Join Us in Celebrating 50 years of Materials Science!

CEMS Materials Science Symposium & Alumni Reunion

Friday, May 15, 2020

Register to Attend: z.umn.edu/mse50
MESSAGE FROM THE HEAD

Join the Next 100 Campaign

Your gift, no matter the amount, makes a difference!

Our Centennial in chemical engineering and 50 year Jubilee in materials science provides a historic opportunity not only to reflect on our past achievements, but also to re dedicate ourselves to continued success. Last spring, I asked the graduating class of 2019, some 100 soon-to-be bachelor’s in chemical engineering and 41 in materials engineering, if they would consider contributing to a Senior Class Scholarship and the H. Ted Davis Undergraduate Study lounge improvement fund (a stated priority of theirs!). Fully 50% of the Class of 2019 contributed towards this effort. Gifts ranged from $5 to $100, and complemented by a generous faculty match, CEMS established two new scholarship awards and provided needed enhancements to the Davis lounge. The fact that 50% of our students participated was just as important, perhaps even more important, than the total dollars raised. For the Class of 2019, that participation rate was simultaneously a vote of confidence in the department, a meaningful celebration of their time in CEMS, and a commitment to supporting future generations of students.

As we start the New Year, the Next 100 Campaign moves into a new and urgent phase. We have made great progress toward our goal of raising $30 million for faculty and student support (see article by Courtney Billing, page 12). We will continue working hard to reach this goal by June 2021. Beyond the campaign, the key to sustaining the long-term health of CEMS is annual participation in supporting the department, at all levels of giving. In a given year, donors to the department number approximately 300 out of a total of about 7,500 living alumni. That’s about 4%. Another 300 or so give to the College or the University. In all, approximately 8.5% of CEMS alumni give to CEMS or the broader U of M annually. We are extremely grateful for this support. Within CEMS, alumni giving funds undergraduate scholarships, graduate fellowships, student interest groups, faculty research programs, and more. We are a stronger and more robust program because of direct alumni support!

In a historic year such as this, we have an opportunity to dream boldly about our future as a department. What could we accomplish if we doubled or tripled the number of annual donors to CEMS? How many more undergraduate scholarships could we award to students of exceptional financial need and/or merit? How many more graduate fellowships could be created to recruit the best and brightest minds from across the world to study in this remarkable program? The need of our students is great, and the competition we face from other schools in recruiting not only them, but the faculty who educate them each day, is enormous.
To those of you who have already donated or pledged to support the Next 100 Campaign at all levels, thank you – all of us in CEMS are truly grateful for your partnership and commitment to our continued success. If you have not, I ask you to consider an annual, sustaining gift in any amount that is meaningful to you. Annual giving is not a mode that has been very common for us – we have a small group of alumni who make this meaningful commitment each year – but annual giving provides an important pillar of support to sustain the excellence of our top-ranked engineering program. You will find more about annual giving on page 13.

Thank you for your consideration and the many ways you support CEMS! You, our alumni, are our greatest legacy.

C. Daniel Frisbie
Head, Department of Chemical Engineering and Materials Science
“CEMS Connects Alumni” at Ecolab

Jim Tarara (ChE ’93) showcased the best of Ecolab’s innovation, technology, and business applications.

A trusted partner at nearly three million customer locations, Ecolab is a global leader in water, hygiene and energy technologies and services that protect people and vital resources. Ecolab delivers comprehensive solutions, data-driven insights and on-site service to promote safe food, maintain clean environments, optimize water and energy use, and improve operational efficiencies for customers in the food, healthcare, energy, hospitality and industrial markets in more than 170 countries around the world. All of that was fully on display for the CEMS Connects Alumni event hosted by Jim Tarara (ChE ’93), RD&E VP, Technical Service, Packaging and Process Development at Ecolab.

“During this event, it was exciting to see the level of research underway at the University and to offer attendees a first-hand look at the cutting-edge innovations we develop to help make the world cleaner, safer and healthier,” said Tarara.

The tour highlighted some of Ecolab’s innovation in action. Attendees observed water treatment innovation for boilers and chillers, which serve industrial customers’ water quality needs, as well as food and beverage processing technology that delivers safe food from farm to fork. Ecolab’s Pest Elimination team provided some fun along the way when tour guests were given the opportunity to hug a bug and learn about public health pests. Guests also took a behind-the-scenes look into a kitchen where they learned about sustainable warewashing and proper procedures for cleaning fruits and vegetables. The tour also highlighted Ecolab’s mechanical, digital and electrical product delivery technology. Finally, the tour culminated in a stop to discuss public health innovation and technology in hospitals and long-term care facilities.

Jim Tarara (front row, far right) hosted CEMS alumni, graduate students, and friends at Ecolab on November 5, 2019. Photo credit: Ecolab.
Aris Lectures inspire & engage

The late CEMS Professor Rutherford Aris endowed these unique, interdisciplinary learning opportunities.

This year’s Aris Lectures, Aesthetics: Methods of Perception, aimed to provoke each member of the community to examine introspectively the role of aesthetics in their research through discussions of aesthetic principles beyond our discipline. Organized by Professors Samira Azarin, Frank Bates, and Mahesh Mahanthappa, this series embodied the late Professor Rutherford Aris’ vision of Commune Vinculum Omnibus Artibus (“a common bond between all of the arts”).

The lectures sought to provide multiple, cross-disciplinary perspectives on how aesthetic principles influence and define the work of eight distinguished Aris Lecturers across various fields.

The series commenced with a seminar on “Perceiving Something New” by McKnight Land-Grant Professor Elaine Auyoung from the UMN Department of English and the Center for Cognitive Sciences, who introduced fundamental ideas related to aesthetics, perception, and understanding.

Known for her visually arresting images that so effectively communicate modern scientific principles to broad audiences, Research Scientist Felice Frankel from MIT engaged us in a discussion of her approach to science communication in a lecture titled “More than Pretty Pictures.”

