With the conclusion of spring semester, there is much for CEMS to be pleased about. Approximately 130 graduating seniors received their bachelor’s degrees in May (90 in chemical engineering and 40 in materials science and engineering). We completed our move into spacious new laboratories in the Gore Annex and renovated essentially all graduate student office space in Amundson Hall. We also successfully recruited two new faculty members (more on them in the next issue) and 49 new graduate students (29 in chemical engineering and 20 in materials science and engineering). In attracting this talent, we competed with the best chemical and materials engineering programs in the country.

In addition to being engrossed in teaching and research, CEMS faculty members have been busy receiving awards. Michael Tsapatsis was elected to the National Academy of Engineering in February, our 13th member since Neal Amundson was elected in 1970. Frank Bates, Chris Leighton and former postdoctoral fellow Sangwoo Lee (now a professor of chemical and biological engineering at Rensselaer Polytechnic Institute) received the Cozzarelli Prize for their beautiful work on structure and symmetry in block copolymer systems published last year in the Proceedings of the National Academy. Matt Neurock was selected as the Robert Burwell Lecturer of the North American Catalysis Society, and Kechun Zhang won the University’s Young Innovator Award and a McKnight Land-Grant Professorship. At press time, Wei-Shou Hu received the Amgen Biochemical Engineering Award, given in memory of James E. Bailey, to recognize research excellence and leadership in biochemical engineering. We could not be more pleased with this type of recognition for our colleagues.

Amidst these accomplishments, now is a good time to take stock of our current course offerings and determine future directions for growth and development of the department. As part of a University-wide review of academic units, CEMS will participate in a detailed self-study and external review by a panel of academic and industrial leaders this Fall. The last time this occurred was 1994, so one can certainly argue that we are due for a review. This review goes far beyond the periodic engineering accreditation that occurs every six years (“ABET” focuses only on the undergraduate curriculum and teaching) and will include all programmatic aspects – undergraduate and graduate curricula, teaching, research, professional accomplishments and reputation of our faculty, quality and number of our students, alumni and public outreach, industrial interactions, annual budget, and endowments for scholarships, chairs, and professorships, to name a few categories. We will see how we measure up to our own standards and to the competition. We will also reflect carefully on the question: how do we maintain our leadership position among the best chemical engineering programs in the country while simultaneously growing the reputation of our expanding materials science and engineering program? We know that the answer, at its core, includes hiring and retaining the best faculty, hiring and retaining the best staff, and recruiting and training the best students. But there are many factors that surround this core solution. I look forward to sharing the results of this review with you in the next newsletter.

Have a good summer, and I look forward to updating you on CEMS developments in the new academic year.
Barry Zink serves as 31st George T. Piercy Professor

After visiting in January and February, Zink learned that the climate for “Minnesota nice” is mostly ice.

My time in Minnesota as the George T. Piercy Distinguished Visiting Professor provided a wealth of new opportunities and experiences, and before any further remarks, I would like to once again thank the CEMS faculty and staff for making my time there so thoroughly enjoyable. This, despite my opportunity to gain quite conclusive evidence that Coloradans are utter cowards when it comes to weather. If any of you know (or are) Coloradans, you know that denizens of Denver and the surrounds would like to claim a hardy reputation; born of stomping up the highest mountains (referred to here as “fourteeners”), riding bicycles over rocks and other steep obstacles, and telemark skiing down out-of-bounds chutes, all while driving Subarus full of chocolate Labradors. Though at least some of this is true (I do have a Subaru, but my Lab is black, I only ever hiked one “14-er”, and I don’t ride my bike as much as I used to), the hardy part was called very much into question by the fact that EVERY SINGLE PERSON here in Colorado, after being told about my two winter months in Minneapolis made a remark to the effect of “you know it is cold in Minnesota, right?”

Fig. 1: Comparison of 2015 winter temperatures and snowfall, proving that Coloradans are weather-wimps. Data from www.usclimatedata.com
Well, of course I knew that, but since nothing defines reality for a scientist quite like data, please refer to Fig. 1 (page 2). Here we see daily high and low temperatures (in Kelvin) for Minneapolis and Denver compared to typical averages (shown as black lines) during January and February of 2015 when I was in residence at the University of Minnesota. I have also included snow accumulation totals for the two locations. Even your average chocolate Lab can tell that, indeed, one expects somewhat colder temperatures in Minneapolis than in Denver. In fact, one can also see that during this particular period, Minnesota was more often colder than the average, with 34 of 59 days of below-average temperatures. Somehow, just three states away, Denver was more often warmer with 33 of 59 days of above-average high temperatures. These warm months in Denver included a couple of particularly balmy stretches near room temperature that surely would have driven Minnesotans to fire up the grill and the air conditioning.

Also, note that despite the generally cowardice-confirming Denver weather, there was a particularly nasty cold snap in early January. I can guarantee that during this time no Coloradans could be found out for a pleasant stroll on a frozen-solid lake to see the ice-lanterns. Denver did have its share of winter in the form of one of the snowiest Februarys in recorded history. All this snow waited patiently in our yard for us to return from Minnesota, hoping to see signs of spring, and remained there for weeks into March.

One of my favorite pleasures of the sabbatical stay in CEMS was the blissfully empty office I occupied. A blank space to fill with whatever I wanted to scribble down and think about was a very welcome change from normal academic life.

I would also like to specifically thank Chris Leighton, my official host, and his group for providing many new things to think about and sharing their time. I suspect a few of the graduate students found it odd to see me wandering in the lab from time to time. After a certain number of years as an experimentalist, I guess I get uncomfortable when I haven’t heard a vacuum pump for a while.

Returning to matters of climate, I confess that I studiously avoided weather reports for Denver while I, my wife Ashley and my daughter Lyra adventured in Minnesota, resolving to enjoy new experiences and figuring nothing could be gained by a play-by-play weather showdown. I eventually came to a similar conclusion about explaining the timing of my trip to my weather-averse Colorado friends and colleagues. It turns out to be difficult or pointless to explain to most people that the opportunity to spend time in the intellectual climate of CEMS far outweighs any minor inconvenience from cold or wind or flu (though the flu was a tougher call). I have difficulty expressing how wonderful it was to go to work for two months with such a fantastic group of colleagues doing cutting-edge work and committed to a common purpose and goals. In this regard, I hope that everyone associated with the department, from students and alumni to faculty and staff, enjoys the unique and rewarding academic climate of CEMS as much as I did. I also look forward to continuing discussions and potential collaborations with many CEMS faculty as the years go on, and I certainly hope to come back to visit Minnesota again soon. But, I think probably in fall...or summer...or during a somewhat warmer winter would be fine too. I still have some weather cowardice to conquer...

Barry Zink (center) was presented with a commemorative print from Professor Chris Leighton (left) and Department Head Dan Frisbie (right). Photo credit to Richard Anderson.

Barry Zink (far right) offered remarks during a dinner in his honor at the Walker Art Center in February 2015. Photo credit to Richard Anderson.
Materials Camp sparks interest, engages
Unique, hands-on learning experience attracts students, faculty, alumni, and industry professionals.

The Minnesota Chapter of the American Society for Metals (ASM) International has held a ‘Materials Camp’ each June in the Department of Chemical Engineering and Materials Science (CEMS) since 2007. The four-day camp introduces high school students to the exciting world of materials science and engineering.

