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Class of 2020 Graduates
MESSAGE FROM THE HEAD

Determination in the face of challenge

CEMS confronts racism & the pandemic in first half of 2020.

This past January, I imagined that my summer message would be about the 50 year anniversary of our materials science program, which was founded in 1970 when metallurgy merged with chemical engineering to form CEMS. But the year 2020 has taken us all in very different directions than we anticipated.

The murder of George Floyd at the doorstep of our campus on May 25th and the ensuing protests and violence sent shock waves across the University, the Twin Cities, our nation, and the world. These events had a profound impact on many members of CEMS and brought into sharp focus the challenges we face as a community in creating a truly equitable environment for all students, postdocs, faculty, and staff regardless of race, nationality, gender, gender-identity, or sexual orientation. We must acknowledge, for example, that we don’t have many African Americans in CEMS, and we must understand why this is so and commit to making positive change. A diverse and inclusive culture is already an important goal for our department, but discrimination and bias have many dimensions, and complacency about this reality is not an option for us.

The CEMS faculty have written a public statement (see the adjacent page) affirming our values as a teaching and learning community, and pledging collaborative work with all members of the department – students, postdocs, faculty, and staff – to create a more diverse, equitable, and inclusive environment. We have also created a Diversity, Equity, and Inclusion (DEI) Working Group composed of all constituents that will focus on listening, understanding the issues, and creating a diversity strategic plan. Other plans are also in the making and I look forward to updating you on progress we will make in DEI, alongside the many important accomplishments of our community in teaching, research, and service. Ensuring diversity and equity in our department is not only the right path from an ethical standpoint, but it is also crucial to our overall success as a top engineering program seeking to attract the brightest talent from around the state, the nation, and the world.

Of course, this change and self-reflection in recent months has been occurring on the backdrop of the pandemic that swept into Minnesota in mid-March and forced a temporary stop of all experimental research as well as a rapid switch to online teaching. The pandemic poses real challenges to universities, as it does to
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many sectors of our economy, and I am extremely proud of the response of our students, faculty, and staff to these essentially unprecedented conditions. Using the conferencing software Zoom, the faculty were able to deliver lectures and recitations effectively, and the students did their part, amazingly keeping up their morale, and finishing the semester conscientiously and with no shortage of hard work! On May 8th, 152 chemical engineering and materials science seniors of the Class of 2020 graduated in an online department ceremony that featured personalized messages from some of the faculty and a short keynote address by chemical engineering alumnus Nick Halla (ChE ’05), currently Senior Vice President at Impossible Foods. You can view the graduation here: z.umn.edu/cems20.

Beginning in mid-May we restarted the experimental labs in Amundson Hall under extensive hygiene and social distancing protocols. So, research is active! As I write this we are working hard on teaching plans for Fall Semester 2020, albeit amidst considerable uncertainty. However, we are optimistic that we will be able to deliver the high quality curriculum that has long been characteristic of our chemical engineering and materials science programs. A key challenge of course is the teaching laboratories, but at the moment we feel we have good plans in place to offer these crucial hands-on experiences safely. I admire the resourcefulness and resilience of everyone in CEMS in the face of considerable change.

Additionally, we will mark our 50 year jubilee in materials science and engineering this Fall, with special lectures and perspectives (online of course) from alumni. Any cake-cutting and celebration will likely be virtual, but keep attuned to the CEMS website for online Jubilee events.

I hope that this newsletter has found you and your family healthy and safe. As always, we in CEMS are deeply grateful for the steadfast support of our alumni and friends. Please keep in touch. You can give us your news at cemsalum@umn.edu or join the CEMS-UMN LinkedIn group to connect.

C. Daniel Frisbie
Head, Department of Chemical Engineering & Materials Science

June 10, 2020

Dear CEMS Community:

The horrific murder of George Floyd has starkly highlighted the systemic and overt racism experienced by black, indigenous, and people of color (BIPOC) communities. The tragic and historic events of the last two weeks have evoked in us feelings of outrage, sadness, fear, helplessness, and the need to drive change. It is a critical time for us to come together, to listen to, to learn from, and to support and advocate for our BIPOC communities. By acknowledging these feelings, re-examining our own circumstances, and confronting our status quo, we are presented with unique opportunities to promote positive and lasting change in CEMS, at the University of Minnesota, in our local communities, and beyond.

As a community of students, postdocs, faculty, and staff, we must jointly commit to the creation of an inclusive, safe, and welcoming environment that actively embraces equity and diversity in all its forms. Diversity in our backgrounds and perspectives brings strength to our department, and is central to our collective teaching, research, and outreach missions and our interactions across the University and the local community. Discriminatory acts cause harm that impacts everyone. Thus, the social fabric of our department relies crucially on supporting all members of CEMS in a safe and welcoming environment.

The CEMS faculty pledge to renew and reshape our department culture to be more welcoming, safe, and inclusive. This process must start by examining the ways that we as a department enable or even reward systemic discrimination. This requires engagement of all members of our community, in honest, thoughtful, and heartfelt conversations, to learn and to grow from one another’s experiences. This also requires lifting up of marginalized voices and actively resisting complacency within our department. Through this partnership, we commit to prioritize recruitment, retention, and support of diverse talent at all levels, and for all faculty to act as role models for broader change. Our existing efforts to increase diversity and inclusivity will serve as an initial foundation for a more comprehensive and coherent approach that drives tangible actions and promotes real and sustained changes.

We look forward to developing and implementing a plan of action with the CEMS community over the coming weeks and months. Each and every one of you is integral to our collective success. Already, we have been deeply inspired by a powerful letter from the CEMS graduate students condemning racial injustice and providing the faculty with a call to action. In the meantime, we share these thoughts with you as a way to recognize and to add our voice to that of others calling for lasting change in our community.

C. Daniel Frisbie, Department Head, and the entire CEMS Faculty
Social justice and corporate advocacy

Cordell Hardy (PhD ChE ’04) shares his perspectives on the murder of George Floyd and how 3M is taking action.

“In the corporate sector, an intensified push for racial equity is more than welcome. It is critical for our leaders to apply the benefits of enterprise-level strategic thinking, prioritization and execution to social justice as well as business initiatives. Inaction in the face of clear, pervasive injustice is a threat to the integrity of any organization.

At 3M, we are embracing a focused response framework across stakeholders to provide immediate relief at the point of need, to support economic development organizations and to push reform through advocacy for social justice programs. We are also looking within to challenge ourselves to do even more in balancing representation of black employees and other ethnic minorities, both in terms of initial hiring and in progression to senior leadership. All of these are excellent ways for us to ‘walk the talk’ regarding our corporate values. It is so encouraging to see the outpouring of support from across the company. Let us press forward to actions that meaningfully impact the trajectory of equity and justice in the Twin Cities and beyond.”

Cordell Hardy
Vice President, 3M Corporate R&D Operations
In Memoriam: Lanny Schmidt

Regents Professor Emeritus Lanny Schmidt was a beloved faculty member, colleague, advisor, mentor, and friend.

Regents Professor Emeritus Lanny D. Schmidt passed away on March 27, 2020, with his wife, Sherry, by his side. He was born on May 6, 1938 in Waukegan, Illinois. He received his BS in chemistry from Wheaton College in 1960 and PhD in physical chemistry from the University of Chicago in 1964. He served on the CEMS faculty for 49 years (1965-2014). He was a beloved faculty member and supervised approximately 90 PhD theses and 15 MS theses at Minnesota.

His research focused on various aspects of the chemistry and engineering of chemical reactions on solid surfaces. He also researched catalytic partial oxidation to convert methane and higher alkanes into syngas, olefins, and oxygenated hydrocarbons using monolith catalysts operated autothermically with very short residence time. Renewable fuels such as alcohols, biodiesel, carbohydrates, and lignocellulose were also areas of interest.

Schmidt published over 350 papers in refereed journals and was elected to the National Academy of Engineering in 1994. Among his many honors, he was awarded the Neal R. Amundson Award at the 3rd North American Symposium on Chemical Reaction Engineering, Parravano Award (1997) by the Michigan Catalysis Society, the Alpha Xi Sigma Award (1993) by the American Institute of Chemical Engineers, and a Humboldt Prize (1994) from Germany. He was also honored by several institutions through supported lectures.