Well-known architect Edwin Chan discussed his guiding aesthetic principles in notable design projects that include the UMN Weisman Art Museum and the Guggenheim Museum in Bilbao in his seminar titled “Simple Measure.”

Known for his popular podcast “Hi-Phi Nation” that artfully employs elements of documentary journalism and enthralling narratives to examine deep philosophical concepts, Vassar College Professor Barry Lam delivered a seminar that helped us understand the “Aesthetics and Ethics of Nonfiction Storytelling.”

Professor Sabine Hossenfelder of the Frankfurt Institute for Advanced Study provided us a perspective on “How Beauty Leads Physics Astray,” in which she discussed the perils of relying on aesthetics to develop scientific theories.

Professional jazz alto saxophonist and Princeton University Director of Jazz Studies Rudresh Mahanthappa provided his perspectives on how aesthetics across musical traditions inform his rich and unique musical signature.

Professor Kathryn Pearson of the UMN Department of Political Science engaged us on aspects of aesthetics in politics.

Our final 2019 Aris lecture was presented by Dr. Melissa Moreton of the Hill Museum and Manuscript Library on aesthetics in medieval handwriting, scribal practice, and the science of paleography as a fitting tribute to Professor Aris’s longstanding interest and significant scholarship in paleography (the study of ancient writing systems) and medieval communication technologies.

View some of the Aris Lectures on the CEMS YouTube channel: z.umn.edu/cemsyoutube
CEMS welcomes new faculty

Michelle Calabrese and Stefano Martiniani join CEMS as tenure-track faculty.

Michelle Calabrese
The research in my group combines rheology and soft matter physics, applied to polymers, proteins, surfactants, and colloids. We develop quantitative relationships between a material's structure under deformation and its resulting performance, which then enables us to design new materials with improved properties and flow stability. We also develop new techniques and analysis methods in rheology and scattering for use by the broader scientific community, which allows for more efficient use of scarce resources and more realistic measurements of flow properties in real-world applications. My group is currently working in four main areas: flow instabilities in self-assembled fluids, biorheology and drug delivery, magnetic field-directed assembly of functional materials, and sprayable coatings and membranes. Our research questions are selected specifically to address significant global challenges, including drug delivery and efficacy, recycling and waste, and energy efficiency. We also emphasize developing practical solutions that can be commercially adopted if successful to maximize societal impact.

We’re currently applying rheology and advanced characterization techniques to solve problems in healthcare, including in protein-based therapeutics which are currently a multi-billion-dollar industry. Proteins injected into a patient are subjected to high shear and extensional rates on the order of $10^5$ s$^{-1}$, stemming from the small needle size required to minimize patient discomfort. Both shear and extensional forces lead to protein denaturation, aggregation, and loss of activity; however, extensional “stretching” flows are substantially more damaging because of their likelihood to lead to protein unfolding. However, the extensional rheology of protein solutions has never been measured for several reasons, including large required sample volumes which are cost-prohibitive. Additionally, while extensionally deforming or stretching a solid like a rubber band is trivial, “gripping” and stretching a fluid is substantially more complex. Accordingly, dilute protein solution extensional rheology cannot be performed on commercial instruments. To solve this problem, we are using small-volume droplet-based methods and high speed imaging to capture the capillary breakup behavior of protein solutions. By developing an in-house small-volume instrument, we are able to make these types of measurements on proteins for the first time. Now that we have developed this instrument in-house, we are using similar strategies to assess the sprayability of various fluids, including polymer-nanotube suspensions for electroseparation membranes.
Stefano Martiniani

My research program builds on statistical mechanics and scientific computing to address fundamental questions arising in the study of nonequilibrium phenomena in the areas of soft matter physics, dynamical systems and machine learning. Our primary focus is the design of novel computational approaches. As such, a core theme within the group is the development of Monte Carlo sampling algorithms to characterize the configurational space of complex dynamical systems, ranging from glasses and granular materials to biological and artificial networked systems, for the purpose of elucidating issues relative to their control and stability.

In a second area of investigation we explore the nature of nonequilibrium processes leading to the self-organization of material systems into exotic states of matter. For this purpose we embraced ideas from information theory and machine vision that are capable of quantifying the emergence of order during these processes, even when the nature of the order is not known a-priori. By these methods we were able to detect and characterize phase transitions in systems ranging from active and sheared colloidal suspensions to models of animal flocking. We are also exploring these and related ideas in machine learning for the design of disordered material structures with desirable optical and mechanical properties.

Finally we are pursuing fundamental and applied questions in machine learning. For instance, we are developing a neurologically plausible new class of machine learning algorithms that could bring significant advantages both in terms of performance and their potential for neuromorphic computing. Furthermore, in collaboration with the Hackel group, we will explore new data-driven strategies for accelerating the discovery of antimicrobial peptides in high-throughput experiments.

Machine learning has received a great deal of attention in recent years and it is finding widespread application in fundamental and applied research across a wide spectrum of industries, such as materials, pharmaceutical, healthcare and electronics to name a few. Although the recent surge in success for this discipline is largely due to the increased availability of computational resources and large datasets, it would be unfair not to notice that the field has also made significant technical advances in the past decade. Machine learning is fundamentally transforming the way in which we approach problems in many disciplines, and it will likely be an integral part of the solutions used to address societal challenges.
Faculty awards

Vivian Ferry

Assistant Professor Vivian Ferry is one of two recipients of the 2020 recipients of the SPIE Early Career Achievement Award - Academic focus - in recognition of her contributions to the understanding of light-matter interactions in solar energy conversion, and the development of optical materials for plasmonics, metamaterials, and nanocrystals. The SPIE Early Career Achievement Award is presented in recognition of significant and innovative technical contributions in the engineering or scientific fields of relevance to SPIE. This award recognizes excellence in academia.

“Vivian is an internationally recognized expert on harnessing sunlight with nanostructured materials, and while the topic has expanded considerably in recent years to include many researchers, her work is absolutely on the cutting-edge,” notes Stanford professor of materials science and engineering and SPIE Nanoscience + Engineering Symposium Chair Mark Brongersma. “She is a very creative and talented young researcher and educator who is already having a significant impact in the field of plasmonics and nanophotonics.”

