



Cleaner Water

Advances Lead to Better
Drinking Water for All





Five years as department head have just flown past. As I begin a second term, I thought it worth reflecting on the successes of the department, but my letter was getting too long and this would be old news to you. It has been and remains a great privilege and honor to be given the opportunity to continue to serve such a great department as ours. My wife, Vicky, and I were just discussing where the years went and are hoping the next term will go at a slower

From the Department Head

pace—that does not seem to be happening as there is too much to do. We underwent some changes during the summer. Phil Geil decided after 29 years it was time to retire but when we needed an instructor for the Plastics Engineering course, Phil came back. David Payne also retired after 34 years but is continuing his research. Pierre Wiltzius, Director of the Beckman Institute, accepted a position as Dean for the Division of Mathematical, Life and Physical Sciences at UC-Santa Barbara. Erik Luijten accepted a position at Northwestern University. All four individuals have made great and lasting contributions to the success of the mission of the department, and I want to thank them for all their efforts. We will miss Pierre and Erik and wish them every success in their new positions. We have added a few new faces to the department. Dennis Readey joins us as a Visiting Professor from the Colorado School of Mines and will be teaching some of our undergraduate ceramics courses. Shen Dillion has joined us from Carnegie Mellon as an Assistant Professor beginning in fall 2009. We are excited to have these new additions to the program—you will learn more about them in this and future issues of the magazine. We are in active recruitment mode, and I hope to be able to introduce new faculty next year.

You know the quality of faculty we have in the department, so of course you expect them to be garnering awards. This fall started with some major ones for the department. Steve Granick was awarded the Polymer Physics Prize from the American Physical Society. The citation reads, "For path-breaking and elegant experiments that elucidate the structure and dynamics of polymers and liquids confined by surfaces." Our congratulations to Steve on his selection for this award; it is very well deserved. Steve follows Ken Schweizer as the recipient of the award, making it two years in a row that our faculty has won this award, which is a first. John Rogers continues to gather accolades for his outstanding work. This year John was recognized by the College, becoming the

first Lee J. Flory Founder Chair for Engineering Innovation. Congratulations to Steve and John, and also to Moonsub Shim, Carl Altstetter, Duane Johnson and Trudy Kriven on their recent awards—more details inside.

We continue to renovate the Materials Science and Engineering Building, with our current projects being the first floor hallway and the old machine shop behind the building. Nancy Sottos will move into the new space created by the renovation of the machine shop. The hallway project will take until next summer to complete, as it is being done between semesters to minimize disruption of classes. We are looking for new displays about materials to decorate the hallways. If your company would like to learn about how they can participate, please contact Cindy Brya at brya@illinois.edu.

The success of our undergraduate program continues and this year we welcomed 85 new freshmen. Our undergraduate enrollment has swollen to 275, which is amazing. Now I have to find out how to give these students the laboratory experience you "enjoyed" as well as the research and internship opportunities that are essential to their preparation for the future. We need your help; please let Cindy know if your company has internship opportunities—they will be getting Illinois students and you know how good they are!

Lastly, I want to thank you for your continued support, financial and otherwise, of MatSE at Illinois. Your contributions make a difference in the educational experience we are able to offer and allow us to continue past traditions of rewarding excellence and helping those in need.

Thank you.

Ian M. Robertson

MatSE Organizes Gender Equity Workshop

By Angus Rockett

A key component of a first-class MatSE department is a diversity of opinions and ways of approaching problems. To achieve this includes, in part, a strong representation of women in the student body and on the faculty and staff. However, most departments have relatively few women at all levels and the number of women drops with rank from undergraduate student to senior professor. To begin to address this issue, the MatSE department took the lead in organizing a workshop on gender equity in Materials Science and Engineering.

At the request of the University Materials Council (UMC), an umbrella organization encompassing all major materials departments at universities in the U.S., a national workshop was convened to examine gender equity issues. The workshop considered causes of the historic underrepresentation of women in MatSE, with a goal of developing strategies to increase their representation at universities and national laboratories. Specific workshop objectives were to review efforts to level the playing field, understand implicit biases, develop methods to minimize bias in all aspects of training and employment and create the means to implement a broadly inclusive, family-friendly work environment.

