Orella
Jonathon Perna
Lisa Plumley
Amy Quach
Ellen Reed
Joseph Reynolds
Seth Ritter
Katherine Roop
Eddie Sangern
Kathryn Scrafford
Kelsi Skeens
Tyler Slouf
Evan Sohodski
Brandon Stewart
Tomasz Szostek
Joseph Trotta
Kyle Tucker
Deidra Tuxen
Andrew Vitelli
Anna Walter
Hongbin Wan
Haoxiang Wang
Mengguang Wang
Yuan Wei
Bronson Weston
Matthew Wiatrowski
Jessica Wood
Ken Yong
Chelsea Young
Nathanael Zemui

2013-14 PhD Graduates

Scott Crown
Stefan Gaida
Thomas Kelly
Joseph Stanzione
Weiting Yu
Peter Beltramo
Marco Blanco
Robert Leighty
Dongcui Li
Mark Panczyk
Miso Park
Melissa St. Amand
Steven Traylor
Sarah Tupy
Kyle Zingaro
Abbygail Foster
Qian Gou
Elizabeth Kelley
Brian Moreno
Diane Wuest

2013-14 Master's Graduates

Hyelim Yang
Stijn Koshari

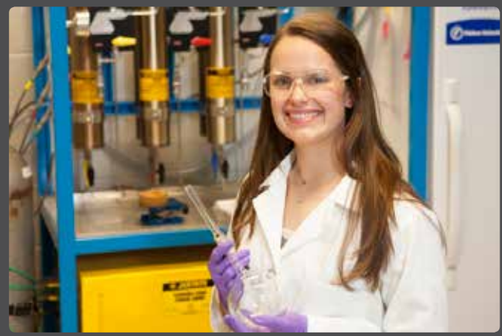
WHERE DID THEY GO?

GRADUATE SCHOOL	INDUSTRY
Cal Tech	Agilent Technology
MIT	Air Products
Purdue	Applied Control Engineering
Stanford	Appvion
Temple	Barclays Capital Services Corp.
University of Alabama	Bristol-Myers Squibb
University of Connecticut	Compact Membrane Systems
University of Delaware	Cree
University of Maryland	Croda
University of Minnesota	Dupont
University of Pennsylvania	ExxonMobil
Villanova	GlaxoSmithKline
	Merck & Co.
	Schneider Electric
	SevOne Inc.
	Solenis (formerly Ashland, Inc)
	TekSolv
	WESCO

Honors & Awards

2013 CIBA Award Winners Selected

ANGELA HOLMBERG received a Ciba Travel Award in Green Chemistry from the American Chemical Society's Green Chemistry Institute. The award is open to student applicants from high school through graduate level programs to help them attend an American Chemical Society technical meeting, conference, or training program that has a significant green chemistry or sustainability component.



Germany bound

Graduate student selected to participate in 63rd Lindau Nobel Laureate meeting

ELIZABETH KELLEY, a fifth year graduate student, took the opportunity to share her research on targeted drug delivery at the 63rd Lindau Nobel Laureate Meeting held June 30-July 5 in Lindau, Germany.

PETER ATTIA received an NSF Fellowship. He is studying Materials Science at Stanford.

DOUG GODFRIN won an award from the American Conference on Neutron Scattering for his poster, "Scattering Study of Reversible Cluster Formation in Concentrated Monoclonal Antibody Formulations."

AMANDA KATE GURNON and **SIMON ROGERS** earned top honors at the 85th annual Society of Rheology meeting held in Montréal, Oct. 2013.

STIJIN KOSHARI has been awarded the IAR-CIT Master's thesis award at the KU Leuven for his work on characterization of lysozyme adsorption in cellulosic chromatographic particles using small-angle neutron scattering. Stijn's research was performed at UD – he is the first student to participate in the UD - KU Leuven dual Masters degree program.

DONGCUI LI was recognized by **Phys.org** for her research on coacervation, which could improve personal care products and drug delivery.

JASON LOILAND was awarded this year's Air Products Fellowship.