Materials science 101
High school students from across the Twin Cities and western Wisconsin participate in the camp, which is offered at no cost to participants. The admissions process is competitive, requiring a formal application and a letter of support from a current teacher. In its infancy, the camp attracted 20 participants, but interest has increased to a point that organizers must now restrict participation to 30 students. Space is limited to provide an exceptional learning experience to the students.

The national organization of ASM International supports the camp financially, as do several local companies. Campers spend three days on the University of Minnesota campus, with the Department of Chemical Engineering and Materials Science providing laboratory facilities and assistance with logistics.

The main feature of the camp is failure analysis. Groups of five students, together with a mentor from industry, analyze a failed part. This investigation prompts the students to establish hypotheses about the composition of the part’s material and usage. Campers learn about techniques for failure analysis and the importance of material selections. One former camper, Luke Balhorn, reflected on his positive small group experience by explaining that, “My group had a faucet that had cracked. We examined the part using optical microscopy, SEM, SEM-EDS, and a couple of other techniques. We also researched the chemical composition of the faucet, common causes of faucet failure, and possible impurities in the water that could contribute to failure. We used the data we had collected to determine a likely mode of failure, which we presented to the rest of the camp. The challenge was a wonderful exercise in problem solving and failure analysis.”

Participants also have the opportunity to go off-site for one day of the camp. A local company, Materials Evaluation and Engineering (MEE), opens its doors for the campers to use scanning electron microscopes and other tools to analyze their specimens and tour their facility. The camp concludes with presentations by the students on their failure analysis projects.

Campers turned MatSci majors
Over the past eight years, the camp has reached more than 200 students. Some ASM campers have found themselves back in Amundson Hall as materials science and engineering students. Luke Balhorn (MatSci ’15) and Elin LaBreck (MatSci ’16) both credit the camp for solidifying their decisions to pursue materials science and engineering for their academic majors and eventual careers.

Balhorn first became interested in materials science during a career search assignment during his sophomore year in high school and attended the ASM camp after learning about it from his chemistry teacher. He recalls his camp experience as providing a “good mix of hands-on science and basic theory. The purpose wasn’t so much to ‘teach’ us any one thing as to expose us to the range of possibilities within materials science, and I appreciated that.”

Balhorn describes his camp experience as a positive one because “it gave me a taste of many topics that I wouldn’t encounter in classes for another couple of years. While fun and not especially difficult, it taught me things that helped me see the big picture in my early materials science classes.”

continued on page 5
at all levels

continued from page 4

Elin LaBreck, a current materials science and engineering student and current President of the Material Advantage student group, also recognizes the benefits of the camp in her academic pursuits, remarking, “I am so thankful for the ASM camp as it has shaped my academic life immensely.”

This year, CEMS alumna Lisa Swartz (MatSci ’01) will take the reins as camp director, marking her sixth year as a volunteer. Swartz shares a similar feeling about the importance of camp. “I want students to know now that an engineering major teaches more than just equations and lab experiments, but really useful problem solving and time management skills that are hugely valuable in the working world. Materials Camp is beneficial to the students because it introduces them to a major/career option that isn’t as well-known as some of the other engineering disciplines. It also introduces the students to a potential career path. When I was deciding to be an engineer, I didn’t know what engineers ‘do’ at their jobs. This shows them a little bit about the engineering field. Finally, I hope, it shows these students that you can be passionate and really enjoy doing your job.”

Volunteers make the difference

The camp is organized and staffed by local engineers from the Minnesota Chapter of ASM International. These volunteers come from a variety of local companies including Medtronic, Honeywell, Materials Evaluation and Engineering, and Engel Metallurgical. For the last several years, Margaret Bush (Medtronic) served as the camp director. This year, Bush will be volunteering her time to launch an ASM materials camp in France so Swartz will fill the director role, sharing her professional expertise as an Engineer III - Electronic Test Services at Honeywell. “As a practicing engineer, I want to share my enthusiasm for my job to help encourage students to pursue this type of career. I realize that the people who had encouraged me to become an engineer are now retiring and it’s time for me to give the same encouragement.”

CEMS alumni are strong supporters and volunteers at the camp. Some recent volunteers include Mark Breyen (MatSci ’91, CSOM MBA ’12), Adam Buckalew (M.S. MatSci ’06), Claire Hypolite (Ph.D. ChemE ’00), Jim Mishek (MetEng ’74), Dan Sorenson (MatSci ’05, M.S. ’14), and Tom Steigauf (MatEng ’81). For Swartz, her volunteer experiences are enhanced by the outstanding caliber of student participants. “The thing that I enjoy most about volunteering at materials camp is my interaction with the students. They’re amazingly intelligent and creative and it assures me that this next generation is going to do amazing things.”

Additionally, CEMS faculty and students are involved by offering lectures and demonstrations. The Material Advantage student group offers a mini-lecture to campers. “As part of Material Advantage, we will conduct a presentation for campers to further inspire high school students to see positive outcomes in the materials science field. Our presentation to campers this year will showcase how materials science is relevant in the modern world and why we’re so excited to be a part of it,” said LaBreck. That combination of relevance and enthusiasm for the discipline bodes well for CEMS.

Watch how CEMS students are learning about 3D printing:
http://z.umn.edu/cems3d
Alumni support sustains the future of CEMS students

Marvin and Christine Ballard Scholarship
Marvin (ChemE ’63) and Christine Ballard established a new scholarship in recognition of the benefits they have received as a result of Marvin’s world-class education in chemical engineering from the University of Minnesota. He built a successful career in the petroleum industry with the Chevron Corporation. This gift will support full-time undergraduate students in their junior or senior years who are studying chemical engineering or materials science and engineering.

Dr. Kenneth J. and Kathryn Valentas Scholarship
Kenneth [Ph.D. ChemE ’64] and Kathryn Valentas created this scholarship to encourage graduates from Trinity School at River Ridge in Eagan, Minnesota and other promising Minnesotan students to pursue a quality education through the College of Science and Engineering and particularly chemical engineering. Kenneth and Kathryn are both graduates of the University of Minnesota and have benefited considerably from their educational experiences. The University of Minnesota was, and continues to be, a significant factor in their lives.

Arvind Varma Graduate Travel Award
Arvind Varma [Ph.D. ChemE ’72] created the Arvind Varma Graduate Travel Award to support promising graduate students studying chemical engineering in their travel to national meetings and research conferences.

This award is the first of its kind to support chemical engineering graduate students. Varma was inspired to establish the award based upon his experience that graduate students benefit tremendously from presenting their research at conferences, such as the annual AIChE meeting. “Funds for this activity are frequently limited in the department or research advisor’s budget. I hope this endowment will help provide for this part of professional development.”

Varma conducted his thesis research under the direction of Professor Neal R. Amundson. Following a two-year appointment in industrial research, he pursued an academic career, first at the University of Notre Dame (Indiana) during 1975-2003 where he served as department chair during 1982-1988, and then as an endowed chair professor during 1988-2003. He joined Purdue University in 2004, where he now serves as the R. Games Slayter Distinguished Professor of Chemical Engineering and Jay and Cynthia Ihlenfeld Head of Chemical Engineering.

Kathryn and Kenneth Valentas
Thank you for your continued commitment to and investment in CEMS. To learn how you can strengthen your partnerships with CEMS, contact Courtney Billing in External Relations at cbilling@umn.edu or 612.626.9501.
Graduate Fellowships

Donors to CEMS ensure that all first-year graduate students receive complete tuition funding.