Lanny & Charlotte (Sherry) Schmidt, along with Lanny’s student, Duane Goetsch, and his wife, Nancy Dickerson, created the “Lanny and Charlotte Schmidt and Duane Goetsch and Nancy M. Dickerson Fellowship” in 2003 to support CEMS graduate education.

Alumni and friends who wish to honor Lanny Schmidt with a memorial gift to this graduate fellowship may do so securely online: z.umn.edu/lanny or by contacting Courtney Billing (cbilling@umn.edu; 612.626.9501).

Alumni Remembrances

Sam Blass (PhD MSE ’13): I was one of Lanny’s last PhD students. Lanny had an adventurous creative spirit when it came to research. He taught me to take bold leaps and not be afraid of failure. I’ve taken those lessons to heart and still find myself thinking about my time with Lanny and my fellow “Schmidtsters” to this day.

Barbara Timm-Brock (ChE ’82): Lanny Schmidt was a favorite professor and also was my assigned advisor — I say “assigned” because I never visited him for formal advice until seeking his sign-off on my graduation credits.

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CEMS faculty tackling COVID research

Hackel and Hu are pursuing creative virus solutions.

Ben Hackel

Researchers in the lab of Associate Professor Ben Hackel are engineering proteins to inhibit the emergent coronavirus from entering cells. The proteins aim to selectively bind to the complex molecular machinery required for cellular entry thereby preventing viral infection. To engineer molecules with specific binding potency to the intended targets, researchers are using a technology platform previously developed in the Hackel lab for engineering molecular imaging diagnostics and cancer therapeutics. In this technology, designed sets of billions of protein variants are produced by yeast cells and tested for target binding via a technique called flow cytometry.

The most effective binding proteins are isolated while still tethered to their host yeast, whose genetic material is then sequenced to identify the functional protein. The lab previously optimized the libraries of protein variants for binding capacity across an array of therapeutic and diagnostic targets. Thus, researchers were poised to apply the technology to the emergent virus.

A collaborative team with Jonathan Sachs (Biomedical Engineering), David Ferguson (Medicinal Chemistry), and Alon Herschhorn (Infectious Diseases and International Medicine) identified and modeled the most compelling molecular targets to hinder coronavirus infectivity and set up assays for downstream evaluation.

Graduate students Sarah Whillock, Patrick Lown, and Daniel Tresnak, as well as research scientists Crystal Dyer and Mani Vunnam, have diligently performed the laboratory research along with assistance from additional labmates. An initial panel of engineered proteins exhibit binding to the viral target, which is encouraging but still requires substantial further development. The team recently received a pilot grant from the Institute for Engineering in Medicine to support one element of the research.

Wei-Shou Hu

The graduate students who have been using a synthetic biology approach to develop a new way of producing influenza virus and an adeno associated virus in Wei-Shou Hu’s laboratory, including Zion Lee, Thu Phan, Min Lu and Qian Ye, have joined forces in the past two months to create cell lines that can produce engineered spike proteins of the SARS-CoV-2 virus. The spike protein is a very large, structurally complex protein and forms a trimer that is more than three times larger than human antibodies. It is embedded in the surface of the virus membrane, so scientists are very interested in exploring its structure, functions and immunogenicity.

However, the complex protein is also very difficult to produce. The team has generated Chinese hamster ovary (CHO) cell lines which can stably produce the wild type and mutant proteins. Besides generating the spike protein needed for the research in the laboratories of Hu and his collaborator, the cell line will be made available to collaborators as well as the broader scientific community in general to advance devising means to fight the pandemic.
Faculty promotions

Chris Ellison

Ellison has been promoted to the rank of professor.
Professor Ellison’s research is in the area of polymer science and engineering. Specific research topics include structure, dynamics and processing of micro- and nano-structured polymers, light-activated chemistries for thin film patterning and fiber manufacturing, and synthesis/engineering of more sustainable materials.

Vivian Ferry

Ferry has been promoted to the rank of associate professor with tenure.
Associate Professor Ferry’s research program broadly studies the interaction between light and nanostructured materials, and particularly focuses on nanoscale chiral materials, light management in photovoltaics, and tunable metamaterials.

Andre Mkhoyan

Mkhoyan has been promoted to the rank of professor.
Professor Mkhoyan’s research uses powerful atomic-resolution scanning and transmission electron microscopes (STEM) to study nanoscale materials and discover unique materials properties and new physics. Also, he is working on developing new STEM-based techniques to push boundaries of experimental capabilities.

Faculty awards

Turan Birol and David Poerschke

Assistant Professors Turan Birol and David Poerschke are among the recipients of prestigious research grants from the Office of Naval Research (ONR) Young Investigators Program (YIP) to conduct challenging scientific research that will benefit the U.S. Navy and Marine Corps. Typical grants range from $510,000 to $750,000 over a three-year period. The ONR YIP is a highly competitive early-career award program in which academic achievement and potential for scientific breakthrough are key factors in the evaluation process.

Kevin Dorfman

Professor Kevin Dorfman has been named a 2020 Distinguished McKnight University Professor. The University-wide program seeks to honor and reward the most distinguished and highest-achieving mid-career faculty.

Dorfman was recognized for his group’s application of chemical engineering concepts to analyze “lab-on-a-chip” methods for manipulating DNA molecules for genomics.

Visit the CEMS website to see more news: www.cems.umn.edu
He said “You should have come to see me sooner, Barbara.” I replied with apologies and a little chagrin that I could have benefited from his advice earlier in my program. He replied, “Well that might also be true, but what I mean is you should have talked to me about your class choices: you don’t have enough credits to graduate. All of your credits from the business school don’t count because they aren’t accredited at the same level as the Institute of Technology. You are 2 credits short.” I had done enough credits for a minor in business, and they didn’t count! His advice: take a sport, which was from a college that was accredited. Turned out that Lanny and racquetball helped me graduate on time! And that business minor has served me well!

Alessandro Donazzi: I work as associate professor at Politecnico di Milano, Milan, Italy. I am deeply saddened about Lanny’s passing. During my PhD school, I was a visiting researcher at Professor Schmidt’s laboratory for one year, from the summer of 2007 to 2008. If I have chosen to work in the academy and if I am now a professor, it is thanks to Professor Schmidt, with no doubt. When I came to Minneapolis, I found a fraternal atmosphere and a hardworking lab. With his outstanding example as a scientist, brilliant and intimately dedicated, Professor Schmidt taught me and everyone to love research and teaching. Professor Schmidt had the simplicity and the genuineness of the most exceptional professors. I remember working with him and his group as a most joyful period of my life, so good that I decided I would have to try the same, once back home. Over the course of the years, I have met several other scientists he had advised, so deep and important was his influence in the scientific community. I am honored to have been one of Professor Lanny Schmidt’s students.

Erik Einset (PhD ChE ’91): I was sad to hear of Prof. Schmidt’s passing last week. He was on my thesis committee back in 1991, and was always very supportive and inspiring, and had a great sense of humor. It was nice to see him a couple of years ago when we were out for a department reunion. He will be missed, but has left a legacy that will continue in the department and the field.

Janice Evers (ChE ’85): I remember Dr. Schmidt as willing to spend extra time to help and explain his material. He was also very helpful in consulting on a project while I was working at 3M.

Troy Goodnough (ChE ’97, Chem ’97): I serve as sustainability director at UMN Morris. My first job out of college was with a start-up company owned by W.L. Gore and Associates in California. I worked as a III-V metal-organic-vapor-phase epitaxialist (or semiconductor crystal grower) for several years there. I remember when I was living in a rented house off of Como Avenue when I got the news that I was invited by Gore to work on a semiconductor production reactor. I was so excited. I had Professor Schmidt for my reactor engineering course, and it was one of my favorite classes. At the time, Lanny was preparing a new textbook – and I think we were some of his first guinea pigs. It was this big photocopied book with a green paper cover. It was a fantastic book! I remember packing that book up with me as I headed out to California. I spent about a decade in semiconductor start-up companies before I moved to Morris and started a new sustainability career. Minnesota (and the world) has lost a giant. Professor Schmidt was an institution within an institution. We will all remember his fierce intellect, wit and humor.