Held May 18–20, 2008, at the Conference Center at the University of Maryland, the workshop included heads and chairs of university MatSE departments and representatives of the National Science Foundation, the Office of Basic Energy Sciences of the Department of Energy and the national laboratories. There were 98 registered participants including 62 attendees representing 45 different universities and 11 attendees representing 9 national laboratories. A variety of other voices were represented as well including women in MatSE

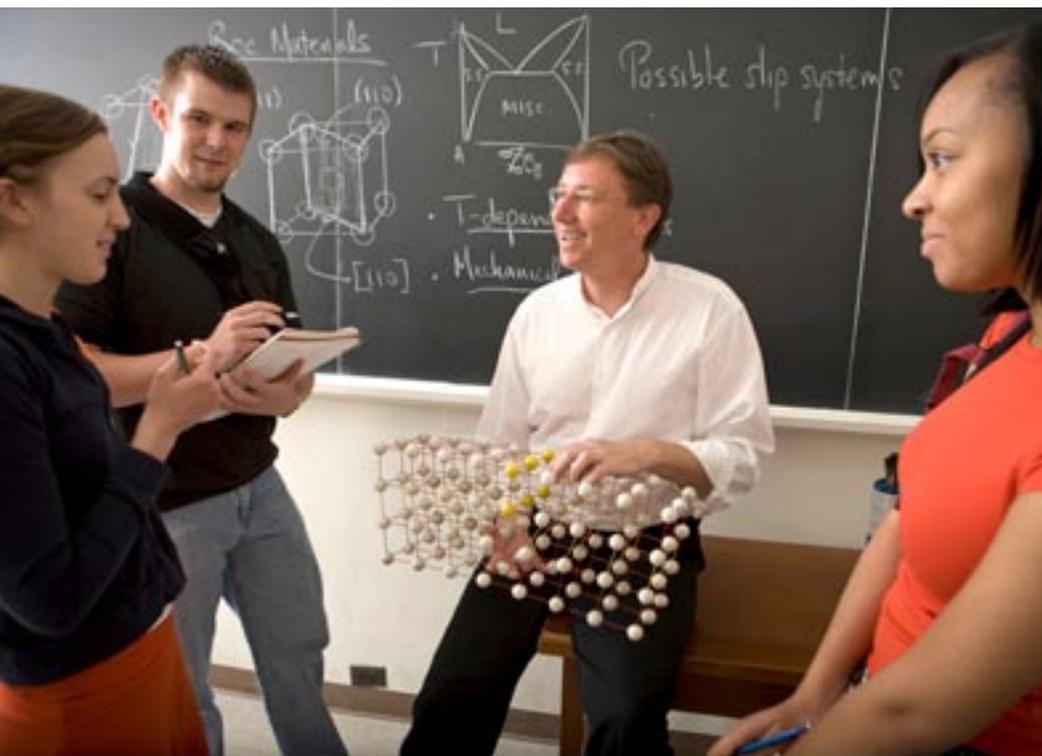
at an early stage of their careers, invited speakers and representatives of MatSE technical societies.

The workshop concluded that change must come at all levels. Progress will require changes in attitude among faculty, administrators, students and staff. Also, the work environment and expectations must evolve if the job of faculty member is to remain attractive to either gender, but especially to women. The implementation of family-friendly personnel policies, dual-career recruiting and transparent promotion and tenure policies is essential. Effective mentoring, including attention to leadership opportunities and professional development, is required. New approaches to relief from duties to deal with family issues are needed. Evaluation criteria that contain arbitrary and subjective components that disadvantage women must be recognized and eliminated. Practices for awards, recognition and promotion must be simple, open and transparent, and the rules should be written down explicitly and vetted for subtle forms of bias. Faculty members must change students' perception of academic careers by conveying the exciting and rewarding aspects of the job.

Support for the workshop came from the National Science Foundation and the Department of Energy, Office of Basic Energy Sciences.



Catherine Didion, National Academy of Sciences, talks to the workshop participants about balancing work and family.



ABET Accreditation and the Engineer of 2020

By Angus Rockett

The Department of Materials Science and Engineering is breaking new ground in educating the engineer of the future. Our comparison of the approaches to undergraduate education taken at MatSE at Illinois and the "Educating the Engineer of 2020" report published by the National Academy of Engineering (NAE) shows Illinois' program as innovative and forward looking.