The First Year Graduate Student Fellowship Initiative
Hui-Min Chuang, Noah Holzman, Pin-Kuang Lai, Meghan McCann, Manjiri Moharir, Phuoc Truong Pham, Deepesh Rai, Kyle Snow, Deepti Verma, Huaiyu Yan, Chang Zhang, Lei Zhang, Tao Zhang, Wenjia Zhang

Neal Amundson Fellowship in Chemical Engineering & Materials Science
Manjiri Moharir

Neal R. and Shirley D. Amundson Fellowship
Manjiri Moharir

James Andrews Fellowship
Chang Zhang

Rutherford Aris Memorial Fellowship
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Lynn Frostman and Mike ZumMallen Fellowship
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Robert and Beverly Sundahl Fellowship
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The Teletzke Family Fellowship
Raju H. Yerra

Matthew Tirrell Fellowship
Chang Zhang

Pat Whitcomb and Patty Napier Fellowship
Huaiyu Yan
Tsapatsis inducted into National Academy of Engineering

Tsapatsis’s dedication and groundbreaking research propels his career to one of highest distinction.

Professor Michael Tsapatsis was among 67 new members nationwide and 12 foreign associates elected to the National Academy of Engineering (NAE) this year. “This recognition gives me strength and increased responsibility to continue our work on energy-efficient processing technologies to enable a sustainable future for the chemical industry,” said Tsapatsis.

A professor at the University of Minnesota since 2003, Tsapatsis currently holds the Amundson Chair in Chemical Engineering and Materials Science. He has published more than 200 papers and has been invited to present more than 130 lectures around the world. He is the inventor/co-inventor of eight issued patents and six patent applications, several of which have been licensed and one commercialized. He also contributed to the development of materials currently in industrial use for natural gas purification.

Tsapatsis received the NAE honor for design and synthesis of specialized nanomaterials, called zeolites, that are used for selective separation and reaction. Tsapatsis’s motivation to create new catalysts, adsorbents and membranes stems from the desire to reduce pollution and improve energy efficiency in the chemical industry. Another motivating factor is the excitement that results from the discovery of new materials.

Tsapatsis’s approach to research has been influenced by his three mentors: Xenophon Verykios, his undergraduate advisor at the University of Patras (Greece) who is an expert in heterogeneous catalysis, his graduate advisor George Gavalas, who is a University of Minnesota alumnus, a gifted mathematician and reaction engineering experimentalist, and his postdoctoral advisor Mark Davis, who is one of the most influential leaders in chemical and biomedical engineering and materials chemistry.

Persistence, patience, skepticism, focus and collaborative spirit are important elements Tsapatsis combined to form his research group’s identity. As a chemical engineer who likes to work at the interfaces of chemical engineering, chemistry and materials science, Tsapatsis has benefited from the unusually harmonious and mutually respectful co-existence of these disciplines in the Department of Chemical Engineering and Materials Science (CEMS) and the College of Science and Engineering (CSE). As a result, the University of Minnesota has been a great place to conduct his research.

Although Tsapatsis’s researchers are an experimental group with a focus on discovery of new materials, they appreciate the power of theory, and at the University of Minnesota they benefit from collaborations with the best groups performing simulations. The last five years have been especially exciting for their research. They expanded upon their understanding of nucleation and crystal growth of zeolites to create 2-dimensional zeolite films, membranes and catalysts, which creates exciting opportunities in reaction engineering, separations and surface science. This type of experimental work is costly, time consuming and labor intensive. Tsapatsis has been fortunate to secure funds from national and international sources, to be part of a network of long-standing collaborators at the University of Minnesota and worldwide, and to attract a skilled and dedicated group of students, postdoctoral associates, and visitors who deserve most of the credit for recent success. The Tsapatsis group may be at the beginning of a new era for membrane separations and catalysis, and there is so much more to discover and understand.
**Xiang Cheng**

Assistant Professor Xiang Cheng was awarded a National Science Foundation CAREER award for his research on “Liquid-drop impacts on granular surfaces and the universality in granular impact cratering.” The Faculty Early Career Development (CAREER) Program offers the National Science Foundation’s most prestigious awards in support of junior faculty who exemplify the role of teacher-scholars through outstanding research, excellent education and the integration of education and research within the context of the mission of their organizations.

The award will support Professor Cheng and his research group in the study of liquid drop impact dynamics on granular surface. Their research will help formulate better solutions to solve important issues such as reducing soil erosion, increasing water-use efficiency in drip irrigation and improving the quality of spray-coating on rough surfaces.

Their first paper on the project was published in *Proceedings of the National Academy of Sciences*. The research has been widely reported by news agencies including the Discovery Channel, Popular Science, CBC news (Canada), SPIEGEL magazine (Germany), and De Kennis van Nu (The Netherlands). The study was also selected as “Back Scatter” in the March 2015 issue of *Physics Today*.

**Matt Neurock**

Professor Matt Neurock was selected as the recipient of the 2015 Robert Burwell Lectureship in Catalysis, a prestigious award given biennially by the North American Catalysis Society. Neurock was selected for his seminal contributions to the development and application of theoretical and computational methods to elucidate catalytic mechanisms and the active sites involved. He has also pioneered first-principle kinetic Monte Carlo methods that explicitly track molecular transformations on realistic surfaces at relevant conditions.

**Kechun Zhang**

Assistant Professor Kechun Zhang was among eight recipients of the 2015-2017 McKnight Land-Grant Professorship. This University-wide program seeks to advance the careers of the most promising junior faculty members who have potential to make significant contributions to their departments and scholarly fields. Recipients were chosen based on merit, professional promise, quality of publication record, and originality and innovation in research achievements. Zhang is engineering a new way of metabolizing natural microorganisms into industrial yeast for efficient fermentation of value-added chemicals from lignocellulosic feedstocks such as corn stove fuel, sugar beet pulp and citrus peel in order to enhance the viability of sustainable biomanufacturing.
Fond memories from Amundson Hall

Ken Ische (ChemE ’70) reflects upon the impact that CEMS made on his life.

I grew up in the country, south of Cologne, Minnesota, helping my dad in his sheet metal shop. Working with my father gave me experience in fluid flow by helping him on plumbing projects, electrical wiring, and lots of other mechanical projects. I had initially planned to major in aeronautical engineering, but decided to switch to chemical engineering when I registered for my first quarter at the University of Minnesota. I think my biology, chemistry and physics teacher, Mr. Charles Anderson at Central High School in Norwood-Young America, influenced that decision. However, I didn’t know anyone in the chemical engineering profession, and Mr. Anderson never told me anything about that profession if he knew something about it. Although I was top in my high school graduating class, I found the University curriculum to be a much greater challenge than I had expected. I remember a time in my freshman year when I thought about attending law school, but then found that I needed to have a bachelor’s degree to go to law school. I managed to stay above a C grade point average to maintain my student draft deferment and stay out of Vietnam. I pursued what was called a “bio” option, which involved taking technical electives such as biology, physiology, biochemistry, genetics and bioengineering [taught by Professor Kenneth H. Keller].