STEPHEN MA was invited to participate in the Excellence in Polymer Graduate Research Symposium at the ACS meeting held in Dallas in March 2014.

MICHAEL ORELLA is the recipient of an NSF graduate fellowship. He will continue his studies at MIT.

KALEIGH RENO won a poster award at the ACS Green Chemistry Conference.

Seven members of the Class of '64 returned to campus for their 50th class reunion as part of the 2014 UD Alumni Weekend. They are seen above in the conference room in Colburn Lab, where most of them were reunited with their senior theses. Shown are (L to R) **LEE MCMASTER**, **JIM MACKRELL**, **BOB CARROLL**, **MARVIN STOUFFER**, **STEPHEN COLE**, **JOHN FLYNN** and **ALLAN LARSEN**. The reunion took place on June 6, which sadly was the very day that another classmate, **RUSSELL HAWES**, passed away (***see In Memoriam page***). An interesting fact that came to light during the visit is that the class's design course was taught by **THOMAS H. CHILTON** of Chilton-Colburn *j*-factor fame. Tom Chilton was a leading light in DuPont's outstanding engineering efforts for more than thirty years, and was a visiting professor in the department in the early '60s, following his retirement. For another alumni connection to Chilton, albeit a more circuitous one, see **DAVID MEISTER** below. One of the fundraising goals of our Centennial Campaign is to endow a ***Thomas H. Chilton Professorship of Practice*** in recognition of Chilton's direct and indirect contributions to our department and the profession. Two of the visiting alumni also sent updates:

JOHN V. FLYNN, JR., B'64, has been a welcome frequent visitor to campus in recent years, as a member of the Biomedical Engineering Advisory Council, in coordinating the Class of '64 reunion visit, and more. John has had a stellar career, including important public service positions, which still keep him very busy in his "retirement." John went on from his honors degree at UD, where he was a member of Omicron Delta Kappa and Tau Beta Pi, to complete a Ph.D. in chemical engineering at Princeton. In 1968 he started his career with DuPont, where he served in a variety of positions starting in research, quickly moving to manufacturing and then on to marketing and sales. In 1973, he was asked to become COO of the city of Wilmington, which he did for four years, improving the management processes of the city, reducing costs and underperforming programs, and working with the State government to restructure the city's financial base. He then joined Touche Consulting in 1977 and from 1987 on served as Managing Director of the Philadelphia office. There he was responsible for the growth and profitability of the practice and led it through significant growth as well as the merger with Deloitte. From 1995-1997 John took a sabbatical from consulting to become President and COO of Rollins Environmental Services, a $250 million NYSE-listed company headquartered in Wilmington. Here John's main responsibility was to improve shareholder value and to expand the focus of the company to that of a full-service provider. He then coordinated a merger between Rollins and Laidlaw Environmental Services, the industry's two largest players. John returned to Deloitte Consulting in 1997 as Managing Director in Philadelphia; in addition, he assumed worldwide responsibility as a Global Practice Director. In that position, he directed the firm's consulting to the pharmaceutical, medical devices industry in more than 20 countries. After retiring from Deloitte Consulting, John helped Banister International expand its professional services business into the healthcare search business and formed Healthcare Resource Solutions. He recently retired from the search business but still serves on a number of public and private boards.

John currently serves as Chairman of the State of Delaware Cash Management Board, an active member of the Nature Conservancy, Biovid Inc., and Archmere Academy. While maintaining these and other extensive activities in Delaware, he is now retired and living in the mountains of Colorado. He has been married for 49+ years to his wife, Mary Lou, and has two sons and 4 grandsons.

MARVIN STOUFFER B'64, was employed by United States Steel in Cleveland, Ohio, for 3-1/2 years, but then returned to DuPont in Wilmington, where he spent 25-1/2 years. During this tenure he also earned an MBA at Widener University. OSHA and EPA were enacted into existence early in Marvin's time at DuPont, and he spent his career interpreting and implementing the ever-increasing regulations for a plant site, followed by auditing DuPont plant sites worldwide for occupational health compliance. Later he helped worldwide customers of a DuPont business comply with Federal and state regulations while addressing employee concerns related to the safe use of DuPont products. At age 51, with the title of Senior Environmental Engineer, Marvin's wife, Cynthia, convinced him to retire. Marvin writes, "Cynthia and I are DINKS (double income, no kids). Our number one hobby is to learn about and travel to new places worldwide." A fascinating but sobering part of the Class of '64 reunion was Marvin's recounting of the traumatic experiences of their classmate Tran Long following his return to his home country, Vietnam, after graduating from UD.