According to the NAE study, the engineer of 2020 should be thinking about working in a global economy. He or she should be exposed to and encouraged to participate in research and should be asked to define and solve broadly defined problems. His or her education should be integrated with programs at local two-year colleges and studies should include a strong case-studies component. The MatSE program at Illinois provides all of these and more.

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ABET Accreditation and the Engineer of 2020, continued

MatSE at Illinois recently completed ABET accreditation, passing review without required revisions. Some of the highlights of the review included that MatSE students at Illinois exceeded the national average for Fundamentals of Engineering and Professional Engineer examinations and that they experienced design in at least two senior year courses as well as in a number of other forms earlier. The program demonstrated how it undergoes continuous quality improvement, consistent with the EC2000 accreditation criteria, and that the students were learning materials science and engineering at a very high level of sophistication.

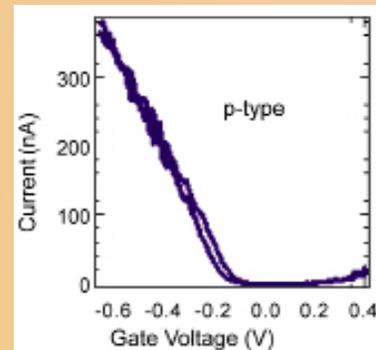
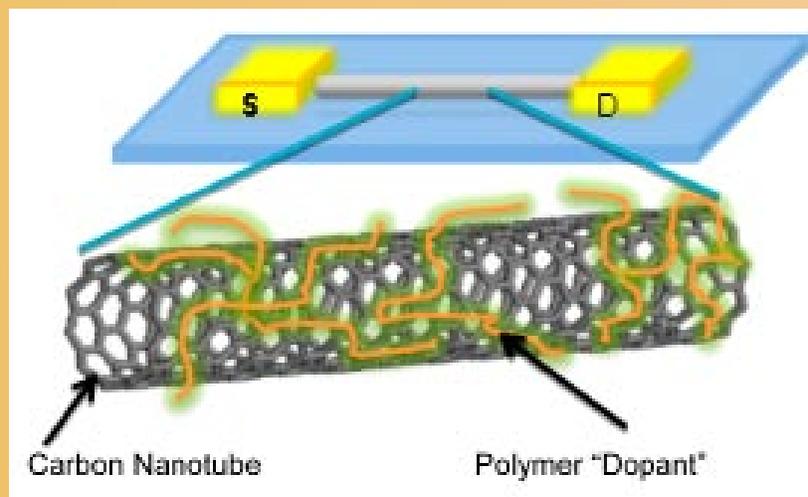
The MatSE program at Illinois encourages students to pursue research by involving undergraduate students in faculty research programs during the school year (typically more than 50 students participate at any time), by participating in research experiences for undergraduates and by encouraging them to pursue industrial internships. We are training future leaders in science and technology

development and the involvement in research directly develops this.

As efforts to bring undergraduates into research programs have increased, so have international experiences. The Department puts a strong emphasis on both study abroad and industrial internships. Many students now study abroad and some even do research abroad. Together with new courses on sustainable design and renewable energy and programs such as Engineers Without Borders, MatSE students at Illinois are taught to think globally and act locally.

The MatSE Department Head, Ian Robertson, in collaboration with G.S. Cargill of Lehigh, led a recent TMS-based revision of the ABET accreditation guidelines to provide a mechanism by which students doing undergraduate research can apply this as a design experience. The MatSE Department is now implementing these guidelines, allowing much more flexibility in the options available for students to experience senior design. More conventional design experiences will continue to be incorporated into the senior courses in the department as well.

Carbon Nanotube Electronics: Challenges and Ideals



By Moonsub Shim

Charge carrier mobilities orders of magnitude larger than silicon, the ability to carry electrical current at densities about a thousand times larger than when typical metals undergo electromigration, and one of the largest known specific stiffness are only a handful of the many exciting properties that carbon nanotubes possess. A daunting number of potential applications from drug delivery systems to space elevators utilizing carbon nanotubes have been envisioned in the past 17 years since these materials have exploded into the research arena.