Lorraine Francis

Professor Lorraine Francis has been named a College of Science and Engineering (CSE) Distinguished Professor for her exceptional contributions to teaching, international reputation in scholarly research, and genuine commitment to the College and its activities. Francis will receive a one-time unrestricted fund of $15,000 to be used for professional development or research. No more than 20 CSE Distinguished Professorships exist at any time, so Francis is truly being recognized as an elite faculty member among her peers. Francis was selected for the award by CSE Dean Mostafa Kaveh, upon recommendation from the College’s Awards and Honors Committee.

Russ Holmes

Professor Russell Holmes has been appointed as the Ronald L. and Janet A. Christenson Chair in Renewable Energy for a five year term. As the Christenson Chair, Holmes will receive an annual stipend to support his scholarly activities in the research and education of renewable energy.

Professor Uwe Kortshagen, a Distinguished McKnight University Professor in the Department of Mechanical Engineering, also holds a Christenson Chair, having been appointed last year.

The Christenson Chair is made possible by a generous endowment by the Christensons and signifies their passion for sustainable energy solutions. Ron is a 1972 Bachelor of Mechanical Engineering graduate. He served as the CTO for Cargill until his retirement in July 2009. Christenson hopes to make a difference for people by helping create advancements in a vital area of research—renewable energy. “Developing technologies that address the future of energy can make a huge difference in this world,” Christenson said. “There is a lot of luck and fate in life, but if you do not have the tools when the opportunity presents itself, you are not going to be able to do anything,” Christenson said. “I felt I got those tools at the University of Minnesota.”
**Bharat Jalan**

Associate Professor Bharat Jalan received his PECASE Award at a ceremony on July 25 at the White House. Jalan (left) is pictured with Kelvin K. Droegemeier, Director of the White House Office of Science and Technology Policy (OSTP).

Associate Professor Bharat Jalan is among the recipients of the 2019 Presidential Early Career Awards for Scientists and Engineers (PECASE). The award is the highest honor bestowed by the U.S. government to outstanding scientists and engineers in the early stages of their independent research careers and who show exceptional promise for leadership in science and technology. Jalan was honored on July 25 at a ceremony in Washington, D.C.

Jalan was nominated for the award by the U.S. Department of Defense. His research focuses on various areas of materials science, materials chemistry, and physics including the synthesis of quantum materials where researchers can manipulate materials at the atomic level. This research provides the fundamental science needed to develop the next generation of electronic devices. Jalan has previously received several awards including the Air Force Office of Science Research Young Investigator Award (2016), International Molecular Beam Epitaxy (MBE) Young Investigator Award (2016), Royal Society of Chemistry Emerging Young Investigator (2017), and American Association for Crystal Growth Young Author Award (2017).

“I am truly honored to receive such recognition of our research contributions,” Jalan said. “The award is particularly rewarding because it recognizes the importance of fundamental material synthesis science research to the nation’s priorities.”

Excerpt taken from a news release written by Rhonda Zurn, College of Science and Engineering, and Lacey Nygard, University News Service.

**Chris Leighton**

Distinguished McKnight University Professor Chris Leighton has been named a Fellow in the Institute of Electrical and Electronics Engineers (IEEE). Leighton receives this Fellowship through the IEEE Magnetics Society for his “contributions to the understanding of magnetic oxides, interfaces, and nanostructures”. Each year the IEEE elevates less than 0.1% of its voting membership to the grade of Fellow. Leighton will be honored at the upcoming Intermag Conference in May 2020.

The IEEE is the world’s leading professional association for advancing technology for humanity. Through its 400,000 plus members in 160 countries, the association is a leading authority on a wide variety of areas ranging from aerospace systems, computers and telecommunications to biomedical engineering, electric power and consumer electronics.
“Give to the Next” Day surpasses goal

With a generous match, CEMS alumni and friends raised $22,538 in one day for scholarship support.

As a result, ten NEW $2,000 scholarships were awarded to deserving undergraduates. Rendering an immediate impact made all the difference for these recipients: Margaret Brown (ChE ’21), Kyle Christopher (ChE ’20), Alex Duhaime (MSE ’21), Bailey Erickson (ChE ’20), Kaci Gwilt (MSE ’21), Jack Hammond (ChE ’21), Hansol Sophie Jung (MSE ’21), Cameron Kelley (ChE ’21), Renuka Paltanwale (MSE ’20), and Hannah Pichman (MSE ’21).

For Kaci Gwilt, a first generation college student from Blooming Prairie, Minnesota, this scholarship provides financial peace of mind and affords important opportunities for the future. “CEMS programs are difficult and sometimes it is hard to

continued on page 16
CEMS Scholarships

Thanks to these generous donors, $240,000 in CEMS scholarships were awarded to 88 deserving students in AY 2019-20.

American Institute of Chemical Engineers Scholarship
Katelynn Mischler

Harold Andrews Scholarship
Malcolm Pithawalla

Michael H. Baker Scholarship
Yosephine Martina

Marvin and Christine Ballard Scholarship
Sophie FitzPatrick, Scott McCullough

Frank and Janis Bates Scholarship
Harrison Wenzel

Eugene and Sharon Brumm Scholarship in Chemical Engineering
Brandyn Contino

Raul Caretta Scholarship
Ethan Tuch

CEMS General Scholarship Fund
Josiah Budiman, Stanley Liu, Spencer Mayasich, Ryan Miller, Madeline Novak, Carly Reller, Nishant Satpathy, Sameer Siddiqi, Tom Weigel

CEMS Class of 2019 Scholarship
Andrew Jacobson, Kinaan Taha

CEMS “Give to the Next” Scholarship
Margaret Brown, Kyle Christopher, Alex Duhaime, Bailey Erickson, Kaci Gwilt, Jack Hammond, Hansol Sophie Jung, Cameron Kelley, Renuka Paltanwale, Hannah Pichman

