On April 15, 1999 our great friend and long-term leader H. Ted Davis appointed me Head of Chemical Engineering and Materials Science (CEMS). By sheer coincidence, I was scheduled to give a department seminar that day at the University of Houston. Following my lecture the Chief (Neal Amundson) took me to lunch, just the two of us. Neal had many valuable insights to share with me that day, but the one clear instruction that never left my mind was, and I will paraphrase a bit, “Don’t screw up my department.”

CEMS is a unique and wonderful place, due in large part to the legacies and culture passed down to us from the people who have invested their lives here. This place works because we are a team, comprised of a remarkable collection of undergraduate and graduate students, post docs, staff and faculty, all committed to delivering the best higher education this country has to offer. We run a very special business: nurturing, facilitating, and guiding the dreams and ambitions of young people, often aspirations they don’t yet recognize, into discovery and self-fulfillment. Our products are people and knowledge. It’s a highly competitive and richly rewarding enterprise that relies on investments by everyone in our academic family, including our great friends and alumni who have brought meaning to our work through their accomplishments and support. I have visited scores of academic institutions around the world and can tell you without a modicum of exaggeration that the impact of the work done by our department remains unrivaled.

Last summer, I decided that the time was right to pass the baton to a new Department Head. This was my decision, arrived at through the conviction that the health of a great institution is directly reliant on timely investments in fresh leadership. We are rich in leadership. Our success is orchestrated by many dedicated people. The position of Head of CEMS is something like being an orchestra conductor or the coach of a sports team, with the important difference that as Head you get to play as well. However, the music is played and the goals are scored by many. When I was appointed, I asked Ted about certain tangible benefits. His response was waggish but wise, “Being Department Head is a hobby, not a job.” I am very much looking forward to returning to my full time job plying my trade in people and knowledge as a professor.

I am thrilled to inform you that Dan Frisbie has accepted the position of Head of CEMS as of July 1, 2014. Dan is great member of our faculty who has served the department as a director of graduate studies, taught graduate and undergraduate courses in chemical engineering and materials science and engineering, produced pioneering research dealing with organic semiconductors and plastic electronics, and has led several teams of faculty in interdisciplinary research centers. All he needed was a hobby.

We have grown in many ways over the last 15 years and we all have a lot to be proud of. It’s been a privilege to serve. Collectively, we have acted on advancing Neal Amundson’s vision. And the best is yet to come!
Daniel Kiener named 30th George T. Piercy Professor

Kiener is an Associate Professor in the Department of Materials Physics at the University of Leoben in Austria.

When I was offered the George T. Piercy Visiting Professor Fellowship by Professor Frank Bates, I felt very honored. I did two things immediately afterward: I got permission from my University to accept the fellowship, and I researched who George T. Piercy was. Turns out, he was a CEMS alumnus who became very successful in the oil industry. And he used this circumstance to support scientific research and his department. This visionary attitude is manifested in the Piercy wing at CEMS, and it also allowed me to become one of 30 scientists so far to visit the department as a named Piercy Professor, which in my case, took part in the beginning of this year (January-March 2014).

I already had close connections to Professor Bill Gerberich, who wrote some of the first papers I read as a graduate student, and sure enough, he taught me a few more lessons in the past months after I joined the department as visiting professor. But, the time in the department allowed me also to interact with many other faculty members and become inspired by the diverse research that is conducted in the department. Being a microscopist, I was in particular impressed by the ongoing efforts in the subject of electron microscopy that will make CEMS a leading institution in the field.

The scientific interaction with members of the faculty, the relaxed encounters with staff and students at department round tables, the cookies after seminar, and inspiring discussions on recent experiments and future plans reflect memories I do not want to lose. One notable experience to mention was the debates over lunch in the Campus Club. No topic was untouchable; everything could be considered, but manners prevent me from revealing details, since what was said at the lunch table stays at the lunch table. Mostly...

I left Austria during the warmest winter in ages, and the winter I experienced in Minnesota was the real deal with plenty of snow, giving me a chance to have some real Minnesotan experiences.
such as outdoor hockey games, snow storms, and interesting driving conditions on the highways. I also learned what it means to own a house during such winters, as Professor Ed Cussler and his wife Betsy were kind enough to allow me to stay in their house.

Looking back it seems natural that, being a foreigner, there will be some challenges arising in this different environment. But to my very pleasant surprise, any issues were resolved almost immediately and without much struggle. I am still not sure whether this was because Minnesotans are so friendly and helpful, or so well organized, or maybe both, but I certainly know that this is something very special I experienced and I am thankful for.

Finally, the Piercy dinner on the evening of my last day in the department was a remarkable evening that allowed me to express my thanks and gratitude to the department in a very eloquent setting and eased my farewell. The award I was presented with found a special place in my Austrian office to remind me of my stay in CEMS.
Valspar donates $1 million for new materials science laboratory

The University of Minnesota College of Science and Engineering announced today that it will receive a gift of $1 million over five years from Minneapolis-based Valspar Corporation, provided through the Valspar Foundation. This gift will be used to provide high-tech equipment for the University’s new undergraduate laboratory, an essential component of modern education and research in materials science.

The new Valspar Materials Science and Engineering Lab will be located in the Gore Annex of Amundson Hall at the Department of Chemical Engineering and Materials Science. Construction will be completed in summer this year and students will begin benefiting from the new lab when classes begin in fall, with full completion in early 2015. The lab will include testing equipment that characterizes the mechanical performance of materials, electron microscopes that image at the nanoscale, and other equipment that can measure magnetic, electrical and optical properties.

“This gift from Valspar allows us to grow our undergraduate materials science and engineering program and outfit the new lab with state-of-the-art equipment that is second to none,” said Frank Bates, head of the University’s Department of Chemical Engineering and Materials Science. “We are thankful for Valspar’s support and forward-looking mission to help us build one of the best materials science and engineering programs in the country.”