While some, perhaps many, of these prospects will remain science fiction, there are developing technologies where carbon nanotubes may have a ground-breaking impact. In areas such as

wearable/flexible electronics, nanoelectromechanical systems and next generation photovoltaics, carbon nanotubes may find uses as mechanically robust, high performance semiconductors as well as conducting elements. However, as with any new material, there are many obstacles to overcome before most envisioned benefits can be realized.

Some of the biggest challenges in integrating carbon nanotubes into high performance electronics and photovoltaics include 1) electronic inhomogeneity where a random mixture of metallic and semiconducting properties can degrade device performance, 2) difficulties in doping, 3) extreme sensitivity to minute changes in the local chemical environment and 4) difficulties in aligning and patterning to achieve ordered/addressable hierarchical systems. Current efforts are underway to address these

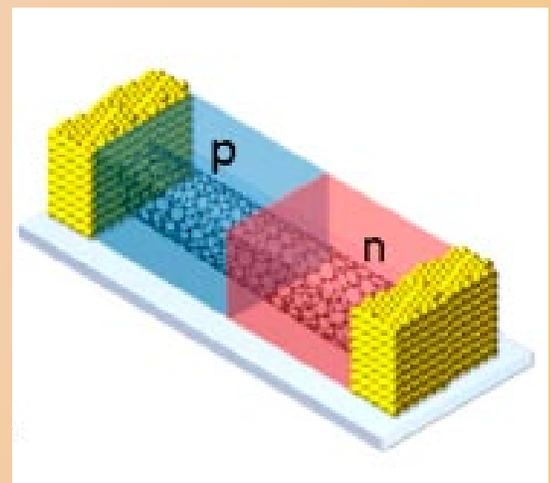
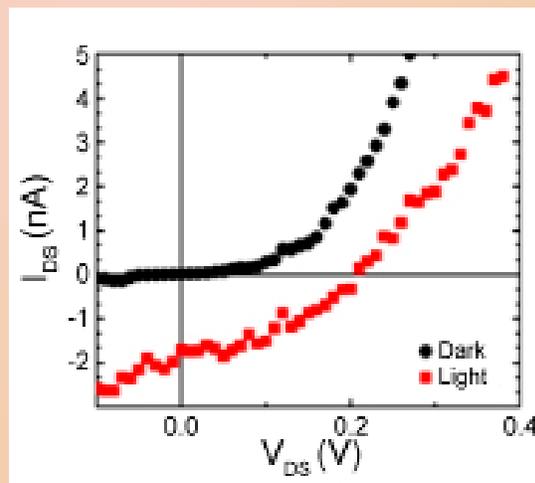
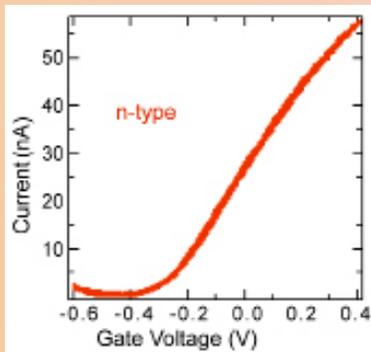
challenges; one example is doping semiconducting carbon nanotubes.

The ability to control the number of carriers (electrons and holes) by impurity incorporation has been one of the key advances that have enabled current semiconductor technology. When a material's size is reduced to nanometer dimensions, the limited number of atoms and the enormous surface-to-volume ratio can and will hinder many conventional processing techniques including doping. Consider, for example, the density of impurities in heavily doped silicon—only about one impurity for every 10,000 host atoms. Materials of nanometer size scale will typically contain a few hundred to a few thousand atoms. Statistically, that is a disadvantage. Even if we were to develop new processing techniques that can achieve orders of magnitude higher impurity concentrations, there is still the problem of the surface. Atoms at the surface tend to have unsaturated bonds. These dangling bonds can become trap sites for electrons and holes and hence limit or possibly eliminate available charge carriers from the dopants. In this regard, a single-walled carbon nanotube, an atomically thin cylinder of carbon atoms, presents the ultimate challenge since all of the atoms are at the surface.