JOHN ANDERSON B'67 has announced that he will step down as president of the Illinois Institute of Technology as of August 1, 2015. He plans to remain at IIT, where he has been president since 2007, as a professor of chemical engineering. That John reached this level of academic leadership is ample testimony to his career success, and the caliber of his leadership didn't diminish at IIT. Bud Wendorf, chairman of the IIT Board of Trustees, said: "Replacing John Anderson won't be easy. He helped bring fiscal stability back to the university, while simultaneously insisting upon an upward trajectory of academic excellence." John completed his PhD at Illinois and held faculty positions at Cornell and Carnegie-Mellon, where he was also department chair and dean. His IIT appointment was preceded by a term as provost and executive vice president at Case Western Reserve University.

RAKESH JAIN M'74 D'75 has been honored with the 2014 Princess Takamatsu Memorial Lectureship of the American Association for Cancer Research (AACR). Rakesh, the Andrew Werk Cook professor of tumor biology (radiation oncology) at Harvard Medical School, directs the Edwin L. Steele Laboratory in the Department of Radiation Oncology at Massachusetts General Hospital in Boston. He was recognized for his pioneering work in tumor biology and his leadership in developing diverse international collaborations and training the next generation of scientists. Rakesh is renowned for his work characterizing the abnormal state of blood vessels within tumors and for proposing and then validating the groundbreaking hypothesis that "normalizing" the network of blood vessels in a tumor can improve treatment outcomes. In testing his hypothesis, he made discoveries that fundamentally changed understanding about the ways in which anticancer therapeutics called antiangiogenic agents work. His research showed that antiangiogenic agents, developed to prevent tumor blood vessels from forming, can actually normalize tumor blood vessels in both animal models and cancer patients, and that this improves outcomes for patients. Prior to joining MGH and HMS in 1991, Rakesh held faculty positions at Columbia and Carnegie-Mellon University. Throughout his career, Rakesh has mentored graduate and postgraduate students from around the world from diverse backgrounds, including chemistry, molecular and cellular biology, immunology, radiology, pathology, surgical oncology, engineering, mathematics, and physics, many of whom are now leaders. "I feel enormously honored and pleased to be chosen as a recipient of this prestigious award. I have had the good fortune of collaborating with more than 200 doctoral and postdoctoral students from diverse backgrounds, my faculty colleagues, my former and current department chairs and a highly talented technical staff, and a large number of basic scientists and clinicians from all over the world. I am grateful to all of them for making my journey as a chemical engineer into the world of solid tumors both productive and compelling," Jain said. The AACR Princess Takamatsu Memorial Lectureship is presented to a scientist whose novel and significant work had or may have a far-reaching impact on the detection, diagnosis, treatment, or prevention of cancer, and who embodies the dedication of the princess to multinational collaborations. Her Imperial Highness Princess Kikuko Takamatsu was instrumental in promoting cancer research and encouraging cancer scientists. She became a champion for these causes following her mother's death from bowel cancer in 1933 at the young age of 43. Jain's contributions to cancer research have been recognized with numerous other accolades, including election to the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine; he is one of only 20 people ever to have been elected to all three U.S. National Academies. He also received the American Society for Clinical Oncology's Science of Oncology Award in 2012.

Our alumni at DuPont continue to receive major recognition on the DuPont technical ladder. **JIM TILTON** B'81 M'82 is one of seven DuPont employees who have been named DuPont Fellows, the highest technical professional level in the company. DuPont Fellows are scientists and engineers who define new technologies, influence research direction and mentor other scientists both inside and outside of the company. Jim has enabled a number of science-based laboratory innovations to be scaled-up for production, and improved performance of manufacturing operations, across several DuPont businesses. After UD Jim completed his PhD at Houston, he returned to DuPont, where he has been a mainstay of the Engineering Department since. Jim has also taught classes in our department for more than 25 years, a remarkable stint considering his responsibilities at DuPont.