Valspar’s shared mission to develop world-class materials science and products, along with proximity of research laboratories were primary factors in the company’s decision to award the gift. The gift announcement comes as Valspar completes a major expansion of its Minneapolis R&D facility. With the opening scheduled for early June, the Valspar Applied Science and Technology Center will enable the current campus to accommodate up to 135 additional researchers and technologists.

“The alliance of Valspar with the University of Minnesota is clearly a strong match with our strategy for science and innovation leadership in the coatings industry,” said Dr. Cynthia Arnold, Valspar’s Senior Vice President and Chief Technology Officer. “Valspar will benefit from the University’s outstanding interdisciplinary program for materials science, a specific coatings program, and proximity to one of our major research laboratories.”

“The University of Minnesota’s materials science and engineering program has seen tremendous growth in demand as a wide range of companies, from oil companies to computer chip manufacturers, to medical device companies, begin recognizing this emerging field as critical to their success,” Bates said. In just the last few decades the number of materials science and engineering students at the University of Minnesota has increased four-fold.

“The University grew the materials science and engineering program very purposefully with world-class faculty, quality graduate programs, and now a robust undergraduate program,” Bates said. “This new lab will allow us to deliver on our promise of excellence and put Minnesota at the forefront in materials science and engineering.”

About the Valspar Corporation

The Valspar Corporation is a global leader in the paint and coatings industry with over 10,000 employees in more than 25 countries. Since 1806, Valspar has been dedicated to bringing customers the latest innovations, the finest quality and the best customer service in the coatings industry.

News release written by Rhonda Zurn, College of Science and Engineering, UMN.
Prioritizing outreach and career preparation

*The Material Advantage and AIChE student organizations prepare their members for success beyond the classroom.*

As part of the undergraduate experience, many students choose to become involved in student organizations in order to develop their leadership skills, access professional networks, or interact with their peers in social settings. The CEMS student organizations are no exception. The AIChE student chapter and Material Advantage group offer those member benefits while promoting the disciplines of chemical engineering and materials science and engineering through increased visibility on campus and community outreach activities.

Jieyi Zhang, president of the AIChE student chapter, reflected on the group’s activities in the past year. “We invited more corporations than ever before (15) to speak to our members about professional development. Bemis, Dow Corning, Schlumberger, and General Mills also made generous donations to sponsor our group events. In addition to many corporate events, we held a joint meeting with the local professional chapter of AIChE. The joint meeting is a highly anticipated event each year.”

Social activities are also important to the AIChe student chapter. This year, the group formed an intramural volleyball team called “Sodium Fine” and held a spaghetti and marshmallow tower competition. The group looks forward to continuing their efforts in developing activities for chemical engineering students that promote professional development and academic excellence.

For Jenna Ronquillo, her focus as president of the Material Advantage (MA) student group has been on outreach. Since May 2013, Material Advantage has conducted materials science demonstrations to more than 600 students at local high schools and those attending engineering summer camps at the University of Minnesota. In addition, Material Advantage members attended some specialty events at 3M and “Science Fusion” at the Science Museum of Minnesota.

Material Advantage members also benefit from professional industry connections. At MA meetings this year, corporate representatives from Medtronic, General Mills, Valspar, and Polyone presented hour-long presentations describing their research and provided information for obtaining internships and full-time employment. The Material Advantage group will also expand its reach by touring companies; a visit to a Cardinal float glass company in Wisconsin is planned.

These active student organizations provide our undergraduates with the necessary resources for future success and continued stewardship as chemical engineers and materials scientists.

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**CEMS/Arkema research team wins 2014 American Coatings Award**

A team of researchers from the University of Minnesota and Arkema Inc. won the coveted 2014 American Coatings Award for their groundbreaking research on finding more sustainable ways for latex particles to form films, which promises to reduce the need for volatile organic compounds as traditional coalescing aids. Their paper, “Stress Development and Film Formation in Multiphase Composite Latexes” concluded that it is possible to produce soft core/hard shell latex materials, in terms of their film formation and their applications in binders in paint formulations. The first author on the paper is materials science Ph.D. student Kyle Price, and co-authors are Wenjun Wu and Kurt Wood from Arkema Inc., undergraduate researcher Stephanie Kong, Professor Alon McCormick and Professor Lorraine Francis. The research was primarily supported by the NSF GOALI program with Kong’s undergraduate research support from the NSF MRSEC REU program. The team was presented with a trophy and a check for $2,500 in prize money at the recent ACS meeting.

Want to learn more? Check out this video:

http://z.umn.edu/cemsumncoatings
CEMS researchers discover persistent light-induced magnetism in non-magnetic oxides

In collaboration with the group of Scott Crooker at Los Alamos National Lab, and Greg Haugstad of the College of Science and Engineering’s Characterization Facility, CEMS graduate student Palak Ambwani and faculty member Chris Leighton have recently reported a remarkable finding in a family of materials known as complex oxides. These are crystals composed of multiple metal ions and oxygen, one of the most intensively investigated classes of materials. They exhibit properties such as ferroelectricity and electrical conductivity, and can be permeable to oxygen. They thus find application in capacitors and random access memory, and are being developed for fuel cells and oxygen separation membranes.

The new research focused on strontium titanate (SrTiO₃), one of the most heavily studied oxides, in part due to its semiconducting properties. In certain conventional semiconductors it is known that illuminating them with a specific type of light (with circular polarization), at the right wavelength, can induce weak magnetism, even in non-magnetic materials. This magnetism disappears very quickly after the light is turned off however, typically in nanoseconds. The surprise in strontium titanate was that not only was strong light induced magnetism observed for the first time, but also that at low temperatures it persists for hours and days after the light is turned off. Writing, reading, and storing magnetic information in this otherwise non-magnetic materials becomes possible (see figure 1), suggesting exciting potential applications.

“This is really something completely new in oxide materials like these - the ability to write permanent magnetic patterns into an otherwise non-magnetic material,” said Chris Leighton. “The challenge will be to properly understand how and why this works, and to increase the temperature at which it can be done. The exciting possibility is to potentially use this to store data.”