Our unconventional but simple approach to charge carrier injection in carbon nanotubes exploits the fact that all atoms are surface atoms which

with available microfabrication techniques which in turn allows many nanotube-based devices to be readily obtained. A p-n diode is perhaps one of the simplest yet the most pivotal of electronic and photovoltaic devices. However, p-n diodes of carbon nanotubes have been difficult to fabricate. First, such devices have suffered from large reverse currents ("leaky" diode behavior) due to uncontrolled doping and have been operational only under high vacuum conditions since oxidation in air rendered donors and acceptors ineffective. By extending the idea of the field effect transistor where an externally applied gate voltage electrostatically dopes desired segments of a nanotube, p-n diodes exhibiting better performance have been obtained. However, these devices require cumbersome fabrication steps and unnecessarily add two more terminals (to define p- and n-regions) to one of the simplest circuit elements. Furthermore, they inevitably incorporate an intrinsic (electrically insulating) segment between the p- and the n-regions which degrades performance by possibly uncovering carrier trap sites as well as increasing the series resistance.

Using our unconventional approach to doping, one-half of a carbon nanotube can be easily made into p-type while the other half



makes their electronic properties highly sensitive to the local chemical environment—another one of the big challenges mentioned above. Instead of substitutional doping, polymers with different chemical groups surround the nanotubes. For carbon nanotubes resting on insulating substrates, which is the preferred geometry for current simple electronic devices based on these materials, this can be achieved easily by spin casting. Figure 1 shows that both p- and n-type field effect transistors of carbon nanotubes can be obtained with our "polymer doping" approach opening up possibilities in power efficient circuit designs.

The ability to simply spin coat polymers or polymer solutions to control charge carrier type and concentration also provides compatibility

with available microfabrication techniques which in turn allows many nanotube-based devices to be readily obtained. A p-n diode is perhaps one of the simplest yet the most pivotal of electronic and photovoltaic devices. However, p-n diodes of carbon nanotubes have been difficult to fabricate. First, such devices have suffered from large reverse currents ("leaky" diode behavior) due to uncontrolled doping and have been operational only under high vacuum conditions since oxidation in air rendered donors and acceptors ineffective. By extending the idea of the field effect transistor where an externally applied gate voltage electrostatically dopes desired segments of a nanotube, p-n diodes exhibiting better performance have been obtained. However, these devices require cumbersome fabrication steps and unnecessarily add two more terminals (to define p- and n-regions) to one of the simplest circuit elements. Furthermore, they inevitably incorporate an intrinsic (electrically insulating) segment between the p- and the n-regions which degrades performance by possibly uncovering carrier trap sites as well as increasing the series resistance.

Using our unconventional approach to doping, one-half of a carbon nanotube can be easily made into p-type while the other half is converted into n-type. With controlled doping levels and without the need for an intrinsic region, high performance diodes exhibiting nearly ideal behavior with low series resistances can be obtained. Promising photovoltaic response (figure 2) has been measured in these intra-nanotube p-n junctions and efforts are under way to build on these results.

The research highlighted here is the results of talents and tireless efforts of present and former graduate students Daner Abdula, Ju Hee Back, Anshu Gaur, Taner Ozel, Giles Siddons (MS '04) and David Merchin (MS '04).

Advances in Water Purification Research at Illinois Lead to Cleaner Drinking Water for All

By David Cahill



The numbers are shocking: 1.2 billion citizens of our world lack access to safe drinking water, and 3,900 children die each day from diseases transmitted through water supplies or inadequate sanitation. While the most severe problems associated with unsafe water occur in the developing world, we are not immune to problems of water quality in the U.S. In 1993, hundreds of thousands of people in Milwaukee were sickened by a water-borne parasite (*Cryptosporidium parvum*) and more than 100 died. Low levels of pharmaceuticals have been revealed in the water sup-

1.2 billion citizens of our world lack access to safe drinking water.

plies of most major cities. Chemicals that are widely used to disinfect water are now known to also generate toxic and carcinogenic by-products at levels that can impact human health.