MARK SHIFLETT M'98 D'02 has been named a DuPont Technical Fellow. Mark received his bachelors from NC State and has worked for DuPont as an engineer in several capacities since 1987. He quickly rose through the ranks and by 1997 had been promoted to Senior Research Engineer at the Experimental Station in Wilmington. Along the way he also completed his graduate work in our department. Mark has also been an adjunct instructor for the department for several years and a critical asset to core courses like junior and senior lab.

DuPont has also honored several distinguished outside scientists and engineers with lectures named after historical technical leaders at the company. The inaugural Allan P. Colburn Lecture was presented by **RAKESH AGRAWAL** M'77, the Winthrop E. Stone Distinguished Professor of Chemical Engineering at Purdue. His talk was titled "Engineering a Sustainable Energy Future" and included coverage of how his research on thin-film solar cells, production of fuels and chemicals from biomass, and energy storage at gigawatt-hour levels can help overcome the challenges associated with the harnessing, storage and use of solar energy to meet daily needs for food, fuels, chemicals, heat, electricity and transportation.

RON BEHRENS D'84 has spent his entire 30+ year post-UD career working in various locations for Chevron. Soon after starting in La Habra, California, he engaged with Stan Sandler to customize some interesting and practical thermodynamic applications that are still in routine use. From there, he went on to seven other locations in four countries, including several assignments in operating companies to get the practical business grounding not possible in the technology company. Now, as a Team Leader, Heavy Oil and Unconventional Resources, he has an interesting blend as part of a small branch of the technology company embedded within an operating oilfield. Because it is a heavy oil operation under steam injection, well spacing is very dense so he literally bikes past 1000+ pump jacks to get to his office.

TIM GRIFFIN B'84, has moved far afield geographically while maintaining some very UD-like interests. Since 2005 he has been a professor at the University of Applied Sciences in northwestern Switzerland, active in energy research (biomass) and teaching thermodynamics. However, he gets back to Delaware often to visit family and friends. Stop in and see us too on one of your visits, Tim!

DAVID MEISTER B'84, is one of numerous alumni who have pursued legal careers, and David's has been characterized by considerable accomplishment and distinction. While he stresses that he always traces his roots back to the UD chemical engineering program, since 1987 he has been practicing as a criminal/enforcement lawyer, both as a government prosecutor and in private practice. Of particular note are his government positions with responsibilities in the financial services industry, first as an Assistant U.S. Attorney in the Southern District of New York, followed by nearly three years as Director of Enforcement of the U.S. Commodity Futures Trading Commission (CFTC) in Washington. In 2014 he returned to Skadden, Arps, Slate, Meagher & Flom LLP in New York, where he currently runs the Government Enforcement and White Collar Crime practice. A side note: while David was at the CFTC, one of the commissioners was Bart Chilton, grandson of Thomas H. Chilton (see Class of '64 above).

BRIAN FARRELL B'85 has been named Chief Engineer at Air Products and Chemicals. We see Brian regularly on his recruiting visits at UD, where he is usually accompanied by **CARL MARTIN** B'77. Having our alumni named Chief Engineer at major chemical companies is a particular point of pride for us. Another recent such appointment was that of **KAREN OLSEN FLETCHER** B'81 M'82 at DuPont, where her position includes the title Vice-President for Engineering.

PHIL SAVAGE M'83 D'86 has been selected as the new head of the Department of Chemical Engineering at Penn State University, effective Aug. 20, 2014. He comes to Penn State from the University of Michigan, where he has been serving as Arthur F. Thurnau Professor and interim head of chemical engineering. Phil is returning to his undergraduate alma mater and his selection continues Penn State's longstanding practice of appointing chemical engineering heads with Delaware connections, including the late **LARRY DUDA** M'61 D'63, Hank Foley and Phil's immediate predecessor, Andrew Zydney.