Importantly, the effect occurs only in samples deliberately prepared to have missing oxygen ions, known as oxygen vacancies, and the details of the experimental data implicate a defect complex as the origin, i.e. an oxygen vacancy coupled to another defect. Work is underway to understand the nature of this defect, potentially the key to room temperature operation. As stated by Palak Ambwani, “Understanding the role of these defects will be of paramount importance in understanding the origin of light-induced magnetism in SrTiO₃.” The work, “Persistent optically induced magnetism in oxygen-deficient strontium titanate,” was recently published in the journal Nature Materials.

Kaler elected to AAAS

University of Minnesota President Eric W. Kaler [Ph.D. ChemE ’82] has been elected a member of the American Academy of Arts and Sciences (AAAS), one of the nation’s most prestigious academic honorary societies.

Now in his third year as University of Minnesota president, Kaler has become one of the nation’s foremost experts on "complex fluids," which have applications in drug delivery, food processing, pharmaceuticals and manufacturing.

“An honor of this sort is not an individual recognition, but rather reflects on the people I’ve worked with over the years,” Kaler said. “I’m very pleased to be elected to the AAAS as an engineer, which reflects well on the contributions of my students and colleagues, including my longtime collaborator University of Minnesota professor Joe Zasadzinski. And my election as an academic leader speaks to the terrific leadership team at the U. I am very grateful.”

The newest class of the American Academy of Arts and Sciences will be inducted at a ceremony on Oct. 11, 2014, at the headquarters in Cambridge, Mass.
Kevin Dorfman

Associate Professor Kevin Dorfman was named the 2014 AES Mid-Career Award winner. After being nominated by one of his colleagues, Dorfman was selected by board members of the AES Electrophoresis Society for the award. The award is given for exceptional contributions to the field of electrophoresis, microfluidics, and related areas. Dorfman will receive a plaque and give the plenary talk at the SciX 2014 meeting in Reno, Nevada.

Bharat Jalan

Assistant Professor Bharat Jalan has developed a novel molecular beam epitaxy (MBE) approach to tailor electron interaction using artificial heterostructures and defects. Interactions between electrons can provide a plethora of interesting phenomena in condensed matter systems, resulting in many of the well-known phenomena such as superconductivity and ferromagnetism. Guided by theory, Professor Jalan’s research group employs the state-of-art MBE – a UHV thin film deposition technique – to design and synthesize “artificial” structures with atomic layer control to tailor electron interaction for their potential applications in energy, communication and information technology. Using these atomically controlled structures, graduate and undergraduate students in Jalan’s group also focus on addressing some of the most important and fundamental questions in materials science, materials physics and materials chemistry such as what happens to the electronic, dielectric and optical properties of materials when the material thickness reaches to one unit cell.

Want to learn more? Check out this video: http://z.umn.edu/jalan

Andre Mkhoyan

Assistant Professor K. Andre Mkhoyan recently began his second year as a Principal Investigator for the Center for Spintronic Materials, Interfaces, and Novel Architectures (C-SPIN). Begun in 2013, the Center, which is headquartered at the University of Minnesota, aims to build computer systems that use electron spin as the basis of computation, information storage, and information transfer. Such systems will theoretically be smaller and require much less energy than current computer systems.

Over the past year, Mkhoyan has collaborated with other C-SPIN researchers to identify and characterize atomic-scale properties of materials that store and transfer spin-based information. In 2014, he expects to use the University’s new FEI Titan G2 60-300 electron microscope, described in the last CEMS newsletter, to characterize new materials and probe deeper into materials studied with less powerful microscopes. He also expects to work with other C-SPIN researchers to test several new spintronic materials developed on the basis of his characterizations.

C-SPIN, which is sponsored by the Semiconductor Research Corporation and DARPA, coordinates the research carried out by 32 Principal Investigators (including nine from the University of Minnesota) and 98 Ph.D. students and postdoctoral fellows from 18 U.S. universities. For more information about the Center, refer to: http://cspin.umn.edu.

Michael Tsapatsis

A special issue of the journal Advanced Functional Materials highlighted the topic of porous materials and featured Professor Michael Tsapatsis’s research on the 2-dimensional analogue of the microporous silicate ZSM-5. The work described in Adv. Funct. Mater. 2014, 24, 201–208, is based on Tsapatsis’s group efforts to produce extremely thin layers of zeolite ZSM-5 and elucidate its formation mechanism using electron microscopy and x-ray scattering. The CEMS team was joined by Dr. David Olson, and other colleagues.
CEMS faculty achieve triple crown for top University awards

We like to think that betting on CEMS faculty is a sure-thing, and with those winning odds, a trifecta (of sorts) was achieved this year. Assistant Professor David Flannigan and Professors Lorraine Francis and Chris Leighton received a few of the University’s most prominent faculty awards.

The University-wide competition for a McKnight Land-Grant Professorship, Horace T. Morse-Alumni Undergraduate Teaching Award, and Distinguished McKnight University Professorship provides a glimpse into the large number of applicants contending for these esteemed accolades. A small number of awards are granted each year and to have three recipients from the department is truly a significant achievement.

Flannigan deemed a promising young faculty member

Assistant Professor David Flannigan is among eight recipients of the 2014-16 McKnight Land-Grant Professorship. This award 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.

Flannigan is conducting cutting-edge research in the area of 4D electron microscopy (also referred to as ultrafast transmission electron microscopy). Current transmission electron microscopes are able to reach sub-atomic spatial resolutions, but cannot be used to image dynamic events that occur faster than hundreds of microseconds. To overcome this, Flannigan is working to develop a new electron microscopy technology that couples the high-spatial resolutions achievable with electrons with the very short temporal resolutions of ultrafast pulsed laser systems. In this way, the ability to directly visualize femtosecond events occurring at the atomic-scale will be possible.

The McKnight Land-Grant Professorship is a two-year appointment that includes a grant in each of the two years, to be used for research expenditures. In Flanningan’s brief faculty career, he has shot out of the gates with ambitious goals for his research, and this honor will support his path to success.