Tu and Pi-Fang Chen Scholarship
Lucas Golen, Logan Karls, Jackson Muehlbauer, Hudson Shih, Jack Van Sambeek

Bobbie Huston Cronquist Scholarship
Jenna Kelly, Seiei Shiba

Rosalie Sperling Dinkey Scholarship
Che Lee

Harry Fischman Scholarship
Erik Widjaja

Todd Fredin Scholarship
Katharina Fransen, Sarah Wexler

John P. Fridley Scholarship
Alexis Bern, Duong Bui, Jessy Cai, Jessica Chiu, Zhisen Chong, Kavinraaj Elangovan, Tyler Hanft, Erin Schlavin, Vijay Shah, Emerson Uhlig

Donald Leask Fuller Scholarship
Sean Baecker

Christie John Geankoplis Scholarship
Chad Dea

General Mills Scholarship for Chemical Engineers
Sayandeep Biswas

Jerry and Leona Hillestad Scholarship
Edmund Necas

Archie B. Japs Scholarship
Emily Brandt

Kempf Scholarship Fund
Cory Hall

Kenneth V. Krake Scholarship
Pratik Kamat

Vincent K. Leung Scholarship
Rami Azzazi

Charles A. Mann Award/Chemical Engineering (1934)
Scott Berens, Jinbin Chen, Bao Nguyen

Wendell and Dottie Manske Scholarship
Matthew DeJong

Materials Science Scholarship
Zachary Dykes

Joan Mattern Scholarship in CSE
Sarvagya Saluja

Joseph P. Matula Scholarship in Chemical Engineering
Diya Saha

Raj Melkote Scholarship
Tung Nguyen

Mendesh Family Scholarship
Justin Oliver

Eleanor Margaret Minor Scholarship
Matthew Jacobson

Jim and Lorinda Mishek Scholarship
Rebecca Perry, Justin Torres

Athos J. Monti Scholarship
Nicholas Gartner

Thomas and Sandi Mooney Scholarship
Kendra Brickley

continued on page 20
As friends and alumni of CEMS, your support fosters competence, curiosity, creativity, collaboration, and commitment to excellence in a new generation of engineers who walk out the doors of Amundson Hall and into research labs and workplaces of tomorrow. Our students are the talent and the potential that the world needs now. We are profoundly grateful for your help in ensuring that we can recruit, train, and empower these talented individuals now and in the future. In this Centennial and Jubilee year, every member of the CEMS community is an important part of this history. Thank you for:

- Helping us inspire young people to study science and engineering
- Creating research opportunities that allow faculty to turn theory into practice
- Supporting students with scholarships and fellowships that put a world-class chemical engineering and materials science education within reach.

Whenever, and however, you have joined us on this journey, please know that your generosity is deeply appreciated.

As of July 1, 2014, generous alumni, friends, and industrial partners have contributed $22,660,945 in support of the CEMS Next 100 Campaign, which will end in 2021. These extraordinary philanthropic investments comprise 75% of the campaign goal of sustaining the department’s celebrated legacy of excellence for the next century.

You can make this record-breaking goal a reality:

- Sign up for a recurring monthly gift of any size, or increase your annual gift.
- Let us know if you intend to include CEMS in your estate plans. Documenting your gift today celebrates you, counts towards our campaign goal, and helps CEMS plan for its future.
- For donors 70.5 years and older, consider a gift from your IRA required minimum distribution.
- Make a gift online in honor of your favorite CEMS professor, fellow alum, or family member.
Unlock opportunities for CEMS students with a monthly gift of only $8.34

You can give CEMS students the gift of a world-class education by making a sustaining gift to the CEMS Next 100 Campaign. For only $8.34 per month ($100 per year) you help CEMS students offset the costs of their tuition, innovate in research teams, study abroad, and participate in outreach activities designed to inspire new generations of scientists and engineers. Your gift unlocks opportunities that would otherwise be unattainable for the 350 undergraduates and 240 graduate students in CEMS.

All gifts, no matter the size, make a huge impact.

Join the “CEMS Next 100” with a recurring monthly gift of just $8.34 ($100 per year) to provide CEMS with the necessary resources to sustain our legacy of excellence, now and for the next century. Each month, you can provide critical support to CEMS for less than the cost of lunch!

Your gift, and all CEMS Next 100 gifts, add up:
  • 75 donors would eliminate the average annual student loan cost for one undergraduate student
  • 50 donors would help offset the cost of recruiting talented graduate students into our PhD programs
  • 12 donors would provide a travel grant for one graduate or undergraduate student to attend a national conference to gain crucial exposure for their research and future career
  • 10 donors would supplement a student’s study abroad experience, often inaccessible to undergraduates due to costs

Please Consider Supporting the Next 100 Today!

z.umn.edu/cemsgift
Gifts in action

New scholarships sustain undergraduate success.

Eugene and Sharon Brumm Scholarship in Chemical Engineering

Gene Brumm (ChE ’65) and his wife Sharon’s connections to the U of M span more than five decades. Growing up on a farm in Houston County in southeastern Minnesota, Gene learned the values of a solid work ethic. Later while attending Caledonia High School, he was fortunate to take math and chemistry classes with Mr. John Pongratz who helped Gene prepare to enroll in the Department of Chemical Engineering and Materials Science in 1961.

While working on his degree, Gene received an NSF Research Grant to study “Non-Newtonian ViscoElastic fluids.” After graduation, Gene spent his career with companies including Sinclair Research, General Mills, Pillsbury Corporation, Thomson Reuters and a variety of consulting positions. Gene and Sharon’s family grew to include two sons and four grandchildren. Now, celebrating 54 years of marriage, the Brumms wanted to give chemical engineers at the U of M the opportunities that blessed them 50 years earlier. With the Eugene and Sharon Brumm Scholarship in Chemical Engineering, students like inaugural Brumm scholar Brandyn Contino are able to pursue their education without the burden of additional educational debt.