The summer of ’69 was the best summer of my life because I was fortunate to get a job between my junior and senior years at a paper company technical center in West Nyack, New York. That summer gave me a great deal of self-confidence, having driven out there with my old ’51 Plymouth. I worked on an enjoyable project involving fiber recycling, made new friends, and became familiar with New York City, not far from where I lived.

The self-confidence I felt from that summer job in New York resulted in the best thing I got from my chemical engineering education—my wife, Maureen. Between classes, some of the senior chemical engineering students would congregate in the chemical engineering library, presided over by Miss Mary O’Reilly. That fall of ’69, I noticed a cute female student librarian who spent a few hours there each day for her part-time job. No one I asked knew who she was, so I summoned some of the self-confidence I had gained during the summer and asked her name as we were both leaving Amundson Hall. She told me her name, but I didn’t have the courage to ask for her phone number. However, I got her phone number from the University Registrar. I called her one evening and found she had a steady boyfriend. Then, a few days later, I called her on Saturday night, November 1, and after our hour-long conversation asked her for a date. To my surprise, she said “yes” and we went to see the movie, “Alice’s Restaurant.” Nine months later, on August 1, 1970, we were married and later became the proud parents of three wonderful children.

That fall of ’69 was also memorable because the first draft lottery was held. Young men with the lowest numbers were to be drafted into the Army first. My number of 116 was a winner. In May 1970, Maureen and I participated in a Vietnam War protest march from the Federal Building in downtown Minneapolis that included stops at the University of Minnesota, Macalester College, the University of St. Thomas, and concluded on the steps of the State Capitol in St. Paul. Future Senator Paul Wellstone was arrested at the Federal Building in Minneapolis for his part in the protest.

Not long after passing my draft physical exam and graduating with my bachelor’s degree in chemical engineering in June 1970, I received a letter from the Carver County draft board asking me to appear to be drafted into the Army. There was an appeal period, which gave Maureen and I time to plan our wedding in two

continued on page 11
weeks, get married on August 1, 1970 and have me join the U.S. Air Force instead of being drafted into the Army three weeks after getting married. The Air Force wanted me to train as a pilot or navigator, but color-blindness kept me out of both of those careers.

Instead, I was assigned as a refrigeration and air conditioning specialist. I felt fortunate to get this job, since I would make practical use of some of the thermodynamics concepts I had learned. However, when I had nearly finished refrigeration school, I learned of an opportunity to become a bio-environmental engineer and received a direct commission, which meant that if I was accepted for this job, I would instantly change from an enlisted man to an officer. I applied for this position after arriving at my first duty base, which was Cannon Air Force Base in Clovis, New Mexico. At Cannon Air Force Base, I worked in a “Forward Air Control Squadron” where our job was to load radar and radio equipment onto trucks and load those onto aircraft that would fly anywhere in the world to guide fighter planes into the front lines of combat.

Thankfully, my application to become a bio-environmental engineer was accepted, and I left Cannon Air Force Base and went to the School of Aerospace Medicine in San Antonio, Texas for four months of bio-environmental engineering, followed by nearly three years of duty as a bio-environmental engineer at Carswell Air Force Base in Ft. Worth, Texas. The bio-environmental engineering job involved taking care of the occupational health of the men who worked in the aircraft maintenance shops and a small amount of environmental work, such as finding the cause of a fish kill in a stream that ran through base.

After my four-year obligation to the Air Force was finished, Maureen and I decided to return to Minnesota to be near our families (Maureen was from Minneapolis). Few of our family members came to visit us in Ponca City, so we usually had to spend many of our vacations visiting them. However, for one year prior to moving, I went to Oklahoma State University for a master’s degree in chemical engineering. My thesis project was an attempt to convert carbon dioxide and water to methanol using light energy with the intent that light energy would be solar energy someday. I detected methanol product from my reactor, but it appeared to result from concentrating a methanol impurity in my carbon dioxide feed to my photo reactor. Nevertheless, I received my master’s degree shortly after moving back to Minneapolis in Fall of 1982.

Not being able to find a job at one of the two petroleum refineries in the area, I secured work in the printed circuit board manufacturing industry at the Bureau of Engraving, Inc. in Minneapolis. There, I worked with electroplating chemistry and environmental compliance. Since then, I have held positions in the fields of automotive coolant recycling and award manufacturing, circuit board manufacturing, petroleum refining, and engineering consulting. Nearly 10 years ago, I found myself once again on a military base, this time on the U.S. Air Force Reserve base on the north side of the Minneapolis-St. Paul International Airport as an environmental compliance engineer. There isn’t much engineering involved in the position, but my industrial engineering experience has enabled me to identify many opportunities for improvements.

I plan to retire later this year, and I wish I could say that retirement will give me and my wife more time to travel, which was one of our favorite things to do. However, four and a half years ago, on November 1, 2010, my wife died of cancer exactly 41 years to the day of our first date. Whenever I visit the University of Minnesota campus, it brings back fond memories and tears to my eyes. But, they are happy tears because of what happened in Amundson Hall so many years ago.

Do you have an “In Retrospect” story to share with us? Please send it to cemsalum@umn.edu.
Retiring, but not without reflection

Three longtime faculty and staff members retire from CEMS.

The American philosopher, psychologist and educational reformer John Dewey offered this thought for contemplation: “We do not learn from experience...we learn from reflecting on experience.” With 123 years of combined professional experience among them, recent retirees Marsha Riebe, Lanny Schmidt, and David Shores have much to reflect on.

Like Dewey, their time spent at the University of Minnesota has undoubtedly required many instances of philosophical pondering (of fundamental science for Schmidt and Shores in their faculty roles), psychological analysis (of human behavior for Riebe in her staff role encountering many different personalities), and educational reform (they were employees of the University through progressive decades of the 1960s, 1970s, and 1980s, after all). In their own humble ways, they retired from their positions in the Department of Chemical Engineering and Materials Science during the 2014-2015 academic year. At their request, there was not much fanfare to mark those occasions, but their service was honored with a department luncheon attended by faculty and staff at the University’s Campus Club in April 2015. When reflecting on the influence and impact that Riebe, Schmidt, and Shores had on the University community and beyond, it is in our shared experiences that we find wisdom, inspiration, encouragement, and friendship. Thank you Marsha, Lanny, and Dave. Best wishes in your retirement.

Department Head Dan Frisbie (far right) and CEMS faculty and staff honored retirees Marsha Riebe (far left) and Professor Lanny Schmidt (center) at a department luncheon in April 2015. Not pictured: David Shores.

New CEMS website:
www.cems.umn.edu

Enhancements include:

• **CEMS Connect** - tell us, we’re listening!
• **Giving** - convenient giving options online.
• **Alumni** - update your contact information or submit an entry for the newsletter.
• **Social media** - direct links to CEMS Facebook, LinkedIn, and YouTube sites.
• **Research** - spotlights highlighting recent breakthroughs. We’ve also updated our department research areas as trends change.
• **Mobile-friendly** - the website is accessible from your phone or tablet.
STAFF NEWS

CEMS welcomes new staff

Recent staff hires enhance administrative team.

Christine Fruzyna

Christine (Chris) Fruzyna serves as a Payroll Coordinator, providing payroll support and serving as a resource for employee benefits. Fruzyna previously worked for 13 years in payroll at Target Corporation. She lives in Blaine with her husband and two children. Her son, Matthew, is a sophomore at the University of Minnesota, majoring in biomedical engineering. Her daughter, Sarah, is a sophomore at Spring Lake Park High School, and plays on the varsity basketball and softball teams. In her spare time, Fruzyna enjoys traveling, attending her daughter's sporting events, going for walks, and biking.