Raymond Gorte (PhD ChE ’81): I feel very fortunate to have been one of Lanny’s students. He was a great teacher, creative researcher, a wonderful human being, and a true friend. I want to share a story that occurred about 20 years ago. I was having a drink with a friend (Chuck) and we were discussing the fact that many of our academic colleagues take on many of the aspects of their thesis advisors. I said to Chuck that I did not fit the pattern. He laughed so hard that beer came through his nose and said, “You ARE Lanny.” It may have been the greatest compliment I ever received.

William Harris (ChE ’64, MS ’70): I took Lanny Schmidt’s course in surface chemistry. It may have been the first time he presented it. I remember how he was able to get across complicated material using simple models. His lectures were thoroughly enjoyable and he himself always friendly and approachable.

Andrew Hillier (PhD ChE ’95): Lanny was a great teacher (one of my favorites). I recall taking kinetics with him (and getting called on frequently during class...generally not knowing the answer). Lanny was also on my PhD committee. I had Lanny visit UVA to give a seminar when I was still an assistant professor...and he called on me during his lecture!!! He threatened to take my PhD back if I answered his question incorrectly. What a guy. He will be missed.
Andrew Jones (ChE ’09, Chem ’10): This is truly a tragedy. Professor Lanny Schmidt is the reason I pursued Chemical Engineering and specifically heterogeneous catalysis. At a freshman seminar Prof. Schmidt discussed his microsecond reactor ‘fast pyrolysis’ technology and how they were converting biomass (actual wood chips) to liquid fuels. Seemed like magic to me. He later took me under his wing as an undergraduate researcher. I wouldn’t be where I am today without his enthusiasm, guidance and support. He will be missed.

Jules Magda (PhD ChE ’86): Lanny was a great teacher and researcher. He was an inspiration to me in my academic career (Prof. Magda is currently on the faculty at the University of Utah).

Richard Minday (PhD ChE ’70): I started at the “U” in 1966, only one year after Lanny. I’ve always been proud of the fact that I was one of Lanny’s first PhD students, along with LeRoy Clavenna and Paul Tamm. Lanny was a great professor and leader. He led by example, showed us how to do things necessary for our experimental work, gave us constant challenges. I learned how to blow glass from Lanny, a very valuable skill since my experimental equipment was a glass ultra-high vacuum system in constant need of modification and repair. In the end, we proved something that scientists around the world doubted, but Lanny was sure would be a fact. Several publications resulted, some co-authored with Ted Davis who provided the fundamental modeling to show that what we had proved experimentally was in fact true!

Sherry and Lanny had student gatherings at their home in Minneapolis that were always lots of fun, and we got to know his daughters who were little girls at the time. I met my future wife, Judy, on a blind date on April Fool’s Day, 1967, and Lanny and Sherry attended our wedding August 9 of the next year. Like I’ve said, we felt like we were family.

Lanny’s and his students’ work over the years earned him worldwide recognition and the title of Regents Professor. Lanny deserves all the accolades for a life and career lived to the fullest.

Tom Myers (ChE ’79): Lanny hired me as an undergraduate lab assistant and was one of the most approachable professors in the department. The money came in handy, but the experiences helping his graduate students do anything from polishing platinum wafer samples to a particular orientation (as determined by X-Ray Diffraction) to writing a program to print titles on graphs (with no pen lift) via the microcomputer (look it up Milly!) led me to graduate school at Purdue, also in catalysis and surface science. Bottom line is Lanny was a friend, mentor, and brilliant guy who I will remember for a lifetime.

Ryan O’Connor (PhD ChE ’01): Having Lanny as my thesis advisor was a real pleasure. Lanny had enormous talent for making Ph.D. research “good fun” while inspiring confidence in his students. I was very fortunate to have known and worked with Lanny, a true legend in chemical engineering. Rest in peace Lanny.

Gil Overson (ChE ’65): I knew Professor Schmidt in my last year at the University and fully know what an asset he was. I enjoyed my years at the University of Minnesota and am grateful for them putting up with me. I always admired Lanny’s dedication and hope I can meet someone like him again. It’s inspirational to have such dedication. It’s a lesson learned.

Tom Pignet (ChE MS ’69, PhD ’74): Lanny was my thesis advisor in the late 1960s – early 1970s. We had not much contact over the years since then although we met up for a departmental event in 2012. I enjoyed that very much. But, he has always been a prominent fixture in my memory. He was always so vibrant and healthy, sensible and smart, as if he would never think of leaving us. He taught me a lot and I will remember him always.

Don Sullivan (ChE ’58): Lanny came aboard after I graduated. But in my subsequent dealings with the Department, Lanny was always gracious and welcoming. For sure he’ll be missed.
“Historic occasions such as the CEMS Centennial and Jubilee year offer us unique opportunities for reflection. I began my career as a faculty member more than 40 years ago at the University of Minnesota. I remain immensely grateful for my 22 years in CEMS as a professor and department head, which provided me the superb foundation upon which I have built my entire career as an academic leader. I have witnessed firsthand the profound impact that fellowship funding has made on my own career as a faculty member working to sustain a research group, but perhaps more importantly, the meaningful difference it has made in the lives of graduate students whose careers have been successfully launched and whose lives have been changed.

Philanthropic investment has been critical to magnifying the intellectual output of this department’s faculty and students. I was proud to return to campus last June to deliver remarks at the Centennial and Jubilee Celebration dinner. As I shared that evening, I believe that each and every one of us who have participated in one way or another in the life of CEMS should make an active, new commitment to help sustain it for another century. Our own philanthropy is an important statement, but so is spreading the word about what a remarkable place this is and providing employment opportunities to the human capital that Minnesota Chemical Engineering and Materials Science produces, from internships to PhD researchers. This Department is a powerful resource for the region, the country, and the world. I am proud to renew my support at this historic moment in its history and I remain proud to carry a part of CEMS with me everywhere I go.”

Matthew Tirrell
Robert A. Millikan Distinguished Service Professor and Dean, Pritzker School of Molecular Engineering, University of Chicago

Sallye Gathmann, ChE
Matthew Tirrell Fellowship recipient

“I grew up in Churchville, New York and attended Clemson University for my undergraduate education. I decided to attend the University of Minnesota for my graduate studies due to the uniqueness of the program. Few, if any, of the other top universities have a joint department of Chemical Engineering and Materials Science. Additionally, as I was open to studying a range of topics, I wanted to join a larger department where I would have a variety of options.

I am co-advised by professors Dan Frisbie and Paul Dauenhauer, so my research is at a unique intersection of electronic materials/devices and gas-phase heterogeneous catalysis.

Fellowship funding allowed me to pick my current co- advisement, as this supplemented my external fellowship such that my advisors were able to take me without having current grant funding. This is incredibly meaningful to me, as the Dynamic Catalysis project is what I was, by far, most excited to work on. Further, this allowed me to pick advisors who are supportive of my career goals and promote career development workshops and activities to me.”

Sallye Gathmann
Endowed fellowships elevate student experience

Recipients share how generosity is shaping their education.

Gabriela Diaz, MSE
First-Year Graduate Fellowship

“I am originally from Puerto Rico, but spent most of my life in Corpus Christi, Texas. I first attended community college at Del Mar College, earning an Associate’s degree in math and chemistry and finished with a chemical engineering degree from Texas A&M University-Kingsville. My chief driving force for chemical engineering, and later, materials science, was my interest in art conservation from being in my mom’s framing workshop. Watching her treatment of various works of art made me question how the materials involved ensured the artwork’s longevity. I chose to pursue a graduate degree within materials science to not only find answers to my questions from my childhood, but also to have the ability to lead my own projects in the future.

While my research now doesn’t involve paintings or sculptures, it still involves conservation of the greatest work of art that exists, our planet. I want to help in changing how plastics are handled by opening up routes of mixed plastic recycling.

Fellowship funding is definitely a huge relief of financial stress. With this generous gift, I’m able to put all my focus on learning as much as possible through my courses and doing the most I can for my research. Knowing that my first year of graduate school would be fully funded was also a large contributing factor in my decision to attend school here at the University of Minnesota.”