Water treatment in most U.S. cities is based on a technology that was first established in the 19th century. Coagulants are added to source water to cause suspended solids and pathogens to aggregate into larger structures that can be removed by sedimentation and filtration through granular media. Chlorine is added as a disinfectant; residual chlorine is also needed to protect against pathogens that might enter the water supply through the extensive (and often very leaky) distribution systems of underground pipes. These conventional approaches for water treatment are energy-intensive, require large quantities of chemicals as inputs and produce large quantities of residuals that impair the environment. In addition to high costs, the need for extensive engineering

expertise and infrastructure essentially precludes the use of conventional water treatment methods in much of the developing world.

Water supplies in the U.S. are generally safe but most scientists and engineers—and a growing number of our more enlightened policy-makers—argue that our aging infrastructure is becoming increasingly unreliable; dangerous pathogens are not always inactivated effectively, and chlorination by-products and other micropollutants pose a significant risk to public health. More technological advanced membrane-based

treatment systems have been implemented in a few cities—e.g., treatment of surface waters in Minneapolis, recharging of ground-water in Orange County, CA, and desalination plants in Tampa and Santa Barbara—but the high capital and operating costs have inhibited more widespread adoption.

To advance the technology of water purification and address the basic research needs of providing safe drinking water to the world's population, an interdisciplinary team of researchers came together several years ago and formed the Center of Advanced Materials for the Purification of Water with Systems (CAMPWS). CAMPWS is supported by the Science and Technology Center (STC) program of the National Science Foundation (NSF) with a research and education budget of about \$4 million per year. The STC program was established by the NSF to advance research in areas of national need; under the leadership of Director Professor Mark Shannon of the Mechanical Sciences and

Children in Adu Achi trek two to three kilometers to the nearby stream to collect water for their families. During the dry season, they may make the trip up to six times each day, which often means many miss class time or the chance to attend school entirely.

An interdisciplinary team of University of Illinois engineering students was among the six award winners of the Fourth Annual Environmental Protection Agency (EPA) P3 grant. The award is for \$75,000 over a two-year period to implement Phase II of a project called "Sustainable Water Development Program for Rural Nigeria."

Photo credit: Maren Somers

Engineering Department, CAMPWS's highly successful research, education and outreach programs are widely considered as a model for what an STC can accomplish. Currently, the CAMPWS includes faculty and student researchers from five academic departments at the University of Illinois (Materials Science and Engineering, Civil and Environmental Engineering, Mechanical Sciences and Engineering, Chemistry, Cell and Microbiology) and several partner institutions (Clark Atlanta, MIT, Notre Dame, U. Michigan, Yale, Rose-Hulman, University of California-

Berkeley). Current and past participants of CAMPWS from the Materials Science and Engineering Department at Illinois are David Cahill (Associate Director

Our research will have a major impact on the world-wide need for improving the quality of water.

of CAMPWS), James Economy (past Director), Jian-Ku Shiang, Gerard Wong, Steve Granick and Erik Luijten.

The word "Materials" in the title of the Center acknowledges the critical role that innovation in materials science and engineering will play in advancing the treatment of water and the detection of water contaminants. The majority of research in CAMPWS is, in fact, focused on materials research, even if that work is taking place within academic departments other than MatSE. A few highlights of materials research in CAMPWS are described below.

A major topic of materials research in CAMPWS has been membranes for desalination, i.e., the removal of salt from sea water or "brackish" water produced when salt water infuses into freshwater aquifers. Salt can be removed from water by a process of "reverse osmosis" (RO): water is driven through a membrane by high pressures (as much as 1000 psi) faster than salt can diffuse through the membrane. The RO membrane is comprised of a fabric backing, a porous polysulfone support layer and a 100 nanometer thick "active layer" of polyamide. The polyamide active layer is formed by a self-limiting process of interfacial polymerization; the physics and chemistry of this "nanoscale" polymer film controls the overall performance of the membrane. Researchers in CAMPWS are working to provide better scientific understanding of what limits the performance of state-of-the-art RO membranes and also to develop radically new approaches for synthesizing membranes that will provide high water flux and improved ability to reject contaminants other than salt.

A major barrier for more wide-spread use of membrane processes in water purification is fouling of the surfaces of the membrane by natural organic matter in the source water and the growth of microbial films. These problems are being addressed within CAMPWS by synthesizing microporous layers from block-copolymers that incorporate a hydrophilic (water-loving) component that self-segregates to internal surfaces of pores. The hydrophilic component of the polymer is less sticky to most organic materials and

therefore inhibits fouling and simplifies cleaning.