Francis recognized for her contributions to education

Professor Lorraine Francis is the first-ever CEMS faculty member to receive a Horace T. Morse University of Minnesota Alumni Association Award for Outstanding Contributions to Undergraduate Education. Each year since 1965, the University of Minnesota has recognized a select group of teachers for their outstanding contributions to undergraduate education. Francis is one of eight recipients of the award this year. Those who receive the Morse-Alumni Undergraduate Teaching Award become members of the Academy of Distinguished Teachers. This award reflects the University’s strong and enduring commitment to quality undergraduate education.

“As a visionary teacher, advisor, research mentor, and academic program developer, Lorraine Francis has committed herself to advancing undergraduate education at the University. Lorraine served as a lower-division advisor, director of undergraduate studies, and crafted the current academic curriculum in Materials Science and Engineering, enabling its expansion. Besides those many accomplishments, Lorraine’s dedication to respectful and responsive student-teacher interaction as a pillar for impactful teaching is what truly establishes her as an inspiration for undergraduate education.” Those are just some of the praises that co-nominator (along with Frank Bates) and CEMS Professor Michael Tsapastis used to describe Francis’s exemplary teaching record. She is well-deserving of this honor.
Leighton’s work brings prestige to Minnesota

Professor Chris Leighton is among six recipients of the Distinguished McKnight University Professorship in 2014. This award seeks to honor the University’s most distinguished and highest-achieving mid-career faculty members who have made significant advances in their careers and have brought great renown and prestige to the University of Minnesota.

Leighton has established himself as a world-leader in several areas of materials science and engineering, while leading the undergraduate educational mission of the materials science and engineering program as Director of Undergraduate Studies. “He enters mid-career poised to profoundly impact the world of science and engineering through creative research and inspiring pedagogy. What most distinguishes Chris from almost any other materials scientist in the world is his intellectual and practical versatility,” said CEMS Regents Professor and Department Head Frank Bates, who served as the nominator for Leighton’s award.

Many scientists and engineers are experts at synthesizing certain types of materials. Quite remarkably, Leighton conducts interdisciplinary research at the interface between materials science, chemistry, and condensed matter physics, seeking to understand electronic and magnetic properties of a broad range of materials. These materials, and the devices built from them, are of interest for applications as diverse as data storage, microelectronics, and solar cells, and for fundamental studies of electrons in solids. He has published peer-reviewed articles in leading journals in the field on topics related to six distinct areas of his research, including: electronic phase separation in complex oxides; complex oxide heterostructures; half-metallic ferromagnets; earth-abundant, non-toxic materials for solar cells; nanomagnetism; organic semiconductors.

Recipients of this award are honored with the title “Distinguished McKnight University Professor,” which they hold as long as they remain at the University of Minnesota. Each recipient receives a grant for $100,000 over five years to be used for research and scholarly activities.

Flannigan, Francis, and Leighton deserve all of the praise that accompany these prestigious awards. But in this winner’s circle, they are humble in their approach and attribute their success to their teams: the faculty mentors, students, and peers who helped them in their achievements. Then, they get right back to work.

Cussler awarded Einstein Professorship

Professor Ed Cussler received a coveted Einstein Professorship award from the Chinese Academy of Sciences, under the auspices of the University of the Chinese Academy of Sciences in Beijing. During his visiting appointment in China, Cussler participated in seminars and research discussions on membrane separation at the Institute of Process Engineering. He also visited the Qingdao Institute of Bioenergy and Engineering, where he led a short course on mass transfer.

The Einstein Professorship award is only granted to distinguished foreign scientists to recognize significant achievements in research. The Chinese Academy of Sciences, as the most prominent research organization in China, is comprised of 100 research institutes and nearly 60,000 employees.

The Einstein Professorship program was established in 2004. So far, only 150 foreign scientists have been selected to receive this honor, including some Nobel Prize winners.

Cussler’s contribution in separation science is well-recognized by the Academy and he is among a small group winners from the field of chemical engineering.

Ed Cussler (left) received the Einstein Professorship award in Beijing, China on April 21, 2014.
2013-14 Graduate Fellowships

Through the generosity of CEMS donors, graduate fellowship funds provide our students with complete financial support in their first year of graduate study.

The First Year Graduate Student Fellowship Initiative
William Allman, Dana DeMent, Mia Divecha, Thomas Gage, Chung Hsuan Huang, Anurag Kumar, Hongshi Li, Xiaolan Li, Ziang Li, Joshua Mysona, Abhinav Prakash, Daniel Shore

Neal Amundson Fellowship in Chemical Engineering & Materials Science
Whitney Wenger

Neal R. and Shirley D. Amundson Fellowship
Whitney Wenger

James Andrews Fellowship
Dana DeMent

Rutherford Aris Memorial Fellowship
Sanket Sabnis

Bill and Marcia Ball Fellowship
Michael Harris

Frank and Janis Bates Research Fellowship Fund
Hongshi Li

Laurence W. Booher Memorial Scholarship Fund
Dana DeMent

Phyllis B. Branin Fellowship
Nikolas Wilkinson, Michail Vlysidis

Lap and Jody Chan Fellowship
Frazier Mork

Howard W. and Mary S. Cox Fellowship
Sujay Chopade

Ed and Betsy Cussler Fellowship
Pranav Agrawal

Erling A. Dalaker Fellowship
Thomas Gage, Xinglong Ren

H. Ted Davis Fellowship
Mia Divecha

Gary and Helen Dowling Fellowship
Motao Cao

Arnie Fredrickson Fellowship Fund
Ziang Li

Fridley Fellowship
Jacob Held, Kyle Hershey, Andrew Hwang, Yaming Jiang, Ronald Lewis, Frazier Mork, Qiong Tang, Jun Xu

William Warren Gerberich Fellowship in the Solid Mechanics of Plasticity and Fracture
Yuyang Du