Wan-Ju Hsu, ChE
Curtis M. & Joyce P. Stendahl Fellowship

“I am from Taoyuan, Taiwan. Influenced by my parents’ work, I was taught to develop the ability to solve problems by myself. That independence also affected my choice to major in engineering. Chemical engineers vow to help people achieve better lives through improving the smallest everyday objects. To accomplish my goal of becoming a chemical engineer, I hope to cultivate independent thinking abilities and interdisciplinary communication skills while here as a graduate student.

Attending a graduate school in the United States was a dream for me, but the high cost of living and tuition would have placed a heavy burden on my parents. With the help of CEMS fellowship support, I can focus more on my studies, research, and extracurricular activities and less time worrying about my finances. Thank you very much for helping me study the fields of chemical engineering and materials science more deeply.”

Zach Schmitz, ChE
Jacqueline & Richard Schmeal Fellowship

“I was born and raised in Sioux Falls, South Dakota. I am a first-generation college graduate, and the first in my entire extended family to pursue a PhD. I graduated with a double major in chemical engineering and biology from MIT in 2019 and am passionate about developing novel biological drugs in a more efficient manner in order to improve clinical outcomes.

I chose the CEMS department for my graduate studies due to its strong legacy of collaboration and openness, in addition to my top-choice potential advisor in chemical-biological engineering working here. I hope to refine my abilities as a scientist to identify and pursue ongoing questions in my field, such as novel methods to explore the complex genotype-phenotype landscape in developing better antibiotics or biological drugs.

Fellowship support has helped me to focus on my classes, get a head start in lab, and begin to define potential compelling research directions.”
The Next 100 Campaign — Powered by your generosity

For the past century, CEMS has built and sustained its legacy as one of the great engineering academic enterprises in the nation. With gratitude, CEMS would like to acknowledge the generosity of alumni, friends, and industrial partners who have helped us reach this historic juncture of both the Centennial of Chemical Engineering and the Jubilee of Materials Science.

In partnership with you, the department remains a mark of quality, innovation, and success in serving society, and a clear symbol of the synergy between chemical engineering and materials science. We are grateful to those who have joined the Next 100 Campaign by making philanthropic commitments to CEMS between July 1, 2014 and today, all listed on the adjacent page and subsequent pages. The strength of CEMS, now and in the future, is sustained by your ongoing commitment to our students and faculty.

As of July 1, 2020, generous alumni, friends, and industrial partners have contributed $24,468,204 in support of the CEMS Next 100 Campaign, which will end in 2021. These extraordinary philanthropic investments comprise 81% of the campaign goal of sustaining the department’s celebrated legacy of excellence for the next century.
Thank you to the many alumni, friends, and industrial partners who have joined the Next 100 Campaign with gifts and commitments made between July 1, 2014 and today.

Names listed with an asterisk indicate deceased.

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Pearl Aadland
Mamta & Sayeed Abbas
Michael Abbott
AbbVie Inc.
Timothy Abraham
Leone Abroms
Susan Abu-Absi
Derek & Cynthia Adams
Rolland Adkins
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Bristol-Myers Squibb
Jeffrey & Sandra Brooks
William Broomhead
Richard Brown
James & Nancy Broz
Bradley Bruber
Eugene & Sharon Brumm
Ryan Brunner

continued on page 28
A lifetime of giving

Chris and Kathleen Macosko amplify their impact on faculty and graduate students.

When Emeritus Professor Chris Macosko and his wife, Kathleen, arrived in CEMS 50 years ago, they likely could not have imagined the profound impact that the two of them would make collectively on the lives of generations of students, faculty and staff, and on the very department itself. Nor could they have imagined the innumerable ways in which CEMS would shape their own lives.

Over these past five decades, Chris and Kathleen have given generously through both service and philanthropy. After raising four children in south Minneapolis they unexpectedly were offered the opportunity to buy a 10-bedroom duplex across from the campus. There, they created a living community for students, mostly international and many from CEMS. Kathleen enrolled in seminary and eventually became the pastor of a church just a block away. Their lives became even more invested in students.

This March, the Macoskos made yet another remarkable investment, this time in the department. By naming CEMS as a beneficiary of a tax-deferred retirement account, the Macoskos will realize their desire to elevate the Chris Macosko Professorship to that of an Endowed Chair, while also benefiting the Chris and Kathleen Macosko Graduate Fellowship. Their gift of retirement assets will pass tax-free to CEMS, avoiding income and possibly estate taxes, ensuring that the full value of their gift will benefit faculty and students in the department for the next century. Chris believes that “an endowed chair is an effective way to attract, retain and honor an outstanding member of our faculty.”

The Macoskos’ generosity furthers the department’s Next 100 Campaign, which aims to raise $30 million by June 30, 2021.

Thank you, Chris and Kathleen for making this wonderful gift and affirming your unwavering belief in the future of CEMS – now and for the next 100 years!

Group effort: 2020 CEMS Class Gift

The third annual CEMS Class Gift effort was also disrupted by the COVID shutdown, but still resulted in a positive outcome. The fundraising effort to support improvements to the H. Ted Davis Undergraduate Lounge and establish Class of 2020 scholarships had just begun when the University transitioned to remote operations. Thus, a typically fun, engaging opportunity for seniors to unite and “pay it forward” to the Class of 2021 wasn’t possible. However, CEMS faculty and staff members honored the graduating class by making personal gifts to the cause. As a result of this unified approach, approximately $4,000 total was raised, providing Kendra Brickley and Scott McCullough with 2020 CEMS Class Gift Scholarships and new chairs in the lounge.

Pride for the maroon and gold runs deep for Chris and Kathleen Macosko, pictured at the CEMS Homecoming festivities in October 2019.
Sustaining CEMS throughout COVID-19 and beyond

As the pandemic changes life as we know it, the CEMS community is coming together to make a difference in individual lives and in our world. Amidst these disquieting times, many CEMS alumni and friends have inquired about how they can continue to help the department and support its students and faculty in an uncertain economic environment.

How does the Coronavirus Aid, Relief, Economics Security (CARES) Act affect charitable giving?

- If you do not itemize deductions on your tax return, you can still take a $300 charitable giving deduction.
- If you do itemize, the act increases the amount you can deduct for a cash gift in 2020 from 60% of adjusted gross income (AGI) to 100% of AGI.

Can I still make a qualified charitable distribution from my IRA?

Yes. The CARES Act suspended required minimum distributions from retirement accounts for 2020. However, IRA owners who are age 70½ or older can still make a qualified charitable distribution from their IRA to charity and avoid the income tax that would otherwise be due on the distribution.

If you want to continue supporting CEMS or other charitable organizations that are important to you, a qualified charitable distribution from an IRA is a tax-advantaged way to make a gift and may still be the best option. All future distributions from IRA accounts will be subject to tax, unless transferred to charity.

What are some ways I can support CEMS if I need financial flexibility right now?

Many donors find that including a gift in their will is a meaningful and flexible way to support CEMS. With this type of gift, you maintain control of your assets during your lifetime, and you can change your plans at any time. You can give a specific dollar amount, specific property, or a percentage of what remains after you have provided for your loved ones.

Another option is to name the University of Minnesota as a beneficiary of your tax-deferred retirement account. This straightforward option allows these assets to pass tax-free, so the full value of your gift will support the areas of the University that are important to you. If transferred to your heirs, these assets are subject to income tax and possibly estate tax. Like a gift in your will, a gift of retirement assets can be changed at any time.

You may also consider giving of your time and expertise by participating in the CSE Mentor Program, which begins in October and ends in April every year. Your mentorship will help undergraduate students learn to build their professional network, refine communication skills, explore new areas of interest, and transition to the workplace.

CEMS is in a strong position to weather uncertain times thanks to the past extraordinary generosity of its alumni and friends.

To learn more about how you can help the department sustain its legacy of excellence now and into the next century, please contact Courtney Billing, CEMS Director of External Relations, at cbilling@umn.edu or 612.626.9501.
GIVING MATTERS

CEMS students need your support

These are difficult times for all of us, and the future has never felt so uncertain. We empathize with those who have been negatively impacted by the pandemic. CEMS students are also facing new, unprecedented challenges in financing their education.

Join us as we aim to raise $10,000 in a dedicated one-day giving challenge to support the CEMS Alumni Scholarship Fund (Fund #3895).