Advanced adsorbents and catalytic materials are being developed by CAMPWS researchers to remove and destroy water contaminants. High surface area, highly selective adsorbents can reduce contaminants below the part-per-billion level. Novel reductive catalysts based on nanoparticles of Pd alloys are being synthesized that can convert wide-spread contaminants such as nitrate and perchlorate to completely benign compounds.

Improvements in sensing and detection will enable the efficient application of treatment strategies to match varying levels of contaminants. CAMPWS researchers are using DNA-based enzymes and evolutionary synthesis to produce extremely sensitive and robust sensors with an impressive ability to distinguish between various heavy metals. These sensors are now commercially available, through a start-up company, DNzyme.

Finding alternatives to chlorination for disinfection is a high priority. Several CAMPWS researchers are investigating alternative routes to disinfection based on the photocatalytic properties of titania (TiO_2) and other transition metal oxides. In the pristine form, TiO_2 requires illumination by ultraviolet light (UV) to inactivate pathogens or oxidize trace contaminants. (Essentially, UV illumination provides an energy input to the system that replaces the chemical energy of chlorine used in traditional approaches for disinfection.) By doping TiO_2 with nitrogen or forming composites of TiO_2 with other transition metal oxides, CAMPWS researchers are producing photocatalysts that can be activated efficiently and simply by exposure to sunlight.

CAMPWS will reach the end of its 10 years of funding by the National Science Foundation in 2012. The leadership of CAMPWS is currently working to not just replace the NSF support but to expand our research activity through a combination of new federal funding and financial support from international aid agencies and private donors. Building on our past success, we anticipate that the University of Illinois will continue to be a world-class center for materials research for water purification and that our research will have a major impact on the world-wide need for improving the quality of water for human use, reducing scarcity, and safe-guarding the environment.

Read more about it:

M. A. Shannon, P.W. Bohn, M. Elimelech, J. G. Georgiadis, B. J. Marinas, and A. M. Mayes, *Nature* 452, 301-310 (2008).

WaterCAMPWS Web site, www.watercampws.uiuc.edu
The Blue Death, by Robert D. Morris, (Harper Collins, NY, 2007)



John Rogers Invested as New Chair

On September 25, 2008, John Rogers was invested as the first Lee J. Flory Founder Chair in Engineering Innovation at the University of Illinois. Professor Rogers obtained B.A. and B.S. degrees in chemistry and physics from the University of Texas, Austin, in 1989. From MIT, he received S.M. degrees in physics and chemistry in 1992, and a Ph.D. degree in physical chemistry in 1995. From 1995 to 1997, Rogers was a Junior Fellow in the Harvard University Society of Fellows. In 1995, drawing on his PhD. research, he co-founded and served as director for Active Impulse Systems, which was acquired by a large company in 1998. He joined the Bell Laboratories Condensed Matter Physics Research Department in 1997 and served as director from 2000 to 2002.

He currently holds a primary appointment in the Department of Materials Science and Engineering and is affiliated with the Beckman Institute, the Frederick Seitz Materials Research Laboratory as well as the departments of Electrical and Computer Engineering, Mechanical Science and Engineering and Chemistry. Professor Rogers' research includes fundamental and applied aspects of nano- and molecular-scale fabrication as well as materials and patterning techniques for unusual format electronics and photonic systems. He has published more than 200 papers, and is co-inventor on more than 70 patents and patent applications, more than 40 of which are licensed or in active use by large companies (e.g. Lucent Technologies) and startups (e.g. Active Impulse Systems and Semprius).

His research has been recognized with many awards, including the Xerox Distinguished Lecturer Award (2006), the Dorn Lectureship in Materials Science at Northwestern University (2007), the Daniel Drucker Eminent Faculty Award from the University of Illinois (2007) and the Leo Hendrick Baekeland Award from the American Chemical Society (2007). His teaching at the University of Illinois has been



John Rogers' parents, John and Pattiann, wife, Lisa, and son, John, joined him for the investiture ceremony at the Coordinated Sciences Laboratory on the University of Illinois campus.

recognized many times through selection to the Unofficial List of Teachers Ranked Excellent by Their Students. He was elected as a Fellow of the American Physical Society in 2006 and as an inaugural Fellow of the Materials Research Society in 2007. He serves, or has recently served, on several editorial boards, including those for *Applied Physics Letters*, *Journal of Applied Physics* and *Nano Letters*. He also is associate editor of *IEEE Transactions on Nanotechnology* and *SPIE Journal of Microlithography, Microfabrication and Microsystems*.