Sushmita Singh

Sushmita Singh’s current professional title is Finance Professional Three (referring to the University’s new tiered levels of finance professional titles, formerly Accountants), so she jokingly refers to herself as “Finance Professional the third” among her colleagues, Mary Kosowski and Ann Tran. Prior to joining CEMS, Singh was the Research Programs Administrator at the Minnesota Supercomputing Institute (MSI), where she handled account management and resource allocation for 600+ principal investigators, administration of tutorial classes and workshops, and served as the pre-award grant administrator. Singh’s hobbies include gardening and rock climbing.

Sarah Swenson

Sarah Swenson serves as an Academic Services Assistant, processing post-doctoral hires, coordinating travel visas for international students and scholars, and providing administrative support to undergraduate and graduate programs. She earned bachelor’s degrees in history and speech communication from the University of Wisconsin-Superior and a master’s degree in communication from the University of Wisconsin-Milwaukee. While completing her master’s degree, Swenson taught public speaking. Swenson began her career at the University of Minnesota in the Department of Curriculum and Instruction as part of their administrative support team. Swenson’s hobbies include cooking and baking, traveling, and watching films from the 1930s-1960s.
The Making of a Mentor

The impact of one professor inspires the generosity of alumnus Maxwell Ocansey.

When Maxwell Akplehe Ocansey established the Ocansey Family Scholarship last December, it came with more than just a financial commitment. “I want to make time to come [to the University of Minnesota] and get to know the students as a group and on a one-on-one basis,” says Ocansey. “It’s hard growing up with big dreams when you don’t have the right corporate exposure and don’t know what you don’t know. You don’t often dream big about the possibilities of becoming an executive at a company like ExxonMobil or 3M... it’s not just about making money, it’s about giving back and making a difference in the lives of others.”

After leaving the University of Minnesota, Ocansey (M.S. ChemE ’80) rose through the ranks at ExxonMobil to become an executive within the refining and supply company, leading ExxonMobil’s West Coast Refining Operation. Today, he works with ExxonMobil’s Global OIMS Leadership Academy, which trains the next generation of leaders within the organization to become passionate safety, health and environmental leaders. He leveraged the impact of his giving by taking advantage of the University’s recently completed Fast Start 4 Impact scholarship program, along with the generous 3:1 match offered by ExxonMobil. The Ocansey scholarship will support underrepresented students demonstrating academic merit and financial need who are planning to study engineering (with a preference for chemical engineering in particular) at the University of Minnesota. “I don’t think we’re making much progress in moving students from underrepresented groups into engineering. When I look at graduating engineering classes, I don’t see enough students of color,” says Ocansey.

“True happiness in life comes from helping others and giving back to those who are motivated to change their lives.”

— MAXWELL OCANSEY

Originally from Ghana, Ocansey describes his family as “relatively middle class,” with the provision that Ghana is generally a poor country. He attended the University of Leeds with the benefit of academic scholarships and received his bachelor’s degree in chemical engineering before earning his master’s from the University of Minnesota in 1980. While ExxonMobil expresses gratitude for the role the University played in his admission to the United States and subsequent job with ExxonMobil, he is also forthright about his experiences as a graduate student. “The University of Minnesota in the 1980s wasn’t the most...progressive place for black students. People would say ‘hi’ to you in the hallways, but there was no real connection. I felt like an outsider.”

Enter Professor Chris Macosko. Macosko, a distinguished member of the faculty in the Department of Chemical Engineering and Materials Science since 1970, is a renowned graduate student mentor. “He was my professor, but I came to develop a relationship with Chris that I probably underestimated, and it became more valuable after I left the University,” says Ocansey. He shared that Professor Macosko provided him with sage counsel while he was a student, but it was the lifelong connection through Professor Macosko’s annual Christmas letters that proved transformative.

“Professor Macosko has been such a huge, huge influence both in my professional and spiritual life, as a really great role model,” he says. Ocansey had been contemplating giving back for some time, largely due to Professor Macosko’s ongoing influence. “It’s a credit to Chris for what he stands for and what he does,” notes Ocansey when speaking about his philanthropic motivation.

Ocansey has great aspirations for this scholarship. “I want to see students of color graduate from engineering school. I want to serve as a role model and mentor – I want this scholarship to touch and influence students, and hopefully these students will pay it forward.”

continued on page 15
continued from page 14

to help others be more successful as well. Writing the check was the easy part, the joy for me will come when I meet with Chris [again] and meet the students. My vision is as I see the fund grow and do better, I will make another commitment. I have been very blessed in my life. You reach this point...where you look around you and go, ‘My needs and many of my wants are met, but what?’ It doesn’t make me happier. I have concluded that true happiness in life comes from helping others and giving back to those who are motivated to change their lives.”

When asked what he would tell other potential donors about making a scholarship gift, Ocansey replied, “It’s a no-brainer – just go ahead and do it. You can’t take it with you. It may be satisfying to watch your investment account grow, to amass wealth, but I would ask other people of means to consider giving back to help others reach their dream and make a difference in this world.”

The inaugural Ocansey Family Scholar will be welcomed to the College of Science and Engineering for the 2015-2016 academic year and stands to benefit not only from the financial support, but the personal leadership and mentoring that Ocansey hopes to provide.

Written by Brenna Sonke, College of Science and Engineering External Relations.

Alumni Engagement

Oliver Passe [ChemE ’95] returned to campus to deliver a lecture to Professor Russ Holmes’s senior design course about the path to innovation within his own company, N-Venta, Inc., where he serves as managing director. Students also received samples of one of N-Venta’s most popular products, Sparkle Sparkle® Everyday Jewelry Care Set (featured on the Home Shopping Network).

Passe founded N-Venta, Inc. in 2003 with the mission to create innovative, ecologically responsible, “better than best in class” products. Today, N-Venta is a world leader in expanding innovation and quickly bringing research and technology to the marketplace. In-house capabilities include high speed bottling and production capacity exceeding 3.6 million units per month, and the most extensive fragrance and compounding laboratory in the southwestern United States.

Since graduating from the University of Minnesota, Passe has led the development of 54 technological innovations and advances in intellectual property, including the first electronics-safe submersion cleaner, organometallic protein polymerization, and three generations of Firescoff ceramic nanotechnology. His business background includes technology implementation for Ecolab, Cypress Semiconductor, and ST Microelectronics. Passe also holds a degree in global business administration.

CEMS alumnus Oliver Passe (right) prepares his lecture to senior materials science and engineering students as Professor Russ Holmes looks on.
Class of 1965 returns to campus to join Golden Medallion Society.

The Golden Medallion Society honors University of Minnesota College of Science and Engineering (formerly Institute of Technology) alumni who have reached the 50th anniversary of their graduation. Many provided updates for this newsletter feature and several returned to campus in May 2015 to participate in their reunion activities.

Eugene “Gene” Brumm (ChemE ’65)

Brumm served on the planning committee for the Golden Medallion Reunion. He and his wife, Sharon, reside in Plymouth, Minnesota.