MARK PILLARELLA D'84, joined Air Products and Chemicals, Inc. in 1989 in Lehigh Valley, PA. He worked there for 25 years and guesses he is probably one of the few that have remained at the same company since graduating from UD. Mark worked in a variety of R&D and Process Engineering areas including membranes, adsorption, distillation, and heat transfer. He states: "It's been a great experience and, in addition, has given me the chance to travel to many interesting countries." Currently Mark manages the LNG (liquefied natural gas) R&D, Process Engineering, and Start-up groups. The LNG area has grown substantially over the past few years with the rapid growth in demand for natural gas. Mark and his wife, Kiki, have two teenagers who of course keep them very busy. Their daughter enjoys playing piano, will most likely pursue engineering, and spent the summer in China on a language immersion scholarship program. Their son is starting high school and has a passion for playing baseball.

UDIT BATRA B'91 has continued his remarkable career progress with his appointment as President and CEO of Merck Millipore (EMD Millipore in the US). For the previous two years, Udit had managed the turnaround at Merck Consumer Health as President and CEO, an appointment reported in our 2012 newsletter. As described in that report, Udit's career path has taken him to Princeton for his PhD, a research position at (the US) Merck and Co., McKinsey, J&J, and finally three positions of growing responsibility at Novartis. Udit visited the department in the summer of 2014 and is refreshing in his down-to-earth manner and his continued enthusiasm for engineering, both in education and industrial practice. He sees Millipore as first and foremost an engineering company and, based on our grapevine back to the research community at Millipore, this is greatly appreciated by the technical staff there. Udit had not been back to UD since our building expansion and renovation in the 1990s but he managed to uncover some familiar items, such as the heat transfer experiment in junior lab.

LEAH LANGSDORF D'94 started her career at ARCO Chemical in Newtown Square, Pennsylvania, shortly before graduating and worked with several other UD graduates, including Dan Trauth, Carole Read and Nick Triantafillou. She was part of the team that developed the process for IMPACT™ low monol polyols and enjoyed a production start-up in exciting Charleston, WV. In 1997, she took a process development position at B F Goodrich near Cleveland, OH. In 2001, her group was sold and is now known as Promerus, LLC, a wholly-owned subsidiary of Sumitomo Bakelite, Co., Ltd. She was a key member of the development team for a polynorbornene polymer used in leading-edge semiconductor fabrication. In 2007, this project took her to Utsunomiya (the Charleston, WV of Tochigi Prefecture, Japan) for another production start-up. More recently, she has managed new product development projects and in 2013, she became responsible for Promerus's Quality Management System and Analytical Group. She lives in Akron with her husband, **STEPHEN TOMASKO** (UD MFA 1992), who has a new book of photography (Delira and Excira: Visions of the Flowers of Spring) and her daughter, Alexandra, who will be a pre-med student at the University of Akron this fall.

JAMES BUSHONG B'94 is exemplary in using his engineering expertise to help bring about a more sustainable future. Jim is developing a new type of solar energy panel based on three-dimensional structures and synergistic total energy transfer systems. He utilizes knowledge and experimental observations in materials science, heat transfer, optical physics, and fluid dynamics to maximize total system performance versus costs ratio, to offer a more compelling economic value for solar energy. His goal is to use science and engineering to do his part in creating economic opportunity, a more sustainable energy future, and a cleaner environment for all.

JOHN R. RICHARDS, P.E., D'94 joined DuPont in 1978 after receiving undergraduate degrees in biochemical engineering and psychology from Rutgers and an MS in chemical engineering from Cornell. He completed his UD Ph.D. part-time and is now a Research Fellow in DuPont Engineering Research and Technology at the Experimental Station in Delaware. John has worked on various processes and plant sites employing polymerization and biological modeling and process control. His work has had a significant impact in terms of improved yield, quality, and productivity, and he has received three DuPont Engineering Excellence Awards.