Junior Brandyn Contino of New Prague, Minnesota, shared a similar path with Gene Brumm whose love of chemistry was sparked early in high school. Contino notes, “I selected the U of M because I have lived in Minnesota my entire life and love this state. The U of M was also a top choice for chemical engineering, which made my decision even easier. I’m proud to be a Gopher because of the great culture surrounding the school along with the academic prestige. On campus I have been involved with the Engineers Without Borders UMN chapter, which helps provide engineering solutions to problems facing third world countries.” Thanks to the financial assistance provided to him by the Brumm Scholarship, Contino has been able to participate in a co-op opportunity with Abbott, working with medical devices designed to save lives. “By having additional funding for my education, it allows me to not worry as much about finances and allows me to focus on learning everything I can in school and pursuing every opportunity I can here. I cannot thank the Brumms enough for their support.”

Cossette Family Scholarship

This fall, alumna Betsy Cossette (ChE ’10) along with her mother, Julie, and brother, Wally, established Cossette Family Scholarship in loving memory of Betsy’s father, Thomas Clayton Cossette, to help CEMS students with an interest in advancing cancer research and medical treatments pursue their ideas and fulfill their educational goals. Tom, who passed away on April 21, 2019, had a remarkably positive outlook on life which shined bright and impacted many. He had a passion for helping others however he could and appreciated the little things in life—fishing, hunting, walking his dogs, coaching his kids in sports, and cheering on the Minnesota Twins. Growing up in Columbia Heights, Minnesota, Tom was always a Golden Gopher fan, and the family has many fond memories of tailgating at Gopher football
games together. He was an engineer at heart, known as someone who could literally fix or build anything. Tom is remembered as a loving husband and father, and he is credited with inspiring and encouraging his daughter Betsy to become an engineer.

Betsy has enjoyed a successful career with ExxonMobil since graduating. Her father Tom was always quick to say with a smile on his face, “Well, you’re an engineer now, figure it out,” whenever she shared her problems with him. In July of 2017, Tom received news that no one ever wants to get. He was diagnosed with a very rare type of cancer and began treatment at the University of Minnesota. Due to recent advancements in treatment, Tom was able to enjoy some additional time cancer-free. Unfortunately, his cancer returned, and he ultimately lost the battle at the young age of 66.

The family’s hope is that future medical advances will allow people living with cancer and other chronic illnesses to win their battles and enjoy longer, healthier lives. As a younger alumna, Betsy’s generosity in endowing an undergraduate scholarship is noteworthy. While a student in CEMS, Betsy herself received the Bobbie Houston Cronquist Scholarship, established by Cronquist, the first female chemical engineering undergraduate at the University of Minnesota. Receiving the Cronquist Scholarship was a great aid to Betsy, and played a role in inspiring her generosity to support future generations of CEMS students.

She shares, “It is a pleasure to support the younger generations in this endeavor. In between telling stories and making others laugh and smile, one of my father’s favorite things to say was, ‘If you love what you do, you will never work a day in your life.’ He truly lived up to that saying and was the happiest person around. Tom would hope that the students receiving the Cossette Family Scholarship find this in life as they pursue a career working towards medical advancements.”

**Phil and Sue Zietlow Chemical Engineering and Materials Science Scholarship**

Phil Zietlow (ChE ’64) and his wife, Sue, have established the Phil and Sue Zietlow Chemical Engineering and Materials Science Scholarship, inspired by their deeply held belief that every person has a responsibility to build a better world. While at the U of M between 1959 and 1964, Phil was a devoted member of the U of M Marching Band. During his 51-year R&D engineering career at General Mills, among numerous other technical accomplishments Phil led the teams that invented both Honey Nut Cheerios and Gluten-Free Cheerios.

Dedicated volunteers and community servants, the Zietlows wished to establish a scholarship that would both support ChE students while also encouraging recipients to reflect upon their educational opportunities and consider future support of CEMS once they are established in their lives. Phil, a passionate innovator and committed leader, has served as a Scoutmaster for 45 years and currently holds the position of Scoutmaster Emeritus for Troop 570. He has mentored countless young people and inspiring them to take on leadership challenges and opportunities wherever they can.

Sue, a graduate of St. Olaf College and retired nurse, remains an active volunteer and advocate for children as a Guardian ad Litem.

Inaugural Zietlow scholar Jay Jeske embodies a similar commitment to improving the world around him and life for his fellow CEMS students. Following graduation, Jay plans to enter industry and improve sustainability efforts within the companies in which he works.

*continued on page 17*
PPG establishes new fellowship

The PPG gift will benefit students in both CEMS and Chemistry.

PPG, a global leader and supplier of paints, coatings, and specialty materials, has awarded a $50,000 Industrial Partnership for Research in Interfacial and Materials Engineering (IPRIME) fellowship gift to the Department of Chemical Engineering and Materials Science (CEMS) and Department of Chemistry (Chem). PPG has been an IPRIME member since 2017, supporting and participating in the Coating Process Fundamentals, Microstructured Polymers, Electronic Materials and Devices, and Nanostructural Materials and Processes research programs.

This is the first fellowship gift from PPG to the University and the first-ever IPRIME fellowship gift. PPG has chosen to make this gift to CEMS and Chemistry because of the world-renowned polymer science program, interdisciplinary nature of research, and long history of industrial training. PPG’s businesses and technology have strong alignment with the Coating Process Fundamentals and Microstructured Polymers programs and the fellowship will be awarded to graduate students who are conducting research within these programs.

Current PPG Fellowship recipients include CEMS coatings process students Annie Moorhead, Ting-Pi Sun, Chance Parrish, Panayiotis Kolliopoulos and polymer students McKenzie Coughlin (ChE), Saurabh Usgaonkar (ChE), Derek Batiste (Chem), Hussnain Sajjad (Chem).

Additionally, PPG will support graduate students who are co-advised by chemical engineering and materials science and chemistry faculty. Support will go towards research, equipment purchases, and travel to scientific conferences. Coating Process Fundamentals and Microstructured Polymers are the two largest IPRIME programs and IPRIME is pleased to have this partnership with PPG.