Herbert S. Isbin Fellowship
Chung Hsuan Huang

Kenneth H. Keller Graduate Fellowship
Sujay Chopade

Usha Kumar Fellowship
Jun Xu

Jan J. and Sofia Laskowski Fellowship
Abigail Chanda

Chris and Kathleen Macosko Fellowship
Ronald Lewis

Materials Science Graduate Fellowship
Jessica Kissel

Robert V. Mattern Fellowship
Linh Bui

George Philippidis Fellowship
Michael Harris

Peter and Gene Pierce Family Fellowship Fund
Sanket Sabnis

William E. Ranz Fellowship Fund
Abhinav Prakash

Sebastian C. Reyes Fellowship
Anurag Kumar

Stephen J. Salter Fellowship Fund
Pranav Agrawal, Linh Bui, Motao Cao, Qile Chen, Sujay Chopade, Yuyang Du, Angelika Neitzel, Xinglong Ren, Sanket Sabnis, Peter Schmidt, Michail Vlysidis

L.E. and D.H. Scriven Research Fellowship Fund
Ryan Connell, Anurag Kumar, George Markou, Joshua Mysona, Daniel Shore

Jacqueline and Richard Schmeal Fellowship
Angelika Neitzel

Lanny and Charlotte Schmidt and Duane Goetsch & Nancy M. Dickerson Fellowship
Seunghwan Shin

Nancy Scott and Kevin Gromley Fellowship
William Allman

Bill and Triana Silliman Fellowship
Xiaolan Li

Marvin S. and Norma V. Sivertsen Fellowship
Ioana Ciuta

Thomas R. and Yolanda Shirley Stein Fellowship
Peter Schmidt

Curtis M. and Joyce P. Stendahl Graduate Fellowship
Qile Chen

The Teletzke Family Fellowship
Yuyang Du

Matthew Tirrell Fellowship
Abhinav Prakash

Pat Whitcomb and Patty Napier Fellowship
Peter Schmidt
Recognizing excellence and collaboration, in honor of their fathers

Susanna and Tim Lodge create an innovative fellowship award for CEMS and Chemistry graduate students.

This spring, the University is announcing the creation of The Richard D. Amelar and Arthur S. Lodge Fellowship for Outstanding Collaborative Research in Materials. With this fellowship award, Susanna and Tim Lodge hope to encourage and recognize exceptional graduate students in the Department of Chemistry and the Department of Chemical Engineering & Materials Science who have demonstrated a strong collaborative spirit and initiative to improve the academic community.

In achieving their own personal and professional success, the Lodges drew inspiration from their fathers, both accomplished scientists of high intellectual and moral standards. Tim is currently a Regents Professor in the Departments of Chemistry and of Chemical Engineering & Materials Science; Susanna completed her doctorate in Chemistry at the University in 1990.

Arthur Lodge, Tim’s father, was born in England in 1922 and earned his bachelor’s and doctoral degrees from Oxford University in mathematics and physics, respectively. He joined the faculty of the University of Manchester Institute of Science and Technology in 1961 and, seven years later, emigrated to the United States. There, he became a professor at the University of Wisconsin, Madison, where he taught for 23 years. As a world-renowned expert in the field of rheology, the study of the flow and deformation of matter, he received many accolades and, in 1992, was elected to the National Academy of Engineering. He died on June 24, 2005.

“In his career,” said Tim, “I’m sure he was proudest of two things: his students and his colleagues, with whom he built up the University of Wisconsin’s Rheology Research Center.”

Susanna’s father, Dr. Amelar, now retired, was a professor of clinical urology at the New York University School of Medicine and a pioneer in the field of male infertility. Born in 1927 in New York City, he entered medical school at NYU at age 19 and graduated in 1950.

“My father always wanted to be a doctor and the best doctor he could be,” said Susanna. “His patients’ needs were paramount. He was an extremely able and compassionate physician, with a broad and deep understanding of medicine.”

His many publications include Male Infertility, a book he co-authored that has been widely cited in the field. In 1969, he was invited to Geneva, Switzerland, to serve as a consultant to the World Health Organization on public health aspects of sub-fertility and sterility. The following year, he was awarded grants to establish the first free vasectomy clinic in the United States. He later served on scientific and advisory committees for the National Institutes of Health and was director of the American Fertility Society. Dr. Amelar received the 50 Year Faculty Service Award from the NYU School of Medicine in 2006.

In addition to honoring their father’s legacies, the Lodges’ award celebrates both community and technical skill.

“Growing up, I remember my father always helping people and doing more than what was asked of him,” said Susanna. “So often, people who focus on the greater good are under appreciated.”

For Tim, creating this award is a way to honor the powerfully understated role his father played in molding his life and career.

“He never complained about having to work,” said Tim. “He did not dispense advice, but he did dispense example. I felt this most of all when it came to my own career choice. He never pushed on us the joys of academic science — but he demonstrated daily that he had a job he loved.”
Each spring here on campus, we see the impact of philanthropy first-hand in our graduating students who are poised to make significant contributions in fields ranging from human health and the environment to energy, technology and beyond. For many of these students, their path was made possible by the support of generous alumni, faculty, and friends whose giving to the Department of Chemical Engineering and Materials Science (CEMS) demonstrates confidence in our faculty and students and in their potential to create a better tomorrow.

We now have an exciting opportunity to build on the success of the recent Campaign FIRST through the University of Minnesota Foundation’s new Fast Start 4 Impact program. This program, running through the end of 2014, provides immediate funding to students and helps donors’ support go further.

Typically, an endowment fund starts small and grows over the years. However, the Fast Start program accelerates growth by making awards to students right away. For newly created endowed gifts of $50,000 or greater (made now, or pledged over four years), the Foundation will provide four years of immediate funding. After four years, the new endowment fund takes over and continues to help CEMS students far into the future. These newly endowed funds can be named for the donor or for whomever the donor wishes to recognize and honor.

More than 1,000 new UMN CSE undergraduates attended New Student Convocation last August. The CSE freshman class of 2017 is the largest and most academically prepared in history.