John is also very active outside DuPont. He is an affiliated faculty member in chemical engineering at UD, where he has taught the Fundamentals of Engineering and Professional Engineering Review in Chemical Engineering courses since 1983. He has authored 21 publications in refereed journals, a book, 6 book chapters and theses, and 38 conference presentations. An AIChE member since 1976, he has organized many sessions at Annual AIChE and ACC Meetings and was Conference Industrial Co-chair at the 2009 Polymer Reaction Engineering (PRE) VII, the premier PRE conference held every three years. He was elected an AIChE Fellow in 2011, was awarded the CAST Computing Practice award in 2012 and is currently serving as a CAST Director. He is also an Educational Associate at the Mount Cuba Astronomical Observatory.

Home page: http://home.comcast.net/~jrichards102/

JEFF KABIN B'94, went on from UD to complete a PhD in chemical engineering at NC State University and then worked in process development roles at Albemarle (Baton Rouge, LA) and ExxonMobil (Baytown, TX, near Houston). While at ExxonMobil, he became a co-inventor on 9 patents related to making olefins from methanol. Also while at ExxonMobil he earned my M.B.A. from the University of Houston, where he met his wife, Karen, also a PhD chemical engineer with an M.B.A. Jeff then worked for PROS Revenue Management as a business consultant developing quantitative, software business systems for the chemical industry and subsequently for Sud-Chemie (now Clariant), selling catalysts to the refining and petrochemical industries. Four years ago Jeff joined Kinder Morgan, where he is the Director of Business Development for Transmix, which takes mixtures of refined products such as jet fuel, gasoline and diesel formed during pipeline transportation of these

discrete products and re-refines them back into saleable finished products. Jeff manages a team of three people and oversees the commercial aspects of five Transmix plants, the physical trading of the refined product inventory, and implementation of capital projects. His current focus is on desulfurization of the diesel fuel produced in order to create a saleable ultra-low sulfur diesel (ULSD). Jeff and Karen have been married for 11 years and live in Houston with their three children aged 6, 4, and 3. Karen is a native Houstonian and Jeff's parents retired and moved down to the Houston area, which means they a have a lot of family nearby.

PAMELA MORRISON B'94, writes that she had a great 12 years at Seagate Technology, where she learned a great deal about cleaning and cleaning chemistries as well as project and functional management. She left Seagate in early 2014 and recently started a new job with Sage Electrochromics (Faribault, MN) as a Senior Engineering Project Manager in their product development group. The primary product for this firm is dynamic glass that can be set clear or opaque, depending on the application or removal of a small electrical current.

SHEKHAR GARDE D'97 has continued his meteoric rise at Rensselaer Polytechnic Institute with his naming as dean of the School of Engineering effective July 1, 2014. Shekhar, who is the Elaine S. and Jack S. Parker Professor of Engineering, has been an outstanding head of RPI's Howard P. Isermann Department of Chemical and Biological Engineering. Shekhar, whose research focuses on understanding water's role in biological structure and function, joined RPI in 1999 as an assistant professor and became a full professor in 2006. He also recently received another honor with his election to the American Institute of Medical and Biological Engineering.

HANK ASHBAUGH D'98, associate professor of chemical and biomolecular engineering at Tulane University, has received the Helmholtz Award from the International Association for the Properties of Water and Steam. Hank was given the award for his research "on the effect of water's aversion to oil and the resulting insolubility of oil in water."

TERRI EMIRA (JEFFRIES) JONES'S B'99 recounting of her experience is inspirational. Terri writes that she entered the program in 1992 with Kathlyn Card-Beckles and Heather (Hollowell) Davis. As a student in the RISE program, she started in the summer to get a head start on the English and math requirements. However, taking a full load of classes every subsequent semester, she found herself failing at least one class every year. This led her advisor, Jon Olson, to ask her every semester, "Are you sure you want to continue on in Chemical Engineering?"--to which she would have the same response each time, "Yes. This is what I started, and this is what I will finish." Finally, at her last meeting with Dr. Olson, he said, "Well, you sure do have true grit!" She hadn't seen the movie and had no idea what he was talking about until years down the road. Terri graduated in 1999 with a minor in Russian. She writes, "I never realized the impact those words would have on me, because as a graduate of Chemical Engineering from the University of Delaware, it's that persistence and stamina that has paid off in my career and in my hobbies. I am one semester away from completing my MBA at the University of Baltimore, and I work at Becton Dickinson. I bought a motorcycle in 2002, and I have ridden it in 46/50 states, and I have traveled to 49/50 states. I seem to never stop pursuing my dreams! Thanks Dr. Olson!"