Give to the Next continued from page 10

be able to work to pay for school while also getting good grades, so the extra scholarship really helps relieve some of that stress. I hope to eventually obtain my Master’s degree, so this extra financial support is really important as I pursue my educational and career goals.”

Hansol Sophie Jung, an international student from South Korea, also felt a sense of relief and assurance. “Receiving this scholarship means a lot to me in many ways. It gives me confidence that I made the right choice to attend the University of Minnesota, explore my capabilities, and take full advantage of these educational opportunities,” said Jung.

Cameron Kelley also understands the challenges of financing his college education, as an out-of-state resident, but the appeal of the chemical engineering program here stood out from all of the other schools. Having the opportunity to attend this University and be a part of this prestigious program meant more to me than any other options I had in front of me. I am very thankful to CEMS donors for supporting us as we work to advance our education and develop our skills,” said Kelley.

Hannah Pichman is also focused on the future, one made brighter as a result of demonstrated generosity on CEMS “Give to the Next” Day. She remarked, “I chose to come here because I knew that CEMS would provide me with everything I need to have a successful career. I plan on going to graduate school once I pay off my loans because I believe having a higher education will allow me to help make an even greater impact on the world. Thank you for bringing me one step closer to reaching my goals, and thank you for being generous and kind human beings who care about the future of CEMS students like me.”

continued from page 10
Gifts in action  continued from page 15

The impact of receiving the Phil and Sue Zietlow Scholarship in Chemical Engineering and Materials Science allows him to dedicate more time and energy towards his coursework by not having to work as many hours during the academic year to afford tuition.

He writes, “growing up in Woodridge, Illinois, I was a part of the Boy Scouts of America and as a result developed a deep respect and love for nature. At least once a month I would go camping and get to experience nature in her fullest. For my Eagle Scout project, I focused on conservation and lead a project to build birdhouses for wood ducks. These birds are native to my home state, Illinois, and are also formerly endangered, but are making a comeback thanks to conservation efforts. Being a chemical engineer means helping to create a wide variety of chemicals and products, all of which can have a detrimental effect on the environment. Although the current human need for these products is important, thought must be given to not just the Earth we inhabit, but also the Earth future generations will inherit from us. I want for them to receive a natural environment in the same, if not better, condition than it currently is. I want for them to have the chance to experience this world first-hand, not through decades-old pictures.

The Zietlow Scholarship will allow me to focus on my goals and put worrying about my student loan debt on the back burner. Sustainability is not just going to happen; it needs someone to step up and work for it. By improving the sustainability of my future workplace, I hope to be a part of a larger movement that helps to take care of our collective home.”

Investing in future generations

Generous benefactors endowed Chemical Engineering Legacy of Excellence Scholarship.

An anonymous family whose lives have been impacted by CEMS has established the Chemical Engineering Legacy of Excellence Scholarship. Thanks to this generous commitment, the new scholarship will ensure that the department’s 100-year-old legacy of excellence in chemical engineering education will benefit future students for generations to come. The Legacy of Excellence Scholarship will provide awards to up to two students per year, covering more than one-third of tuition costs.

Dan Frisbie, CEMS Department Head, notes that “the impact of this generous scholarship will be felt immediately among our students, and represents an extraordinary investment in the undergraduate chemical engineering program. The Legacy of Excellence Scholarship will encourage future undergraduates in their pursuit of a world-class chemical engineering education and aid them to develop a passion for the field. We are exceptionally grateful for this new scholarship and its notable establishment during the Centennial year!”
ALUMNI SPOTLIGHT

Making the world a better place

As a Merck Global Health Fellow, Pooja Jambunathan (Ph.D. ChE ’17) is working to establish a pharmaceutical manufacturing company in Tanzania.

Pooja Jambunathan (Ph.D. ChE ’17), Senior Scientist at Merck & Co., is applying her skills nearly 8,000 miles away from home as a participant in the Merck Fellowship for Global Health in Tanzania. This three-month field-based corporate pro bono program leverages the skills of selected employees to support the efforts of non-governmental organizations (NGOs) around the world. The Fellowship program connects Merck employees with NGOs and maximizes their business acumen to build organizational capacity, helping the institutions to provide increased access to health services, products and education to the communities they serve.

The Fellowship program chooses approximately 30 employees from a pool of about 120-130 applicants using a rigorous screening approach which includes three rounds of interviews. The applicants choose from a list of 10-12 projects and give their top three choices. The Fellowship team does the final match of Fellows with the project based on project needs and skills of the different Fellows.

Pooja describes her life-changing work in Tanzania below.

Global Scale

I had chosen Tanzania as one of my top three choices because the project was focused on enabling local pharmaceutical manufacturing in Tanzania and given my manufacturing experience I thought it would be a good fit. I was also very excited by the business side of the project since we were required to write a business plan and that was an opportunity for me to up-skill myself and improve my financial and business acumen.

The Problem

There are very few local pharmaceutical manufacturing facilities in Tanzania resulting in high reliance on imports, unreliable supply, and increased susceptibility to substandard medications. Our project goal was to enable local production of essential medicines in Tanzania by delivering a business plan with a proposal for the start-up of a new pharmaceutical manufacturing company in Tanzania. The business plan will be used by Purdue University to apply for funding grants and loans for financing the project.

Dedicated Team

Three fellows from Merck worked on this project (myself and two other colleagues - one from Merck, New Jersey and the other from MSD-Netherlands). Our role was to act as project consultants and work with our NGO partner to help advance their mission of enabling local pharmaceutical manufacturing in Tanzania by delivering a business plan.

Purdue University and Medical Missionaries of Mary (MMM) are vital partners in this project. Purdue University was our main NGO partner and Sister Zita of Medical Missionaries of Mary was our local NGO partner in the field. The collaboration between Purdue University based in Indiana, USA and the Medical Missionaries of Mary (MMM), a leading Catholic Missionary organization based in Tanzania, started in 2008. This collaboration culminated in Purdue University offering the Biotechnology Innovation an Regulatory Science (BIRS) post-baccalaureate and master’s program in Tanzania for the African population with an aim to bridge the gap in industrial skills and produce a highly skilled workforce for the pharmaceutical sector on the continent. The program is offered to professionals working in the pharmaceutical industry and national drug regulatory bodies of different African countries to enable them to identify counterfeit, substandard medicines and to enhance their skills in pharmaceutical manufacturing.