Putting tomorrow’s engineers on the fast track

Courtney Billing
External Relations
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Monti Scholarship accelerates student’s success

Established through the Fast Start 4 Impact program, the Athos J. Monti Scholarship provided increased funding in its first year to 2013-14 recipient Rochelle Zordich.

The Athos J. Monti Scholarship, established by alumnus Athos J. Monti (ChemE ’49, MBA ’77) in 2013, is assisting future generations of students within CEMS.

This endowed scholarship awards full-time students in their senior year of undergraduate study, with preference given to students who graduate from Hibbing High School in Hibbing, Minnesota. Since the Monti Scholarship was established through the Fast Start 4 Impact program, both Mr. Monti and CEMS students are seeing an immediate impact.

Rochelle Zordich was the Monti Scholarship recipient for the 2013-14 academic year and reaped the benefits of a fast-tracked scholarship. Rochelle shares some of her experiences as a CEMS student.

What has been the best part of your time in CEMS?
Learning so much about an area of engineering that has always interested me and getting to work with students who love this material as much as I do have been the best parts of my time at CEMS. I love getting to share my excitement over something like material properties with like-minded people.

What are your career goals and interests?
Ideally, I would like to work for a company that is doing innovative research and design with materials that will help the world. I know this will likely require a graduate degree, so I am currently looking into options for that.

If you could use the knowledge you have learned in CEMS to solve one global problem, what would you choose?
Pollution caused by the world’s high energy consumption...it’s time we made bigger leaps in affordable alternatives.

How has the Athos J. Monti Scholarship made a difference in your life?
By receiving this scholarship, I am able to focus on my studies, rather than juggle a part-time job and my education. I’ve had a higher grade point average this semester, and this scholarship has been a large part of making that happen. I cannot adequately express how much it means to me to have the support of people like Mr. Monti who want to help students like me succeed.

Grow a Legacy in Maroon & Gold
You have deep roots within CEMS and at the University of Minnesota. With a planned gift to the U, you can manage your finances and utilize assets to provide income and tax benefits for yourself and your loved ones while helping discoveries bloom.

Examples include:
• Bequest in a will or trust
• Naming the U as a beneficiary of retirement assets or life insurance
• Gifts that provide an income to you or others

To discuss your goals or gather information, please contact Courtney Billing, cbilling@umn.edu or 612.626.9501

Photo credit to Nicole Holdorph.
I spent five unforgettable years in Minnesota and took away many life-long memories and gifts from my graduate student experience. The chemical engineering faculty imparted an intellectual curiosity and robustness that has served me exceedingly well for the academic career that was to follow. When I came to Minnesota in 1967, following my bachelor’s degree in Toronto, I thought I was going to work on process optimization or some related frontier area with Professors Amundson and/or Aris. That is until Ken Keller introduced me to the astonishing concept that a chemical engineer could make a meaningful contribution to the advancement of medicine. I had never heard or thought of biomedical engineering before, but jumped at the opportunity to pursue this area for my doctoral thesis. After a year in Edmonton, I accepted an academic position in the Chemical Engineering Department of Lakehead University. Lakehead is a smaller, primarily undergraduate university located in Thunder Bay, Ontario, Canada. I taught undergraduate courses and pursued my biomedical research at Lakehead for 28 years. I continued to teach and do research on a part-time basis for an additional nine years, finally packing up my office 18 months ago. Highlights of my years at Lakehead include sabbaticals in Australia, France and Italy, nine and a half years as department chair and two terms served on the university’s Board of Governors. In 2001, I was honored to be named Lakehead’s Distinguished Researcher for the year. Now fully retired, I have more time for travel to Vancouver and London, England to see my daughter, son, and their families. My partner, Linda, and I get down to Minneapolis once or twice a year. My home on the shores of Lake Superior occupies much of my time, but I try to get out kayaking with my faithful golden retriever, Maddie, as often as possible.

My graduate student years at Minnesota will always occupy a special place in my heart. The chemical engineering faculty members are truly outstanding and remain an inspiration. My graduate student colleagues who arrived with me from all corners of the country and the world also provided me with some terrific memories: those Friday afternoon fishing trips to Forest Lake; the lunch-time bridge sessions; the hapless slowpitch teams I helped organize; the introduction to canoe trips in the Boundary Waters Canoe Area – a past-time I have been able to continue north of the border; even the less pleasant memory of checking to see if there might be an inch or two of coffee left over in the pot from Friday that we could quickly reheat to satisfy our Monday morning caffeine craving. All-in-all it was a great time! I would love to hear from anyone from those U of M graduate student days. My e-mail is: laurie.garred@lakeheadu.ca.
We are pleased to announce a new alumni feature titled, “In Retrospect,” which will showcase historical alumni narratives.

Melvin L. Tobias [Ph.D. ChemE ’50]. I enrolled in the University of Minnesota’s chemical engineering graduate program supported by the “GI Bill.” In my case, this benefit amounted to two years, nine months, and 21 days. I disregarded the fact that this amount of time was almost certainly too short for completing a Ph.D. and simply charged ahead. At the time, chemical engineering at Minnesota was under the control of the School of Chemistry (headed by Samuel Colville Lind, a native of Tennessee, a pioneer in radiochemistry, and later an important figure at Oak Ridge National Laboratory) and considered by the senior faculty (all chemists) as an outgrowth branch of the chemical sciences. It was not even a department yet. Nevertheless, the chemical engineering faculty behaved as if it was, and both the undergraduate and graduate programs were highly regarded.

The chemical engineering facilities, when I was there from 1946 to 1950, were not much more than a rather dark enclave in the bottom of the old Chemistry building. How amazing it is to see current photos of a great modern building, perhaps a city block long, named of course after Neal Amundson. I knew him only as just an assistant professor in his early thirties, not yet as the outstanding leader who built that “stepchild” department into what we know today as one of the finest research institutions in chemical engineering and materials science in the nation.