Gerald L. Fitzsimmons (ChemE ’65)

I chose chemical engineering as my undergraduate major for the many opportunities which were available in that field. I am a licensed professional engineer in the state of Texas, still working part-time. I have been with BHP Engineering & Construction, LP in Victoria, Texas as a Director and Project Manager for the last 22 years. I recently designed over $40 million of improvements for the City of Corpus Christi Water Treatment Plant and a $50 million expansion for the McAllen North Wastewater Treatment Plant. Over the years, I have also been employed by 3M Company, Elcor Chemical, Reynolds Metals, and Hercules and its subsidiaries.

My wife, Janice, and I reside in Victoria, Texas. We have three grown children and six grandchildren. I have been a very active Rotarian since 1981 and have 33 years of perfect attendance at Rotary meetings. I have served as club president for the Kenedy, Texas Rotary Club and as Assistant District Governor for District 5840. I have served the Victoria Rotary Club as a Director and Lane Chairman and worked on several committees for District 5930. I am a four-time Paul Harris Fellow. In my free time, I enjoy stamp collecting and have served the Rotary on Stamps worldwide fellowship as chairman for four years and secretary/treasurer for 10 years. I have also chaired a number of fellowship projects. I served on the Rotary Centennial committee in 2005 with the former Rotary International president. I have attended 17 Rotary International conventions, with the latest being in São Paulo, Brazil. I have also attended numerous district conferences and assemblies and have made presentations and seminars at several of them.

The best memories from my days at the University of Minnesota include all of the fellowship and interactions with classmates, fraternity brothers, and many other acquaintances. The best advice I would give to graduating degree holders would be to have a much greater emphasis on oral and written skills. Way too many current engineers do not have sufficient training in those skills, besides the engineering skills that are also vital to their profession.

William F. Harris (ChemE M.S. ’64, Ph.D. ’70)

William and Colleen Harris traveled from their home in Johannesburg, South Africa to attend the reunion.

continued on page 17
Gary R. Hauck (ChemE ’65)

I chose to major in mineral engineering because I was interested in mining since high school and I was awarded a U.S. Steel Fellowship to attend the University of Minnesota. During my education in the School of Mines (1953-1958), I had lab work in drilling rock mechanics. I conducted my thesis work at U.S. Steel and Mountain Iron on industrial scale experiments. My fondest memories from my undergraduate days are my summer job working in an open mining pit, freshman track in which I took first place in the 440 event, participating in Navy ROTC, band, and parades. My advice to current students is to be sure to include mathematical statistics in your education.

Edward W. Remus (ChemE ’65, J.D. ’70)

After graduation I joined Sinclair Research in suburban Chicago as a research chemical engineer. After a few years, I enrolled in night law school at DePaul University. Upon graduating (J.D.), I became a patent attorney with UOP in Des Plaines, Illinois. In 1971 I went into private practice in Chicago with one of the leading patent firms in the country and was extremely fortunate to have been mentored by one of the premier patent trial lawyers. Thereafter, until my retirement in 2012, my practice was directed to patent litigation. I was fortunate to have more successful outcomes than losses. I spoke at bar association meetings and lectured on trial practice in law schools. For what it is worth, I was ultimately recognized by my peers as a leading expert on patent law in the world.

While a student, I met a nurse, Cora Berland, who was working at The University of Minnesota Hospital following her graduation from Carroll College in Helena, Montana. We were married in Conrad, Montana in a wedding attended by many of my classmates in their Corvettes, GTOs, and Mustangs. We are blessed with four children (one Gopher, three Illini) and thirteen grandchildren. We will be celebrating our 50th wedding anniversary at the end of June. [Behind every successful man is a better woman]. We now spend time between Swan Lake, Montana, and youth dance recitals, concerts, soccer, baseball, volleyball, hockey, lacrosse, etc. in suburban Chicago.

The chemical engineering curriculum taught me critical thinking, the need for teamwork, and gave me a degree from one of the best, if not the best, chemical engineering departments in the country. As a patent attorney I worked with inventors, research directors, and expert witnesses (typically professors), including Nobel laureates. My Minnesota degree gave me instant credibility. It also gave me the building blocks to learn technology unheard of in the 1960s. As a small thank you to the University of Minnesota, we have endowed a CEMS scholarship to a needy student.

And what advice would I give to a current graduate? Be thankful you live in America. It is full of opportunities and you will be presented with many chances to succeed. Setbacks are not fatal; they develop character. One of the keys to success is to be fortunate enough to be in the right place at the right time, to recognize you are in that place, and the courage to make a decision rather than having the decision made for you.

continued from page 16

Gilbert “Gil” Overson (ChemE ’65)

continued on page 21
Realizing the benefits of Unit Ops

The Unit Operations course has been challenging students for more than 65 years, while also preparing them for professional success.

Love it or loathe it, the Unit Operations course is a core component of the chemical engineering curriculum at the University of Minnesota. While current undergraduate students may not recognize the value in preparing excruciatingly detailed lab reports or relying on their peers for a substantial portion of final grades, the benefit of time and experience has allowed some of our alumni to reflect on positive aspects of the course.

1951

Leigh Nelson (ChemE ’51). As I recall, the Unit Operations course took place in the summer, and my partner for the course was Stanlely (Bill) Thiele, who joined 3M after graduation and became VP of Abrasives. He was also quarterback for the Minnesota Gophers football team and thus was not available for much of the effort. Our project had to do with crystalization of an inorganic salt compound, which required several processing steps and understanding of mechanical equipment. We achieved a good yield after spiking the liquor with past batches of the salt. My first job as a chemical engineer involved synthesis of several products requiring the basic unit operation steps, and thus prepared me for a 39-year career in two major companies, Shell Chemical and 3M.

1957

Frank Halfen (ChemE ’57; M.S. ’59). My Unit Operations class was about 58 years ago and I imagine that Unit-Ops classes have changed significantly in that period of time. Our textbook was Brown’s “Unit Operations” and the professor was Dr. Stopple. I think that Dr. Stopple did an excellent job of presenting Unit-Ops in an interesting and useful way. For me, Unit Operations provided the foundation for chemical engineering and the necessary overlap with mechanical engineering that led me to a suitable career path.

The aspects that developed into my career path were heat transfer and hydraulics. Most of the challenging problems in these areas are not steady-state. During my period of time at the U of M, computers were not available for use by students. Therefore, nearly all the classroom and homework problems were limited to those with closed-form mathematical solutions. I remember, one day, one of my classes visited a stone-age electronic analog computer facility for about an hour at the University. I learned that day that programming time-dependent addition and integration on electronic analog computers was relatively easy but limited to fairly easy problems. During the time after graduation, computing power and availability improved, making transient thermal-hydraulic analyses of difficult problems possible. That is the area that I spent the major part of my career. That was made possible by a good foundation in Unit Operations. Therefore, I consider Unit Operations to have been one of my most important chemical engineering classes.

1980

Rod Wolff (ChemE and MetalEng ’80). It was Spring Quarter of 1978 [the “heydays” of the #1 rated chemical engineering department] and I was a junior at the U as a chemical engineering major. A Who’s Who of chemical engineering research and publishing made up the professors from the department then: Ranz, Fredrickson, Aris, Isbin, Davis, Dahler, Keller, others I can’t recall, and Matt Tirrell was the new guy. My classmates and I had survived the “cuts” moving through sophomore year to junior year, when a third to half of the class was whittled away. We were proud we had made it!