On October 1, all gifts up to $5,000 to the CEMS Alumni Scholarship Fund will be matched, dollar for dollar.

Your contribution will have an immediate impact, and new scholarships will be awarded to students for academic year 2020-2021.

Thank you to our Centennial & Jubilee partners!

[Logos of 3M, Dow, Andersen, Boston Scientific, Medtronic, General Mills Foundation, SEAGATE, TENERGY, H.B. Fuller, Jim (ChE '73) & Julie Garmaker, Sundar Ramamurthy (Ph.D. MSE ’96), Light Conversion, Physical Electronics, Sherwin-Williams, Thermo Fisher Scientific]
This is Jeopardy!

*CEMS undergraduate Nibir Sarma wins $100,000 in Jeopardy! College Championship.*

After a rigorous process of written tests, interviews, and show simulations, Nibir Sarma (ChE ’22) was among 15 students nationwide selected to compete for the $100,000 top prize in the 2020 Jeopardy! College Championship, which aired April 6-17, 2020. Already a seasoned trivia enthusiast, having participated in both high school Quiz Bowl and the University of Minnesota Quiz Bowl Club, Sarma displayed his prowess on the popular game show with a combination of swift accuracy and strategy as he wagered (and won!) more than a few “True” Daily Doubles during the four rounds of play, resulting in his tremendous championship win.

Sarma is the first-ever University of Minnesota student to win the championship since the special collegiate tournament started in 1989. “I’m so proud and happy to represent the state of Minnesota, and also represent students at large public universities who sort of get viewed in a different way than, say, some private colleges,” Sarma said in a press release. “I really love representing my hometown college and my community.”

With his win, Sarma advances to the Tournament of Champions competition (filming date TBD) in the hopes of continuing his success. He provided these additional insights regarding his experience:

**What have you spent some of your winnings on?**
I’ve purchased an electric guitar, an electric bass, and some music production software. While I already have been playing guitar for a while, learning bass has definitely kept me busy in the past few months.

**Tell us about your tribute to Alex Trebek.** (Sarma held such a commanding lead, he could cross out the correct Final Jeopardy! response and offer a salute to Trebek. With Historic Figures as the Final Jeopardy! category, the clue was: “In legend, this real European leader fielded an elite corps called The 12 Peers that included Oliver & Roland.” Sarma had the correct answer, “Who is Charlemagne?” but crossed it out and wrote “Who Da Man?” After Trebek read his answer, he responded, “You Da Man, Alex.”)

The idea to say “You da man,” was not actually mine, Marshall Comeaux, the contestant from Texas, came up with the idea that if one of us contestants had a guaranteed victory at some point in the tournament, we should do that. I simply happened to be the one who got to be in that situation.

**Winning a game show is a pipe dream for many people. When was the moment you felt like you could win the entire tournament?**
In the moment, I don’t think I really felt how significant it was that I won; I was just happy that I had done it. I don’t know that there was a single moment in which I realized I had won, since it was sort of a gradual process of me increasing my lead over the other competitors. Maybe when I hit the last Daily Double and chose to only wager $5.

**Who was the most unexpected person to congratulate you on your win?**
I actually got a shout-out on Twitter from Kaitlyn Dever, star of “Booksmart;” after I answered a question about the movie on Jeopardy!
First-year, interrupted

When COVID-19 disrupted research and learning, first-year graduate students were uniquely affected.

Spring Break is a cherished time in Minnesota. The mercury rises just enough to melt some snow and signs of spring quickly emerge (mainly, students wearing shorts in 40-degree weather). It is a benchmark on the academic calendar for students, staff, and faculty alike, a universal countdown to the end of spring semester.

However, this year due to the threat of COVID-19, the University of Minnesota was swift to act during Spring Break, making a decision on March 11 that all University of Minnesota courses would move to an online format beginning on March 18. It was recommended that all University of Minnesota employees begin working remotely on March 16, if possible, and no later than March 18. A whirlwind week (to say the least) for everyone on campus or those enjoying their Spring Break vacations.

That abrupt ending to the first-year graduate student experience presented unique challenges, but unexpected opportunities, too. A few students share their thoughts below.

Rohan Chakraborty, MSE
Hometown: Houston, Texas
Advisor: Vivian Ferry

My goal for Spring 2020 was to learn how to simulate different strategies for increasing solar cell efficiency. One such strategy is to use Luminescent Solar Concentrators (LSCs), which can theoretically replace windows as a building-integrated method of collecting sunlight. Another technique is to design multi-layer mirrors for thermal management of traditional solar cells. These simulations are done in MATLAB and taking exams online through Zoom. In mid-April, I returned home to Houston to be with my family and finish out the semester. After the semester ended, I have remained in Houston and focused on reading literature and doing simulation work. The shutdown did put a halt on my in-lab experimental training, unfortunately, but I hope to resume that in the near future.

It is certainly disappointing that my graduate school experience has been disrupted by the COVID shutdown. More specifically, I was looking forward to the summer in terms of research productivity and getting to explore the Twin Cities and Minnesota at large with my peers. Nevertheless, I have been thankful for the opportunity to spend more time with my family while staying connected to my peers and research group.

Though I am unable to meet my research group members in person, I have been able to communicate with them frequently via Zoom video calls/screen sharing to discuss simulation code and strategies. Additionally, there are several positive outcomes of the COVID shutdown. For example, I allotted a greater portion of research time toward reading and simulations as opposed to experiments, which has deepened my understanding of several research areas within my group. Also, the shutdown has enabled productive conversations within the department about important social issues that affect not only CEMS, but all of Minnesota and our country at large.

Ryan Collanton, ChE
Hometown: Sacramento, California
Advisor: Kevin Dorfman

When the U of M shutdown was announced, I was in Minneapolis for spring break. I was in disbelief as adjustments to the term were made, but didn’t know just how impactful they would be – this would not simply be an extended spring break.

The remote instruction was as good as it could be, and for that I give credit to the effort and commitment of the excellent CEMS faculty. Unfortunately, it was
Ninad Mhatre, ChE  
Hometown: Mumbai, India  
Advisor: Satish Kumar

For my current research, I am conducting a study on dynamic wetting failure in coating applications. My work before COVID involved getting familiar with the literature for my problem, and learning to use the finite element method for obtaining solutions to relevant problems.

I was in Minneapolis when the shutdown was announced. As I don’t have family in the U.S., I stayed in Minneapolis throughout the semester. Remote learning was a major transition and it took some time to get accustomed to the new course delivery structure. I continued working on my research as much as I could. My work is computational and I was not as affected as the experimental groups. But I certainly missed my discussions with fellow group members, which have always proved to be immensely helpful.

This (COVID shutdown) was a very unfortunate development, which certainly affected our daily routines majorly. I feel in-person course delivery is more engaging and helps me to learn in a better way. Moreover, research operations suffered due to the shutdown, and this can affect the first years majorly as summer is the time when most students get a head start in their respective projects.

My advice for adapting to the COVID shutdown is that I think the best way to work from home is to try and stick to the same schedule as before the shutdown.

Diana Zhang, ChE  
Hometown: Katy, Texas  
Advisor: Michelle Calabrese

In my research, I am interested in how molecular structure affects the extensional flow of soft materials for applications such as energy efficient window coatings. My research project is in its early stages, so if labs didn’t have to shut down, I might have started some preliminary and exploratory studies earlier in the semester. My work is

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First-year \( \text{continued from page 19} \)

largely experimental, so access to our lab space was crucial to getting started.

I found the transition to online courses and working from home challenging, and it took me awhile to fully adjust. The transition was quite sudden, so both students and instructors were working together at the beginning to determine how to best navigate remote learning while maintaining course quality, at the beginning.

Interactions with peers, TAs, and professors felt much less organic with the online format, but I learned to take the initiative to ask for the extra Zoom sessions I needed to learn the material as well as I could.

At the very least, I think the COVID shutdown makes our graduate student experience unique. I never envisioned taking my graduate classes remotely. I never thought I would start my graduate research experience under such unusual circumstances, including limited operations and working procedures to keep everyone safe and healthy.