As you know, Professors Aris and Scriven have written a history (I refer to http://www.cems.umn.edu/about/history_chem.html) of the department which briefly describes how Prof. Amundson became department head. I remember the situation well, which followed the tragic death of Prof. Charles A. Mann, and the search for a successor that was sought among outside applicants and the existing staff. Dean Athelstan Spilhaus decided to settle the matter by appointing Amundson as Head. I do not know what brought him to choose someone who was, after all, a junior member of the department, but subsequent events have always made me feel that his decision to do so was the best executive choice he had ever made or would make, for “the rest is history.”

In the latter part of my graduate work, employment recruiters from Oak Ridge National Laboratory came to the University. I did not know that they were coming and was busy with my laboratory experiments when I was told they wanted to meet students. I showed up in my shabby lab clothes and was handed a job application form. A short time later, I was invited to an interview in Oak Ridge, followed later by a job offer, and spent the next 43 years there as a research staff member until my retirement at the end of 1993.

I was much involved in developing computer programs for carrying out criticality calculations on hypothetical breeder reactor designs. I developed, along with my colleagues, a new method for doing what are called diffusion theory calculations. This model for neutron distribution behavior is much like that for calculations of heat conduction in solids. I called it the Equipoise method after a famous long-ago thoroughbred race horse. The name combined the idea of the speed of the code, which I hoped would eventually materialize – we did succeed at that – and the idea of emphasis on calculating the neutron balance as precisely as possible, essential to making comparisons between different designs. At the same time, the neutron balance basis of the method also led us to ways to generate powerful accelerating effects to the iterative numerical operations. The calculation method is easy to understand, but I was unable to come up with a mathematical proof that ultimate convergence would occur.

My job at Oak Ridge gave me the opportunity to work on just the sort of things I had always imagined I would be interested in, in the company of fine associates, and for an employer that treated me very well. The training I received at City College, that wonderful “poor man’s Harvard,” and at the University of Minnesota fitted me very well for the things I was asked to do. I have been very fortunate, of that there is no doubt.
ALUMNI ACTIVITIES

Connecting in Korea

*The CEMS Alumni Association of Korea establishes connections 6,000 miles from Minneapolis.*

When Professors Gui-Young Chung (Hongik University) and Kangtaek Lee (Yonsei University) attended a Korean Institute of Chemical Engineers (KIChe) meeting in 2010, they discussed the possibility of a CEMS alumni gathering. Chung and Lee realized that many CEMS alumni had returned to Korea for their professional careers. Lee began gathering contact information for CEMS alumni in Korea, which resulted in a list of only 23 alumni. Among those initial 23 contacts, 15 CEMS alumni gathered at a restaurant near Hongik University in June 2011 for their first unofficial meeting.

As the number of members increased, Professor Hyun-Ku Rhee (Professor Emeritus at Seoul National University) suggested an official foundation of the CEMS Alumni Association of Korea. Rhee was elected as the first president of the association and Lee served as the administrator.

In order to professionalize the alumni gatherings, members began to give presentations on their recent research progress. Membership has steadily grown and as of 2013, the group has a dedicated following of more than 50 members. The most recent alumni association meeting was held on Dec. 6, 2013 at the Hoam Faculty House in Seoul National University, where Dr. Won-Hoon Park (President in the Association of Academies and Societies of Sciences in Asia (AASSA)) and Professor Jungkyu Choi (Korea University) presented their recent research and activity. At the end of the meeting, elections were held for new officers. Dr. Won-Hoon Park was elected as the new president of the association and Professor Jaewook Nam (Sungkyunkwan University) serves as the administrator for 2014. The meeting will become an annual gathering every December.

The alumni association would like to expand its membership and add to its contact list. If you are a CEMS alumnus living in Korea, please contact Jaewook Nam (jaewooknam@skku.edu) and/or Joona Bang (joona@korea.ac.kr) for further information on the CEMS Alumni Association of Korea.
CEMS keeps them running

A dedicated student running club reunites on the east coast.

It wasn’t unusual to see a group of graduate students on sunny, summer afternoons roaming Amundson Hall in their running gear. Kat Volzing, Ian Hill, Samia Ilias, Liz Mallon, and Alex Marvin formed a running club (with a few other guest appearances) while earning their doctorate degrees in chemical engineering or materials science.

Volzing started running with another CEMS graduate student, Anne Kantardjieff, when she spent the summer in New Haven, Conn. interning for the same company where Kantardjieff worked (Alexion). Kantardjieff had never run before, but was quickly hooked. After the summer was over, she wanted to come back to Minnesota to run a half marathon with Volzing in the fall (the Monster Dash).

After completing that race, an ambitious idea to run a full marathon soon turned into a reality, and now both women have completed three full marathons. They’ve also expanded the group to include fellow CEMS classmates.

With nearly all of the members of the CEMS running club living on the east coast now (aside from Lizzy), Volzing convinced the others to participate in the Gore-Tex® Philadelphia Marathon held in November 2013. Some of the group members opted for the half marathon, but it was easy to spot the CEMS alumni team in their brightly colored uniforms. Volzing reported that everyone had a great race day, and they have plans to run the Hamptons Marathon in September. Volzing blogs about her running adventures at: www.DrTrot.com.

Notable Alumni Achievements

Thomas H. Epps, III (Ph.D. ChemE ’04) was named a 2014 Young Investigator by Sigma Xi, an honor society of research scientists and engineers. Since 1998, the annual Young Investigator Award recognizes excellence in research. Epps received the award for innovative research examining the effects of block copolymer energetics on the nanoscale self-assembly of bulk, thin film, and solution-assembled block copolymers. Epps is an associate professor of chemical and biomolecular engineering at the University of Delaware.

Epps’ multifaceted research program explores aspects of chemical engineering, chemistry, and materials science to generate nanoscale soft materials. Such materials have applications in membranes (for fuel cells, solar cells, lithium batteries, and analytical separations), nanoscale templates and thin film coatings, and drug delivery.