One more major hurdle – Unit Ops Lab! We had heard the rumors. Registration materials showed the CHEN 5401 class was being taught that quarter by Professor L.E. [Skip] Scriven. SCRIVEN!!! He happened to be my undergrad advisor, no less!

The specifics of the first two-week experiment and lab report write-up escape me – probably some sort of process involving mass balances. We worked in teams continued on page 19
in the lab, very diligently, but not quite knowing exactly what we were doing. The report write-up was critical, a chance to explain away any strange results. A little embellishment, and making sure the report “weighed enough.” We turned in the reports. It was a setup.

When we gathered to get our lab reports back, Scriven stood in front of the class that day, took the stack of reports and swept them into the trash can. “I will not have this quality of writing represent the chemical engineering department at the University of Minnesota!” he exclaimed. Point made. We were scared into action. We gathered our reports and looked over the comments. We also noticed, finally, that Strunk & White The Elements of Style was an assigned textbook for the class. Better go buy one. Scriven was sending a message. It was at that point that I, and I suspect others in the class, learned how to write a worthy lab report. How to transfer hard lab results into verbiage that a company’s management could understand. This served me well in a nearly 23-year career at Medtronic (1980-2003) in various engineering, research and project management positions. Many, many such reports were written.

Learn how to write. Tough love by Scriven. This is what I remember most about that Unit Ops Lab.

1984
John Liffrig [ChemE ’84], MSEE, ATP, CFI/MEI. I can’t say enough about how good the BChE program was for me. I had high grades and high ACT scores in high school and came from a medium-sized town (Eau Claire, Wisconsin) to the U of M as an 18-year-old freshman. I had no special prep school background, just a public school education.

The professors made those courses tough. But I admired them for it. Unit Ops was an excellent course. It taught you how to work with others in a team to make the unit operations work. Learning how to work together and learn from each other is what happens in the real world to get the job done. Also, learning how to make science work in a lab was a great education.

1987
Chitra Shanmugham [ChemE ’87]. The Unit Ops Lab was one of the best learning experiences of my undergraduate career. I remember the professor telling my lab team when we handed one of the lab reports in with one person’s section missing that we all will get an “F” for that assignment if we don’t hand in the missing section in 15 minutes. He said in the real world if one person on your team doesn’t do their job your whole team will have failed. We scattered around the campus to locate our missing lab mate. We found him – he had forgotten to wake up for the 8:15 a.m. class. This was the absolute best lesson I learned – oh so true – you win or lose as a team! Or the time when he chastised us for reaching for a calculator for a simple math problem – we had to use our head to calculate vs. using the calculator since you may not be near a calculator. He forced us to think quickly on our feet as he would quiz us before allowing us to touch “his” equipment… It is one of the experiences I have referenced when talking about my college years!

Chitra Shanmugham currently works as the North American Hair Care & Color Business Leader for Procter & Gamble.

1996
Scott Olson [ChemE ’96]. I have two fond memories of the Unit Operations Laboratory. Well, three if you include the time we spent drying lentils.

Christie Geankoplis was old school and perhaps didn’t know what to make of the students passing through the lab in the 1990s. I was to be filmed in the Unit Ops lab by the University of Minnesota Foundation as part of a promotional video they were sending to donors, highlighting the doings of students throughout campus. I was a good student, active on campus in activities and with Admissions. On the day of filming, Christie took the film crew aside and told them they could not film in the lab. A safety issue? Interference with the class? No, it was that the student with the grungy look about him (Soundgarden did win two Grammys that year), shoulder length hair, and goatee “was not representative of a
chemical engineer.” Thus, we ended up filming at the Weisman instead. I laughed, then was bitter for some time, and have now settled on a wry smile – I would hope that my graduate degree and 15-year career in the energy industry demonstrates that I am actually a pretty good representative of our school and our discipline.

Raul Caretta let us know what to expect when we entered the real world. Besides informing us that using bad test data for extrapolation of full scale design when we know we have bad test data may not be wise, he explained how his grading scale translated to the real world. It went a little something like this (courtesy of L.E. “Skip” Scriven):

- A = Well done. You get a raise.
- B = Adequate. But you could do better.
- C = Think about a new job.
- D = I fire you.
- F = I fire you and sue you.

I believe I have so far done better in industry than I did for Dr. Caretta, thanks in part to his motivation.

Scott Olson is a Project Manager, Renewable Energy Efficiency for Black & Veatch located in San Francisco, California. 2009

Joel Monroe [ChemE ’09]. I loved and hated Unit Ops, however, it was the most realistic course to describe how companies work. After working for two months at my first job after college, I was asked to give a presentation at the quarterly R&D meeting of 200 industry experts and upper management folks from around the world. There’s nothing that could have prepared me better for that situation than the Unit Ops presentations. An engineering degree is not complete without the skills from Unit Ops. Joel Monroe is a Process Engineer at Bemis Co. Inc.

2013

Aarti Anand [ChemE ’13]. The concept of the class is fantastic and very useful. It is the only course that integrates learning from other chemical engineering coursework into hands-on labs. Many people (and may I emphasize here, many women) do not grow up with hands-on interactive learning, and Unit Ops has done a great job of including learning of that style in the chemical engineering curriculum. The labs cover a good breadth of concepts and useful industrial applications, and as far as I can tell, our Unit Ops course covers far more experiments than other schools’ equivalent courses. In the workforce, I am in a pilot plant setting at least 30% of the time in addition to my time spent at full-scale plant facilities (let’s say 10%). The confidence to work with new unit operations, understand how they work quickly, and ask the right questions has been crucial to my success in my current position working on scale-up for new soup products.

Upcoming Events

Alumni and Friends Reception at the 2015 AIChE Annual Meeting in Salt Lake City, Utah

November 10, 2015
Reception will be held at the Salt Palace Convention Center
CEMS alumni and other friends of the Department are encouraged to attend, especially those living in the Salt Lake City area.
After finishing my graduate work under Professors Fredrickson and Tsuchiya, I began a 43 year career in the food industry, holding positions as Director of Research and Development at companies which included Pillsbury, General Mills and Industrial Ingredients.

I was fortunate to work with teams that were able to develop both new products and new processes, which led to both enterprise growth and, equally important, new job creation.

Many of these innovations were significant, and I am proud to be the holder of numerous U.S. and foreign patents.

At the same time, I am even more proud of my family, which has grown out of the association, since the early 1980s, with an orphanage in the state of Morelos, Mexico, on the part of my wife and me. Through becoming bilingual and multicultural, we were able to come to know another facet of accomplishment which, I feel, is like no other.

I continue to be, as I am sure all of us are profoundly indebted to CEMS and the University of Minnesota for the grounding which gives a person both the breadth and depth to experience a diverse variety of things throughout the course of life.

**Thomas Standing (ChemE ’65)**

Fifty years after receiving my undergraduate degree, I’m back in school taking final exams. No kidding! This time it’s for the love of music. While many classmates gathered for the CSE reunion, it was practice, practice, practice for my year-end recitals in voice and piano. I’ve been a music major at City College of San Francisco (CCSF) taking all the courses in fundamentals, musicianship, harmony, composition, voice, piano, and music history. A lifelong music lover, I grew impatient with passively attending music concerts, and sought active involvement. At age 40, I gave myself a piano as a birthday gift and started lessons to learn the basics of the music system. However, I soon realized that I had scant talent for the piano — as difficult for me as differential equations! Thus humbled, I dusted off my experience as a chorister from school days. For twenty years I sang in choruses — performing operas, oratorios, and cantatas, which led me to the music program at CCSF.