Since 2008, the program has awarded approximately 140 post-baccalaureate and master’s degrees to students from countries including Tanzania, Kenya, Uganda, Nigeria, Burundi, Rwanda, South Sudan, Zimbabwe, Democratic Republic Congo, Ghana, and Lesotho.
Finding Solutions

With the success and recognition of the BIRS program all over Africa, Purdue and MMM wanted to expand their vision to strengthen the local pharmaceutical industry in Tanzania by setting up a new manufacturing facility to provide quality essential medicines at affordable prices to people in Tanzania and the rest of East Africa.

Purdue University and MMM are working on solving the problem of providing local access to medications through their capacity building efforts by offering a BIRS program for the African population, where professionals from local drug regulatory authorities are trained on how to identify counterfeit drugs and the professionals working in Africa’s local pharmaceutical companies are trained on how to produce quality medicines for the local population.

Merck is involved through the Fellowship program by providing expertise of their employees to support and advance Purdue’s effort on the ground by sending three employees to work on the project full time for three months.

Rooted in CEMS

As a graduate student in CEMS, I worked on sustainable production of biochemical and biofuels by engineering bacteria (E.coli) to convert sugars found in different types of biomass into useful chemicals. My current role at Merck involves manufacturing support of Keytruda, a blockbuster immuno-oncology drug, to ensure robust supply of the drug to the market. While I work with different biological systems now, my technical knowledge in cell metabolism and cell culture skills I learned in graduate school are applicable on a daily basis in my current role.

Through my Ph.D. work, I gained problem-solving skills which help me in my day-to-day job in Merck. Through my roles as Graduate Student Council member and as a member of the CEMS Women’s group I developed strong communication and teamwork skills which have been critical both in my regular job at Merck as well as in my Fellowship. These applicable skills I learned in graduate school helped me get selected for this Fellowship program and have helped me in my current role at Merck.

CEMS alumni, share your stories with us!
Contact cemsalum@umn.edu
ALUMNI EVENT

**CSE ALUMNI AND FRIENDS RECEPTION**
*Thursday, March 19, 2020*
5:30 - 7:30 p.m.
Saint Arnold Brewing Company, Investors Pub
2000 Lyons Avenue - Houston, TX 77020

The University of Minnesota College of Science and Engineering (CSE) invites you and a guest to a reception at Saint Arnold Brewing Company, Texas’ oldest craft brewery. Connect with fellow Gopher alumni, as well as special guests Dean Mos Kaveh and CEMS Department Head Dan Frisbie.

Alumni panelists Michele Brekke (Aero ’75, M.S. ’77), Alison Cozad (ChE ’09), and Gary Teletzke (PhD ChE ’83) will also share perspectives and discuss how CSE shaped their “moment of curiosity” in their respective careers.

Complimentary appetizers and refreshments will be served, but pre-registration is required.

RSVP by Friday, March 6:
z.umn.edu/Houston2020

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Scholarships  continued from page 11

**Gil Overson Scholarship**
Sophie Socha

**Procter & Gamble Company Scholarship**
Nibir Sarma

**Ed and Cora Remus Scholarship**
Joseph Gotchnik

**Zsolt Rumy Scholarship**
Ariana Kedoin

**Jeffrey and Patricia Schott Scholarship**
Tejas Nivarty

**Dr. Steven F. and Candace A. Stanley Scholarship**
Krista Holmstrom, Teddy Johnson

**Donald M. and Patricia R. Sullivan Scholarship**
Sara Sandlass

**Charles E. Taylor II Scholarship**
Travis Hammerstad

**Sheldon and Karen Thompson Scholarship**
Katharina Fransen

**James Stanley Vacek Memorial Scholarship**
Christine Tran

**Dr. Kenneth J. and Kathryn T. Valentas Scholarship**
Katie Bergstrom

**Raymond A. Voet Scholarship**
Jane Wang

**Barbara J. and David J. Yarusso Scholarship**
Margaret Brown

**Phil and Sue Zietlow Chemical Engineering and Materials Science Scholarship**
Jay Jeske

**Paula Zoromski Memorial Scholarship**
Sunyoung Hong
Zsolt Rumy awarded Outstanding Achievement Award

*Rumy (ChE ’66) was honored for his innovations which revolutionized the carbon fiber composite industry.*

Since his graduation from the chemical engineering program at the University of Minnesota, Zsolt Rumy has distinguished himself as an entrepreneur and visionary business leader. In particular, he was the founder and CEO of Zoltek Corporation in St. Louis, which began in 1975 as a manufacturers’ representation and distribution business and became one of the world’s leading companies in the production of carbon fiber materials. The key to Zoltek’s success was Mr. Rumy’s relentless effort from 1987, when Zoltek entered the carbon fiber business, to 2014 when he sold the company, to drive down the cost of carbon fiber so that these materials could penetrate new markets.

Over that 27 year time frame the cost of carbon fiber decreased by a factor of 10 to ~$10/lb. Zoltek was on the leading edge of this dramatic cost reduction, which it achieved by innovations in the chemical technology for forming carbon fibers and by shrewd decisions to acquire and overhaul overseas production facilities where labor and materials costs were minimized. The result for Zoltek was essentially complete dominance of the aircraft brake market, which relies on carbon fiber ceramic composites, and a strong position in the wind turbine industry, where low-cost carbon fiber is required for economical production of giant (100 m) wind turbine blades. For these applications, Zoltek out-competed the chemical colossus Toray of Japan, which had begun carbon fiber research in the 1960s and had perfected a very high performance, but also very high cost, product that was well accepted in the aerospace industry. The competition between Zoltek and Toray raged on until finally Toray made an offer for Zoltek that Rumy thought was fair.