However, the COVID shutdown has also revealed a number of positive aspects about our CEMS community. The care and deliberation that went into making the COVID protocols for lab reopening/operation as thorough and safe as possible reflects the strength of the safety culture of CEMS and the Polymer Group. Additionally, everyone has demonstrated resilience and flexibility in adapting to the circumstances and coping with so many uncertainties for so long. I’ve been maintaining the collaborative scientific discussions that would otherwise happen in lab or our offices with group-mates over Zoom. Our group has also adapted working and training procedures to comply with safe social distancing guidelines, for example by putting together instructional videos when possible.

Staying connected to peers during this time requires more deliberate effort, and we have continued to support each other through the challenges and celebrate the small wins. Thus, in a way, this has strengthened our connection. Personally, working through this shutdown has strengthened my adaptability with remote learning, new modes of maintaining connections, and new working conditions.

Clark receives UMN Outstanding Service Award – Student

\textbf{Catherine Clark}, a fifth-year MSE PhD candidate advised by Professor Russell Holmes, received the University of Minnesota Outstanding Community Service Award – Student, the highest honor the University of Minnesota gives to an undergraduate or graduate student who has made an extraordinary, significant, and demonstrated contribution to the betterment of society through academic studies and/or public service. This prestigious award, presented by the University of Minnesota’s Office for Public Engagement (OPE), recognizes faculty, staff, students, and University-affiliated community members who, by devoting their time, talents, and expertise to serve the public good, have made significant, demonstrable, and direct contributions to society’s well-being.

Clark was nominated by her friend and fellow CEMS graduate student Ryan Gnabasik, for her University involvement on the CEMS Graduate Student Council (GSC) and the Institute on the Environment (IOnE) Boreas Leadership Team, in addition to her community involvement with the Giving Project led by Headwaters Foundation for Justice. The Giving Project (GP) is an innovative model that funds social change, builds community, and develops leaders. Over the span of six months when Clark was involved with the organization, a cross-class, multi-racial group of people come together to raise and grant money to organizations that support significant, long-term solutions for justice and equity across Minnesota. Clark personally raised over $15,000 for the GP, and her GP cohort collectively raised over $250,000 total, resulting in twelve $20,000 grants to MN-based organizations led by and for BIPOC (black, indigenous, and people of color) communities.
Returning home

An alumna and Minnesota native, Professor Erica T. Lilleodden (MSE ’96) served as the 36th George T. Piercy Distinguished Visiting Professor.

“I am most thankful to CEMS for awarding me the 2020 Piercy Visiting Professorship. Taking my sabbatical at CEMS was influenced by the proximity to family and friends; I am a Saint Paul native and proudly received my bachelor’s degree in materials science from the department in 1996. I had several objectives for the planned six months; I expected to work closely with colleagues I already knew well – namely Nate Mara and Bill Gerberich, but also recognized that the strengths of such a department promised the development of new ideas to bring back to Germany. And, indeed this was the case.

Within weeks of arriving, those initially planned collaborations led to hours-long discussions with other faculty, not only in CEMS but also in the departments of Aerospace Engineering, Physics and Chemistry, and entirely new experiments were conceived. In fact, I had just finished my obligatory lab safety training for my planned organic chemistry experiments – the irony not lost on me that it was the required organic chemistry course which motivated me to change my major from chemical engineering to materials science – when the novel coronavirus changed everything.

In the face of the pandemic, I witnessed how quickly the faculty, staff and students came together to navigate uncharted waters, figuring out how to carry out research when labs are closed, and how to teach courses effectively from a computer screen. But despite how much virtual interaction platforms can be utilized for maintaining progress in research and scholarship, it is not a proper replacement for real personal interactions. And it is the personal interactions afforded by the Piercy Visiting Professorship that are critically needed to foster scientific inspiration and long-term collaboration. Those long discussions I had with professors in front of whiteboards, the time spent scouring through older (i.e., not available online!) texts in Walter Library, and the spirited debates held over lunch in the Campus Club or over rounds of beer later in the day, could not be replaced by online means.

Sadly, my family and I made the difficult decision to move back to Germany - my adopted home - many months earlier than planned. Yet those two and a half months were densely packed with amazing experiences: engaging with Nate Mara and his research group on nanomechanical analyses, planning new scientific experiments with Dan Frisbie and Tim Lodge, discussing with Ellad Tadmor the limitations of molecular dynamics in understanding experimental observation, and waxing philosophical with Jorge Vinals about punctuated equilibrium.

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Mark Ellis’ passion for photography is on full display at the University of Minnesota’s Bell Museum.

Mark Ellis (ChE, Math ’82, PhD ChE ’90) has a longstanding connection to the University of Minnesota. Having spent many years on campus as an undergraduate and graduate student, he returned to CEMS as an adjunct faculty member and taught process design and process control courses for a decade.

In late 1989, Ellis began his 30-year career at 3M Company in St. Paul, first as a process control engineer, then focusing on sustainable adhesive R&D for products like medical dressings, automotive attachments, electronic device assembly, outdoor graphics films, and office supplies.

Throughout Ellis’ technical education and career, a common creative outlet was nature photography. Beginning with a generous gift at age 12, a manual 35mm camera, he began photographing nature scenes and wildlife at his family’s northern Minnesota lake cabin. Even a part-time job at a B&W darkroom helped pay a portion of his undergraduate education.

Once digital photography flourished, Ellis’ nature photography also thrived. He could often be found in the serenity of northern Minnesota wilderness, photographing wildlife including the common loon, moose, the night sky, and aurora scenes. Extending to time-lapse photography led to beautiful personal projects illustrating swirling stars and shimmering aurora moving across the Minnesota night sky.

His personal video projects caught the eye of researchers at leading natural history documentary organizations, and his time-lapse clips have been licensed and featured by the BBC’s Natural History Unit, Nat Geo WILD, leading science blogs, and Minnesota Public Television (Almanac).

A common theme of Ellis’ photography has been nature conservation and education. He donated video clips to an award winning 2015 wolf documentary production “Medicine of the Wolf” (Amazon Prime, iTunes, Hulu).

When the University of Minnesota’s Bell Museum was being relocated to its beautiful new building and location, researchers for the Museum’s interactive display production company found Ellis’ work and licensed several of his video clips. His video scenes can be found among the Museum’s legendary nature dioramas, specifically the moose diorama and in a short phenology movie on display. “It was especially rewarding to pass the Bell Museum’s scientific and quality scrutiny to have my work on display there,” said Ellis. “It really brought my U of M experiences and legacy full circle, merging art and science at the Bell Museum.”

www.markellis.com
https://www.facebook.com/markellisphotography/
https://vimeo.com/markellis
https://www.instagram.com/mark.ellis.photography/

Top photo: CEMS alumnus Mark Ellis attended the CEMS Centennial & Jubilee social event at the Bell Museum in June 2019 (Photo credit: By Rebecca Studios). Bottom photo: An example of Ellis’ nature photography, courtesy of Mark Ellis.
Adapting to change across the globe

Alumni from around the world share insights into their pandemic experiences.

To address challenges associated with the pandemic, CEMS alumni worldwide are exploring enterprising ideas, leading in the face of change, and forging ahead by using the skills and knowledge developed from their time in the department.

A Time to Pause and Reflect

Navneet Kapoor (MS EE '96, PhD ChE '96), Chief Technology and Information Officer at A.P. Moller-Maersk, has spent his career serving in various corporate leadership roles in several different countries. Currently spending time primarily between Bangalore, India and Copenhagen, Denmark, his professional role has required a substantial amount of travel. However, when COVID-19 forced a worldwide pause, Kapoor reflected on how necessity continues to remain the mother of invention.

“Inventions have transformed human lives over centuries. The invention of electricity, the steam engine, aircrafts, motor cars, the shipping container, the computer, and the Internet have had a quantum impact on human productivity and reach and have changed lives forever.

But sometimes life changing technology already exists and yet it is not easy to fathom the possibilities. For the last five years, we have had technologies that can enable work from home, reduce travel, facilitate telemedicine, enable education in the remotest parts of the world, and streamline farm to table and more.

Yet, it has needed a once in a millennium crisis to provide the clarity that has eluded us. On one hand, seven billion people impacted simultaneously. Economies struggling, businesses going bankrupt, high joblessness. On the other, millions working from home productively. Reduction in traffic congestion and pollution, accelerated online learning and telemedicine.