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1951
Leigh Nelson [ChemE ’51]. At the present time I am retired from 3M (since 1990) and am active in skiing and operation of Welch Village Resort. I continue to use the technical background I gained in CEMS as I design and operate snowmaking systems, ski lifts, and the computerization of our business.

1984
John Liffrig [ChemE ’84] MSEE, ATP, CFI/MEI. Professor Ken Keller had plenty of time for me as a young 18-year-old with questions about the program. Professor Klaus Jensen advised me on my progress and career path. Professor Rutherford Aris took time to privately instruct me after I had pneumonia in the fall of my junior year in order to make up what I had missed in his class. Even my own father could not believe what kind of concern Rutherford had for his students. All three of the aforementioned professors were world-class caliber, helping a young student eager to learn. As it turned out, I found out I had a gift for science and math that enabled me to be successful as an engineer. As a young college student, I had no idea of the caliber of the program.

I spent most of my career in the electrical engineering field because when I graduated, the oil industry was at a low point. I went on to obtain an MSEE from the University of Colorado. I have also obtained my FAA pilot certifications as an Airline Transport Pilot and Flight Instructor. I have flown jet aircraft for several years as a corporate pilot.

My classmates have gone on to become medical doctors, Ph.D. chemical engineers, patent attorneys and many have made a small fortune. Our success also came from how well-trained we were at the U of M and how hard the professors made us work. I attribute much of my success to the BChE program. The adversity made me so tough. It was the academic equivalent of U.S. Marine Corps boot camp.

I am now coaching my nephew as he goes through the UMN electrical engineering program. What a great school!

2009 & 2010

2013
Aarti Anand [ChemE ’13]. I currently work for General Mills at the James Ford Bell Technical Center in Golden Valley, which is part of the GMI Corporate Headquarters Campus. I’m an R&D Process Engineer in the One Global Meals Commercialization and Technology group, working specifically with thermally processed goods which, for now, is Progresso soup. I interned with GMI between my junior and senior years in college, quantifying pasta textural properties, after which I received an offer of employment.

In Memoriam
Lynn C. Adolphson [ChemE ’52].
John R. “Bob” Beck [ChemE ’45].
Robert C. Bertelsen [ChemE ’48].
Paul H. Binek [ChemE ’47].
Bernard “Bernie” Bratter [ChemE ’43].
Robert R. Burt [MetalEng ’52].
Einar T. Carlson [ChemE ’40].
Glen A. Fevig [ChemE ’45; M.S. ’48].
Everette D. Johnson [MetalEng ’37].
Lennart I. Johnson [ChemE ’48].
Vance R. Kuritz [ChemE ’60].
Donald R. Lindahl [ChemE ’49].
Richard E. Loftfield [M.S. ChemE ’46].
Thomas R. Pearson [ChemE ’67].
Kurt F. Pfeiffer [ChemE ’57].
Thomas “Tom” M. Plouf [ChemE ’61].
Roger A. Schmitz [Ph.D. ChemE ’62].
Harry C. Schuman [ChemE ’44].
Neil H. Sherwood [ChemE ’39].
Julius Solomon [M.S. ChemE ’46].
Normann Storeygard [ChemE ’48].
Patrick F. Tomlan [ChemE ’65].
Maribeth Mrozek Klein (ChemE ’99, J.D.’05) was promoted to shareholder of the national law firm, Polsinelli. Klein focuses her practice in the environmental and natural resources area. For five years in a row, Polsinelli has been ranked the fastest growing law firm in America by The American Lawyer.

Cynthia D. Pederson (ChemE ’83) was named the first female U. S. Nuclear Regulatory Commission (NRC) regional administrator. Pederson, a 30-year veteran of the agency, oversees the Region III office in Lisle, Ill. As regional administrator, Pederson will manage a staff of about 225 employees. Region III is responsible for regulating 15 commercial nuclear power plants and more than 1,200 materials licensees in seven Midwestern states. Pederson is also a recipient of the Presidential Meritorious Rank Award, which honors high-performing senior government employees for sustained extraordinary accomplishment. Throughout her career, she has worked to support awareness of the importance of science, technology, engineering and mathematics in education. In this new position, she plans to continue to foster interest and encourage students in these fields.

“Cynthia D. Pederson is exceptionally well qualified to lead Region III in carrying out our mission of protecting people and the environment,” said Bill Borchardt, the NRC’s Executive Director for Operations. “She has held a diverse range of positions with increasing responsibility and continues to successfully meet the challenges before her. Her tenure in Region III will mean a seamless transition and continuation of our strong oversight activities in the Midwest.”

Cynthia and her husband, Paul (ChemE ’83), have two children and reside in the suburbs of Chicago.

Faculty News continued from page 7

from Rutgers University, who performed adsorption measurements that revealed important differences between the conventional and the 2-dimensional ZSM-5. Dr. Olson is a member of the 1978 Mobil team that reported the structure of the zeolite ZSM-5 (Nature, 272, 437-438). The work was supported by the Catalysis Center for Energy Innovation (http://www.efrc.udel.edu), an Energy Frontier Research Center funded by the U.S. Department of Energy.

Frank Bates and Timothy Lodge

Regents Professors Frank S. Bates and Timothy P. Lodge were recently honored at the Minnesota Block Polymers 2014 conference and dinner on April 12, 2014 on the UMN campus. In addition to a scientific program, the conference provided an opportunity to commemorate the 60th birthdays of Frank and Tim.
MARK YOUR CALENDARS

Department of Chemical Engineering and Materials Science
151 Amundson Hall
421 Washington Avenue S.E.
Minneapolis, MN 55455

Save the Date for the Grand Opening of the Gore Annex!

Friday, November 7, 2014
3:30 p.m. to 5:30 p.m.

Join your fellow CEMS alumni, friends, faculty, and students as we celebrate this extraordinary addition to Amundson Hall and our Department.
Invitations to follow.

Significant progress has been made on construction of the Gore Annex. (Photo taken on April 15, 2014).