University of Minnesota President Emeritus and CEMS alumnus Eric W. Kaler (Ph.D. ChE ’82) presented Rumy with the University’s Outstanding Achievement Award at the CEMS Centennial & Jubilee Celebration Dinner on June 22, 2019. The prestigious award is conferred only to graduates or former students of the University, who have attained unusual distinction in their chosen fields or professions or in public service, and who have demonstrated outstanding achievement and leadership on a community, state, national, or international level.

Rumy was honored as a “relentless innovator and strategist, whose belief in the radical concept of a low-cost, high-performing carbon fiber transformed the energy and aviation industries.” His citation also acknowledges him as a “courageous and insightful entrepreneur, whose bold spirit allowed his company to flourish in previously unavailable applications and markets.”
Class Notes

William F. Harris (ChE MS ’64, Ph.D. ’70). The University of Johannesburg presented me with their Dignitas Award for 2019, a great surprise and honor for me. The presentation was at the University’s Council Dinner held at Thaba Eco Hotel south of Johannesburg on 22 November. The citation was ‘for excellence in research and unwavering commitment to science’.

On 8 December 2018, I received the Distinguished Achievement Award ‘for exceptional achievement in the realm of research and academia’ (photo below).

I retired completely from the University of Johannesburg in 2018 and am now Professor Emeritus. I am still doing research but spending more time doing MOOCs.

Ray Johnston (ChE ’80).

I completed my undergraduate studies in the department in 1980, and accepted a position at 3M. Professor Chris Macosko was my undergraduate advisor. It might be of some interest that I actually didn’t want to work in Minnesota, but was compelled by the corporate culture, diversity of businesses, and technologies at 3M. My career has spanned 40 years if you count my summer internship in 1979. I have been fortunate to have developed and invented several products that people see every day. I continue to feel that the department’s emphasis on strong fundamentals and theory in the undergraduate program was a significant reason I have enjoyed success in industry.
In Memoriam

Maria Flytzani-Stephanopoulos (Ph.D. ChE ’78), a Distinguished Professor and the Robert and Marcy Haber Endowed Professor in Energy Sustainability in the Tufts University School of Engineering, passed away on October 28, 2019. She was a world-renowned expert in the realm of chemical engineering. She was pivotal in the integration of biological engineering into the Department of Chemical Engineering curriculum at Tufts and a strong advocate for her colleagues during the establishment of the university-wide faculty senate in 2016. She held ten patents, wrote more than 180 technical papers, was a member of the National Academy of Engineering, and a fellow of the American Association for the Advancement of Science and the American Institute of Chemical Engineers. Flytzani-Stephanopoulos was born and raised in Greece, and her funeral will take place in a suburb of Athens. She is survived by her husband Gregory Stephanopoulos (Ph.D. ChE ’78), the William Henry Dow Professor in Chemical Engineering at MIT, and three children.

Excerpts from article written by Angela Nelson, Tufts University.

Joseph Sullivan (Ph.D. ChE ’66), former CEMS adjunct faculty member, passed away from a sudden illness while traveling with his wife, Marcia, in September 2019. Joe was a chemical engineer who retired after twenty-five years as Ciba-Geigy Corporation Vice President and Member of the Board of Directors, responsible for the industrial divisions. After, he taught chemical engineering for several years at Virginia Tech, then returned to CEMS as an adjunct assistant professor for Unit Operations Lab. Joe’s lifelong passions were family and education. Survived by his wife Marcia of 54 years; three sons Mike (Katey), Paul (Hannah), and Dan (Meg); eleven grandchildren. Among his hobbies were travel, grandchild and wildlife photography, bicycle riding, and following sports, particularly the Virginia Tech Hokies and Minnesota Twins. Family and friends will particularly miss his engaging conversations and the warmly told stories of his and others’ life experiences.

CEMS softball team, “One Hop Hopefuls,” won the Class “C” championship in 1974

Front row (left to right): Bob McCabe, Lynn Orr, Bill Davis, and Steve Moore.

Back row (left to right): Jose Blanco, Mike Leary, Arnie Ruttman, Steve Seltz, Jack (Do you recognize Jack? Please let us know his last name!), and Bob Armstrong.

Photo courtesy of Bill Davis, with Lynn Orr and Bob McCabe serving as identification consultants.
The Celebration Continues!

Spring Events:

CSE Alumni & Friends Reunion
March 19
5:30-7:30pm
Houston, TX
Saint Arnold Brewing Company, Investors Pub
z.umn.edu/Houston2020

CEMS Centennial & Jubilee Public Lecture
“Save Our Planet” by Nick Halla (ChE ’05), Senior VP, Impossible Foods
April 16
Doors: 6:00 p.m.  Lecture: 6:30-7:30pm
Coffman Memorial Union Theater, UMN East Bank Campus
z.umn.edu/cmslecture

Materials Science Symposium & Alumni Reunion
May 15
Symposium: 12:45-4:45 p.m.
Alumni Reunion: 5:30-7:30 p.m.
UMN East Bank Campus and Finnegan’s Brewery
z.umn.edu/mse50

Centennial Lecture Series
1:25-2:30 p.m.
University of Minnesota East Bank Campus
Amundson Hall, Room B75
February 13: Michael Baldea (PhD ChE ’06), UT-Austin
March 17: David F. Bahr (PhD MSE ’97), Purdue University
March 19: Matthew J. Panzer (PhD ChE ’07), Tufts University
March 24: Navneet Kapoor (PhD ChE ’96), A.P. Moller-Maersk
April 7: Thomas H. Epps III (PhD ChE ’04), University of Delaware
April 21: William A. Tisdale (PhD ChE ’10), MIT
April 23: Sundar Ramamurthy (PhD MSE ’96), Applied Materials, Inc.
April 30: Nancy K. Lape (PhD ChE ’04), Harvey Mudd College

CEMS news

Chemical Engineering & Materials Science
University of Minnesota

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The Celebration Continues!