Each semester the voice and piano classes sing and play in recitals open to family, friends, and fellow students. Singing or playing solo in front of an audience originally was most terrifying, but it’s become more comfortable now. I’ve been learning to sing in trios and quartets where each singer blends harmonically and dynamically with other voice parts. This semester I was fortunate to sing a Mozart opera duet with a gifted young soprano who is headed for the prestigious Manhattan School of Music. I’m continuously inspired by the talent of the younger students!

**Stephen K. Sundeen (ChemE ’65)**

I struggled as a high school senior choosing between flying for the U.S. Air Force or pursuing a technical degree. Obviously, the engineering field won out, and I began studies at the University of Minnesota-Duluth before transferring to the Twin Cities campus after two years. At the time, chemical engineering seemed to have the more interesting career choices and that’s what won me over.

My memories are plentiful, but the fondest involve the people I met including numerous faculty, my good friend and lab partner Paul Nick Nelson, and many others. Working as a night watchman at Pioneer Hall (our only co-ed dormitory) and ensuring the safety of the girls at night also provided some interesting memories. Outside of the classroom, my experience working part-time at Donaldson Co, a mechanical engineering-oriented company specializing in air cleaners, etc., for tractor trailers was invaluable. We worked on a project for the U.S. Army (Aberdeen, Wyoming) in which I was given the lead on some specific challenges.

Upon graduation I was hired at DuPont and worked in plant technical (textile fibers) for acetate, then Orlon®, then Lycra®, before transferring to technical marketing, in the early 1980s. I was fortunate to become family with a number of important customers, establishing relationships lasting through today. Those years were by far the most rewarding of my career. I retired in 2001 after 36 years with DuPont.

Life now involves grandchildren, (11), chores on a 5.5 acre home, golf, and winters in a second home in Scottsdale, Arizona. My wife, Linda, and I enjoy friends, wine tasting, and occasional travel. My advice to students is to be the best at what you choose to do. Take the team approach, and always making your teammates and managers better.
Endless possibilities

Earning a college degree was just the beginning for the Class of 2015.

We polled some of the graduating seniors to share their fondest memories as CEMS undergraduates and plans for the future. Congratulations Class of 2015!

**Daniel Bakke (MatSci, Chemistry ’15)**

My most memorable experiences are late nights in MechE 308, swinging the “charpy impact hammer,” and really getting to know my classmates during my senior year. Upon graduation, I will be an Engineering Development Associate at Tundra Companies in White Bear Lake, Minnesota. I am excited about putting my education to work and finding new hobbies. In five years I will still be working for an engineering-type company, possibly in a management position.

**Tanner Brandt (ChemE; Chemistry ’15)**

My most memorable experiences are the friends that I made in CEMS. It isn’t a particular moment, so much as the development of deep, caring friends whom I hope to see for many years to come. I’ll be staying in Minneapolis post-graduation and living with several great friends I made during college. I’ll be looking for engineering work in the Twin Cities area, especially at companies like 3M. I am very excited to see how life changes after college. I’m most excited about taking another step towards independence and making decisions that affect my life and other people’s lives; decisions that could take me anywhere at any time. In five years I’d like to live in another country. I don’t really know where or with whom though, just outside of the U.S. and probably in a non-English speaking country.

**Melissa K. Cassel (ChemE ’15)**

My experiences with the American Institute of Chemical Engineers have been particularly memorable, especially competing in and winning ChemE Jeopardy with my amazing team this past February (2015) at the North Central Regional AIChE Conference! Upon graduation, I will be working at ExxonMobil Chemical Company in Baytown, Texas as an Engineer in the Technology division. When thinking about life after college, I am most excited to have a career that I love, and the time and money to travel (and, not writing Unit Ops reports). In five years, I think the combination of missing college and still seeking knowledge will prompt me to apply to graduate school to pursue an MBA or Ph.D.

**Aakash Deshpande (ChemE ’15)**

My most memorable experiences in CEMS include performing research in Professor Hackel’s lab, making friends, and meeting the challenges of upper division coursework. Upon graduation, I will be attending medical school here at the University of Minnesota! I am excited to try to meet the challenges of integrating my knowledge of chemical engineering with a career in medicine.

**Christina Dinh (ChemE ’15)**

My fondest memories of CEMS are all of the people who were a part of it; going through such a rigorous program, developing friendships, and having peers that I could relate to were important for maintaining our sanity. The Unit Ops experience is also one that I won’t be forgetting anytime soon! Upon graduation, I will attend the Massachusetts Institute of Technology (MIT) as a graduate student in chemical engineering. I’m

continued on page 23
excited to explore all of the different career options that a degree in chemical engineering provides. I’m unsure of my exact career path after graduate school, but I really appreciate that I will have some diverse options.

Yanpu He (ChemE, Math ’15)

My most memorable experience in CEMS was my undergraduate research experience with Professor Timothy Lodge. I really appreciate him for introducing me to some very interesting polymer programs and providing me with a great lab environment and awesome lab-mates. I have enrolled in MIT’s chemical engineering Ph.D. program for Fall 2015. I am excited about my new life in graduate school, starting a research project of my own, meeting more awesome people from both academia and industry, and being inspired by their brilliant ideas. Upon completing my Ph.D., I will seek a research and development position in industry.

Kara Meyers (ChemE ’15)

I really enjoyed learning with and from such a concentrated group of highly intelligent people in CEMS. I’ll always remember the people here who helped shape me into the person I am today. Upon graduation, I will be working as a Product Development Engineer in 3M’s Abrasives Systems Division. My plans for the future are to keep learning, working, and problem solving.

In Memoriam

John Allen Anthes (ChemE ’34; Ph.D. ’39) on April 1, 2015.


Alden W. Bohlig (ChemE ’39) on February 18, 2015.

Shafiul Hossain (M.S. ChemE ’52) on February 13, 2015. He developed novel pollution-abatement solutions for paper mills and patented Kleenex tissue that killed viruses on contact. In retirement, he worked for the United Nations on international environmental issues.


Robert D. Koppes (ChemE ’81) on May 3, 2015. Koppes founded Safe Reflections Inc., based on his own

John Phillips (ChemE ’15)

My most memorable experiences in CEMS are working 10 straight hours on a single thermodynamics assignment, “dress like [Professor] Dorfman day,” and making carbonated fruit in one of our classes. Upon graduation, I will work as a Fermentation Scientist at BioAmber. In five years, I hope to be working in a fermentation process start-up company.

Michael Quevillon (ChemE ’15)

I really enjoyed Professor Cussler’s Thanksgiving turkey lecture (modeling heat transfer). It was also an interesting experience to see all the stages of Amundson Hall’s renovations and construction of the new Gore Annex. I’ll be attending the University of Notre Dame to earn my Ph.D. in chemical engineering. I’m excited to apply the academic material I’ve learned at Minnesota to both my Ph.D. research and my career after. Upon completing my Ph.D., I’d like to pursue a career in a R&D group for a chemical industry company.
Congratulations graduates and 50-year alumni!

CEMS students at their graduate commencement (above) and undergraduate commencement (right). CEMS alumni (below) at the CSE Golden Medallion Society Reunion, marking 50 years since their graduation.