KEITH WELP D'99, starts off, "Wow - I really can't believe it has been 15 years since I was at UD! In those intervening years much has changed for me, and some things have not. Most importantly, I remain married to Janet and since our departure from Newark we have had two children. Our daughter, now 12, and our son, now 9, are a constant source of wonder and joy to us both." Keith joined Air Products and Chemicals, Inc., after graduation and spent 4 years in a series of R&D roles before taking a "trial" or "on loan" commercial role in the Performance Materials business. The trial planting clearly took roots and he spent 10 years in a series of commercial leadership roles in the Polyurethane Additives business with increasing responsibility. For the last three years Keith was the Americas Regional business manager for the Polyurethane Additives business unit. In early 2014 he took on a new challenge, leaving Air Products after 14 years to join Minerals Technology Inc. as the Global Marketing Director - Performance Minerals, in the Bethlehem, PA, offices.

SULJO LINIC D'03, who is an associate professor of chemical engineering at Michigan, continues to rack up accomplishments. A recent one was his selection to present the Ernest W. Thiele Lecture at the University of Notre Dame. His thesis advisor at Delaware, Mark Barteau, was also a Thiele Lecturer, in 1988.

PETE TESSIER D'03 has been promoted to associate professor at Rensselaer Polytechnic Institute. His research on protein engineering and interactions continues to have an enormous impact, and this has been recognized with his appointment as Richard Baruch M.D. Career Development Associate Professor. Pete and his wife, Maria, and two daughters will be spending 2014-5 in Germany, where Pete will take a sabbatical leave at the Max Planck Institute for Biochemistry at Martinsried, near Munich.

WILLIAM TISDALE B'05 has received a 2014 3M Non-Tenured Faculty Award, which recognizes outstanding new faculty who excel in research, experience, and academic leadership. Will, who is an assistant professor of chemical engineering at MIT, was recognized for his research on quantum dots. He earned his PhD at Minnesota after completing his studies at UD, where he was a particularly effective leader of student organizations.

MARY MCDONALD STAEHLE D'10 has received Rowan University's Frances S. Johnson Junior Faculty Innovative Teaching Award. The award, which is named in honor of the former director of Rowan's Faculty Center, who passed away in 2008, is given annually for innovative and meaningful teaching that promotes student learning. Mary's chemical engineering faculty colleagues at Rowan include several more of our alumni, including Zenaida Otero Gephardt, Robert Hesketh and Joe Stanzione, who started as an assistant professor at Rowan after completing his PhD last year.

Several other recent graduate alumni have assumed faculty positions. **JULIE ALBERT** D'11 is now an assistant professor at Tulane University. Julie, who did her doctoral research with Thomas Epps, is studying the use of combinatorial methods to engineer nano- and micro-structured polymeric materials for cancer research, alternative energy, and other applications involving biological systems. Her previous research focused on developing gradient methods for exploring the effects of surface interactions on block copolymer thin film self-assembly and tailoring the chemical and mechanical properties of silicone elastomer networks for cell mobility studies and peptide assembly. Julie joins others with Delaware connections at Tulane, namely, **HANK ASHBAUGH** D'98 and department chair Anne Robinson. **KELLY SCHULTZ'S** D'11 new position is at Lehigh. Her graduate work at Delaware was with Eric Furst, whose thesis advisor Alice Gast was until very recently the president of Lehigh. Kelly also has plenty of Delaware colleagues, including **TONY MCHUGH** M'70 D'72, **BRYAN BERGER** D'05 and **MARK SNYDER** D'06. Last but not least, **BECKY BRUMMITT KALMAN** M'08 D'10 is now an assistant professor of chemistry and biochemistry at Georgia Gwinnett College.