Personally, for me, as Chief Technology and Information Officer at A.P. Moller-Maersk, it has meant zero travel for the last four months, and I have really enjoyed being at home, closer to family. I have been traveling for work for the last 25 years, at least once a month, and this has been truly an eye-opening experience about what is possible without doing so. 75% of the office staff in my company was able to work from home and be productive. We were able to serve our customers around the world and support the communities we were a part of, while keeping the safety of our employees as top priority.

As a dad of a 22-year-old, who has just moved to Minneapolis to start working with Target, it has also meant not being able to be with my son as he graduated.

While the crisis has been debilitating for so many around the world, it represents an inflection point in the evolution of mankind. What’s possible? Trillions of dollars of productivity to be unleashed; inclusion into the workforce of those with limited opportunities before; education accessible for all; new business models; broad based prosperity.

Finally, the crisis has also reinforced the importance of science and technology for our future, whether it is helping find vaccines for the virus or creating PPE kits and ventilators at a much lower price point, or just enabling the world to operate remotely.

Personally, I am grateful for having pursued doctoral studies at the University of Minnesota, which have been fundamental to shaping my thinking process; instilling a sense of curiosity; developing a first principles approach to modeling the world; and for being able to deal with complexity and uncertainty.

Here’s wishing you all a safe and energizing journey at the U of M, and to a lifetime of continual learning.”

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A Not-so-new Normal

Jaewook Nam (PhD ChE ’09), Assistant Professor of Chemical and Biological Engineering at Seoul National University in Korea, echoed the importance of technology, invention, and lifelong learning to cope with these challenging times.

“Here in Korea, just like everywhere else in the world, social distancing, quarantine, and isolation have become so popular that everybody knows their importance. The other famous keywords, especially for academia, are virtual classrooms and virtual meetings. Some people say that it is the “new normal” for teaching and advising, but they are not “new” to me.

During my studies at the U of M in the middle of 2007, one of my advisors, Professor Skip Scriven, passed away. I had another advisor, Professor Marcio Carvalho (PhD ChE ’96), but he was not based in Minnesota (he is on the faculty at Pontifical Catholic University of Rio de Janeiro, Brazil).

At this point, I have to say that I owe a lot to him and my colleagues, especially Kris Tjiptowidjojo (PhD ChE ’09) and Alex Lee (PhD ChE ’10), for my degree.

Because of the physical distance, Marcio decided to use the telephone to advise me. Yes, this was still a “virtual” meeting without any cutting-edge technology, such as “share-screen” or “annotations.” At the beginning, it was tough for me as an international graduate student. Yet I realized that that experience gave me a new “opportunity” to improve my communication and document preparation skills, especially in making “good-looking” and concise presentation slides with computers. These skills are beneficial for my work as a professor.

I love to share this story with my own students and colleagues these days. I believe that we can see opportunity in crisis. Perhaps this is the right time to familiarize oneself with recent technical advances, especially network-related technologies. They will become a new standard like the telephone was previously.”

A Global University

Guangzhao Mao (PhD ChE ’94) and Ray Neff (PhD ChE ’95) quickly adapted to new surroundings, moving from Detroit, Michigan to Sydney, Australia just ahead of the pandemic.

“The major motivations for Guangzhao to take the role of Head of School of UNSW Chemical Engineering were the University’s ambitious plan to make it Australia’s Global University, and its brand new, state-of-the-art chemical engineering building.

However, COVID-19 poses significant challenges to her plan to improve international collaborations and exchanges. Like many universities worldwide, some international students were not able to return to campus. This created immediate problems and a crisis within her School and University. UNSW, already a leader in online education, quickly adapted to the new reality, and transitioned smoothly from face-to-face teaching to online learning. Working closely with the School’s research and laboratory safety leadership teams, the School quickly put in place a set of guidelines to ensure continued research productivity and safety during COVID-19 that was subsequently adopted by the whole University.

After 23 years with BASF, I found a position with UNSW, leading the research activities for Flame Security International (FSI). FSI is a startup company located on campus which develops fire-protection products and
building monitoring systems. Not only is the work timely due to the recent bushfires in Australia, but I can leverage my background in polyurethanes, which began with my PhD thesis at the University of Minnesota.

Despite the challenges of our new environment, both of us continue our pursuit of new and exciting opportunities in Australia."

**Local Leadership**

The new year brought many changes for **Cordell Hardy (PhD ChE '04)** at 3M, based in Minnesota.

“In January of this year I was honored to be appointed as Vice President, Corporate R&D Operations, reporting to 3M’s Chief Technology Officer. 3M recently transitioned its organization structure to drive strategic planning and prioritization through four global operating units, and my newly created organization has responsibility for providing technical capabilities shared by those business units globally. Examples include regulatory compliance, customer engagement facilities, materials analysis labs, pilot plants, and project management offices.

When I was appointed to this role in Q4 2019, I had no appreciation of the impact COVID-19 would eventually have. In early February, I bypassed China during a multi-country trip to Asia, and in early March I truncated a visit in Europe in view of rapidly increasing cases in Germany and elsewhere. Since then, operations at 3M’s headquarters have largely reflected many around the nation, with most working remotely except for business-critical activity such as supporting manufacture of respirator and safety equipment for protecting healthcare workers and first responders.

Now, with government restrictions lifting, I have point responsibility to lead the planning for 3M’s technical employees to return to the workplace. It is difficult to overstated the intensity of focus and caution going into the myriad decisions associated with returning employees to in-person, hands-on technical work. Within the building walls there is updated protocol for social distancing, personal hygiene, personal health monitoring, face coverings/masks and workspace cleaning. Beyond this, there is consideration for how to support 3M employees in managing personal aspects which often impact how one comes to the workplace – care for at-risk family members and need for childcare being prominent examples.

Beyond defining and training on new protocols, I have a deep appreciation for how critically important communication is around such topics. It has been a privilege working with our legal, HR, EHS, R&D, and Corporate Affairs teams to facilitate safe return of 3M employees to laboratory work and travel.”

**Embracing Change**

**Dan Hickman (PhD ChE '92)**, Senior R&D Fellow at Dow, adapted to changing operations at the multinational chemical corporation rather seamlessly. Based in Michigan, Hickman began his working-from-home journey in mid-March and continues doing so today.

“My current role is very different from my early career with Dow as an individual contributor conducting experiments while developing kinetic and reactor models to support process development projects. Now, I provide technical leadership, organizational leadership, coaching, and mentoring. When I moved to my home office, my role and my daily tasks remained the same. My daily interactions with colleagues continued, except that all of those interactions became virtual, and all of us continued to make research progress, adapting our work and effectively using technology.

My primary adjustment since the pandemic began is that I no longer travel regularly. Despite the lack of travel, my interactions with remote colleagues have been effective because of our infrastructure and established practices. In fact, we plan to apply our technology and experience in our upcoming campus recruiting effort at Minnesota.”

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Also, in the current situation, I have found more time for reading journal articles and exploring potential new research directions, enabling intensive study that I hope will help my company achieve its ambition to become the most innovative, customer-centric, inclusive and sustainable materials science company in the world."

Innovating to Fight COVID-19

Jaime Reyes Robles (MS ChE ‘70), former Secretary for Innovation, Science, and Technology for the State of Jalisco, Mexico, brings public and private sector experience to bear in the fight against COVID in Mexico.

“I obtained my MS in Chemical Engineering from the U of M in 1970, after which my career path led me to KODAK where I worked for 15 years, and then on to Hewlett-Packard for an additional 21 years, retiring in 2004 after serving as Global Vice President of the business unit within the Imaging and Printing Group. I was director at Tecnológico de Monterrey for seven years and entered the public service as Secretary of First Ministry of Innovation, Science and Technology for the State of Jalisco, Mexico for six years.

In April 2019, I founded a company focusing on how disruptive technologies are changing the world based on neural networks, which beginning this February has launched its own Innovation Committee to fight COVID-19. The COVID-19 is becoming worse every day in Mexico, with infections and deaths increasing exponentially. We have developed a respirator for patients recently admitted to hospitals and are also developing both molecular and immunologic low-cost rapid tests. Additionally, we are developing an app which uses artificial intelligence to predict and track infections. Finally, we have developed antiviral products which protect the whole body based on nanoparticles of ZnO2.