CARA TOURETZKY B'11, now a graduate student at Texas, has been awarded the EPA STAR (Science to Achieve Results) Fellowship. The award covers two academic years starting in Fall 2014 and will fund her tuition, stipend, research expenses and travel. Earlier this year she was also selected for the Winter Internship from NEC Corporation and spent the Spring semester at their research center in Mountain View, CA. Word from Texas is that Cara has done spectacular work (she is about to complete her fourth journal paper). She was also awarded an NSF Graduate Fellowship last year.

STEVE LUSTIG M'85, D'89, Research Scientist at DuPont and adjunct professor, is the winner of AIChE's 2013 Industrial Research & Development Award. This award recognizes individuals or teams working in the industries served by chemical engineers, for innovation that has resulted in the successful commercial development of new products and/or new processes for making useful products. The award was presented at the AIChE Awards Ceremony in the Hilton Union Square hotel, San Francisco, on Sunday, November 3, 2013.

Giving back

Thank you to the many friends and alumni who have made generous contributions over the past year. Your gifts are used for many worthwhile purposes, including support of our research and educational programs.

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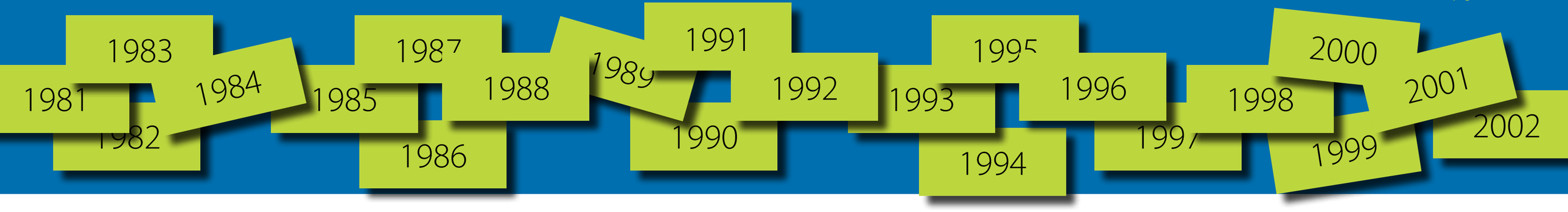

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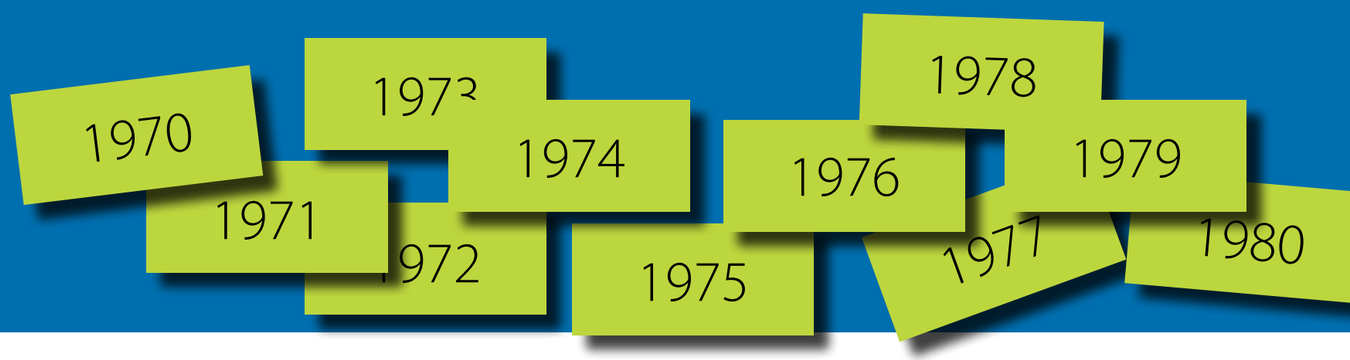
Chengkun Zhang

Robert E. Zumwalt and Doris Wild Zumwalt



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