My time in CEMS has had a tremendous impact on all areas of my professional life through to the present day. I am grateful for my educational experience at the U of M. My wife, Sara, and I are the proud parents of four children and eight grandchildren, all of whom are well.

Engineering Medicine

Jennifer Long, MD (PhD ChE ’03), serves as an Associate Professor and Vice Chair of Research in the Department of Head and Neck Surgery in the David Geffen School of Medicine at UCLA. Her engineering degree proved even more useful when the pandemic presented novel challenges that required her expertise.

“COVID-19 produced a whirlwind for my work, as it did everywhere. Being in a group of surgeons, my engineering background made me the de facto expert on N95s and aerosols. We scrambled to develop our own clinical protocols because none existed. As it became apparent that the world could not possibly supply enough protective gear for our usual practices, we found ways to get by safely with less. I think having reusable PPE options is important for the future, as we have clearly seen the failure of the “single-use” paradigm.

I often ask resident doctors in research to define the problems they notice and work to solve them – that was never more important than in the early days of the pandemic. I’m proud of how my department came together during these months. We published several COVID-related manuscripts and guidelines, trying to contribute something helpful. We managed to keep the patients who needed our care safe, and keep those who didn’t need us immediately at home. Along with the rest of the country, we shut down the entire laboratory research enterprise and are now navigating how to start it up again.

I hope that all this effort is just the beginning of finding creative large-scale solutions to reduce the impact of emerging infectious diseases in the future.”
Alumni awards

Nick Halla (ChE ’05)

Nick Halla has received the 2020 U40 Alumni Leader award, which celebrates an exceptional individual who has excelled in a career and/or public service and is 40 years of age or younger. Halla is Senior Vice President for International at Impossible Foods, overseeing the company’s growing presence around the world, and leading its dramatic expansion in Asia.

Impossible Foods’ mission is to restore biodiversity and reduce the impact of climate change by transforming the global food system through making the world’s most delicious, nutritious, affordable, and sustainable meat, fish and dairy foods – all directly from plants. This technological innovation represents a crucial step towards solving one of the planet’s most pressing challenges: sustainably feeding a growing global population while consuming fewer of Earth’s natural resources.

Upon graduating from CEMS in 2005, Nick worked at General Mills for four years, where he became an expert in food commercialization by developing and launching several new product lines and designing large-scale food manufacturing systems.

Following his time at General Mills, Nick went on to receive an MBA from the Stanford Graduate School of Business, and an MS in Environment and Resources from the Stanford School of Earth, Energy, and Environmental Sciences. It was during Nick’s graduate education at Stanford University where he met Dr. Patrick Brown, the Founder and CEO of Impossible Foods, who recognized Nick’s intelligence, creativity, and distinctly Minnesotan work ethic and hired him to help launch the company in 2011.

In his remarks at the CEMS Centennial & Jubilee Celebration Dinner in June 2019, Nick stated, “I’ve used every part of my background. The first year at Impossible Foods, I was 1/3 farmer, 1/3 engineer, and 1/3 a businessperson. My U of M chemical engineering training prepared me to understand that no challenge is too much, and I learned how to break through countless physical and psychological barriers. I’m proud to be part of such a great institution and network of brilliant, driven, successful alumni.”

Lee Jones (ChE ’79)

Lee Jones has been selected as the 2020 University of Minnesota Entrepreneur of the Year to recognize her entrepreneurial success and her significant contributions to the University and broader business community.

Her entrepreneurial journey began when Lee left Medtronic to lead the turnaround of Inlet Medical, a medical devices firm that specializes in minimally invasive surgery. The firm had two employees and no funding, but she led the fundraising for $6 million while increasing revenue by more than 50% annually for a decade. Inlet Medical was acquired by Cooper Surgical in 2006.

In 2011, Lee co-founded and served as CEO of Rebiotix, a biotech company that develops and plans to commercialize a proprietary drug platform that delivers healthy, live, human-derived microbes into the gastrointestinal tract. In 2018, Rebiotix was acquired by Swiss drugmaker, Ferring Pharmaceuticals. Lee continues to lead the company as it develops a global platform for this emerging drug therapy.

Through her support in various University programs such as volunteering as an original MN Cup mentor, supporting the development of the Women’s Entrepreneurship Program, serving as Chief Administrative Officer for the Schulze Diabetes Institute, advising the Technology Commercialization Office, and speaking regularly and mentoring students, Lee has generously given her time to lead the entrepreneurial community in the Twin Cities.

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While every attempt has been made
to ensure the accuracy of this list,
please contact us at cemsalum@
umn.edu should you notice an
omission or error.
Alumni awards continued from page 27

“I’m very proud to be granted this honor by the University,” noted Jones. “I believe that the University is a cornerstone of innovation for our state. I am always amazed at the value it provides through its various programs and I look forward to continuing to be actively involved in supporting its mission in the future.”

Franklin “Lynn” M. Orr, Jr. (PhD ChE ’76)

Lynn Orr has been honored with a prestigious University of Minnesota Outstanding Achievement Award for his accomplishments as the Former Undersecretary of Science and Energy for the U.S. Department of Energy, as a public servant and advocate for the environment and renewable energy, university leader and distinguished scholar. His scholarly contributions and leadership in energy issues earned him election to the National Academy of Engineering in 2000.

Orr has had a tremendously successful career in academia, first at New Mexico Institute of Mining and Technology (1978-85), then at Stanford University (1985-2014), followed by service in the public sector as Undersecretary of Energy (2014-2017) during the Obama Administration. Orr also served as Dean of the School of Earth Sciences at Stanford from 1994-2002.

He founded the Global Climate and Energy Project (GCEP) at Stanford and served as Director from 2002-2009. He also founded the Precourt Institute for Energy, which he directed from 2009-2013. The Precourt Institute now involves over 200 Stanford faculty focused on solar and wind energy, hydrogen production, carbon capture, biomass conversion, and many other topics. No other US academic institution has a comparable investment in renewable energy research.

Upon learning of this recognition, Orr remarked, “I’m honored. I’ve been lucky all the way – choosing to come to Minneapolis was a very good decision (despite obvious limitations of growing up in Texas from a weather standpoint).

The opportunities I’ve had to contribute have built, at almost every turn, on the foundation of technical, thinking, writing, and speaking skills that were developed and honed during my few years at the U of M. Looking back, that short time had a remarkable impact on me. Learning to hold my own in a debate with (Regents Professor Emeritus) Skip Scriven on some arcane topic of free-surface fluid mechanics turned out, decades later, to be good training for dealing with tough questions from members of Congress. And, I learned how powerful it can be to treat students as fully functioning research colleagues whose ideas are worth pursuing. That’s what Skip did with me, and I’ve tried to do that with my students over the decades that followed.”

Returning home continued from page 21

Those specific experiences along with the broader interactions I enjoyed with the amazing faculty, staff and students of CEMS, make it clear to me that I will return to Minnesota to finish my planned sabbatical. That I have contact to the Twin Cities in my personal life is no longer a prerequisite; during my stay as the 2020 Piercy Visiting Professor, CEMS proved to be an inspiring and welcoming community that feels indeed like family and friends.

Erica T. Lilleodden
Professor for Experimental Nano- und Micromechanics, Institute of Advanced Ceramics, Hamburg University of Technology;
Department Head, Experimental Materials Mechanics, Institute of Materials Research, Helmholtz-Zentrum Geesthacht

Honored as the Visiting Piercy Professor, Erica Lilleodden reacts to remarks from Dan Frisbie, CEMS Department Head, during the Piercy Dinner. Photo credit: Rebecca Slater, By Rebecca Studios.
CEMS Alumni and Friends,

Wherever this edition of *CEMS News* finds you, we hope you and all of your loved ones continue to fare as well as possible as we navigate these uncertain times.

While we don’t yet know when we will next be able to connect in person or as an alumni community, please visit https://next100.cems.umn.edu to learn of guest lectures and virtual event opportunities.

Whether you are looking to expand your professional networks, continue learning about new developments in chemical engineering and materials science, or wish to reconnect with former classmates and professors, please stay connected with us.