Lee J. Flory was employed by W.W. Grainger, Inc., for 42 years, and served as vice president and secretary. Following his retirement from the company in 1991, he continued to be involved with The Grainger Foundation, a private family foundation that provides support to a broad range of organizations including educational, medical and cultural institutions. Mr. Flory served as a director and vice president and executive director of the Foundation at the time of his death in December 2007. The Lee J. Flory Founder Chair in Engineering Innovation was established to honor Mr. Flory and to recognize the large part he had in the highly successful partnership between The Grainger Foundation and the College of Engineering at the University of Illinois.



MatSE Grad Student Earns Fulbright Grant

Gordon Nangmenyi, a MatSE PhD student, has been selected for a J. William Fulbright Grant—one of eight grants to South Africa (out of 109 applicants). The grant is made possible through funds that are appropriated annually by the U.S. Congress and, in many cases, by contributions from partner countries and/or the private sector.

"I will spend the next year working with researchers at Tshwane University of Technology in Pretoria, South Africa, developing and testing an alternative water disinfection system for use in rural areas," Nangmenyi explained. "It will be a great opportunity to see the immediate application of the new bactericidal materials that we have developed through the course of my doctoral program at Illinois."

"There is little doubt in my mind that he will be highly successful in his future endeavors in South Africa," remarked his advisor, Professor James Economy. "Gordon has a lot of energy and enthusiasm for his research, which he expresses most fluently. His training is in mechanical engineering, but he has effectively learned materials science and engineering in a relatively short time. He is most fluent in discussing his research and this will undoubtedly be of great value to him for the future."

Through his research, Nangmenyi has helped to discover a new class of highly effective antibac-

terial materials for water purification. He also is developing new polymer-based adsorption systems capable of removing carbon dioxide from power plants, which are the largest single source contributors to global warming. This research, along with the work of his Fulbright, will lead to innovative advancements in water and air purification, which will challenge the current thinking on previously acceptable technologies in these areas.

Born in Cameroon, West Africa, Nangmenyi was raised with his younger brother by their single mother in Houston, Texas. He completed his ScB, and ScM, in materials and biomedical engineering from Brown University and was formerly a semiconductor engineer at Texas Instruments before returning to graduate school.

The J. William Fulbright Foreign Scholarship Board (FSB), a 12-member board, appointed by the President of the United States, is responsible for establishing worldwide policies for the program and for selection of Fulbright recipients.

“Developing international understanding requires a commitment on the part of Fulbright grantees to establish open communication and long-term cooperative relationships,” said FSB Chair Shirley Green. “In that way, Fulbrighters enrich the educational, political, economic, social and cultural lives of countries around the world. Together, they help fulfill the principal purpose of the Fulbright Program which is to increase mutual understanding between the people of the U.S. and the people of the more than 150 countries that currently participate in the Fulbright Program.”

As a Fulbrighter, Nangmenyi joins the ranks of distinguished alumni of the program. Fulbright alumni have become heads of state, judges, ambassadors, cabinet ministers, CEOs, university presidents, journalists, artists, professors and teachers. They have been awarded 37 Nobel Prizes. Since its inception more than 60 years ago, approximately 300,000 Fulbrighters have participated in the Program.

Engineering Communications Office



Steve Granick



Trudy Kriven

Faculty Honors

Steve Granick will receive the 2009 Polymer Physics Prize from APS. This prize, the highest award in Polymer Physics, is given to an individual “To recognize outstanding accomplishment and excellence of contributions in polymer physics research.” Professor Granick’s citation reads: “For pathbreaking and elegant experiments that elucidate the structure and dynamics of polymers and liquids confined by surfaces.”

The organizers of the 2008 International Hydrogen Conference presented **Carl Altstetter** with a certificate of achievement for advances made in the field of hydrogen effects on materials.

Moonsub Shim has been promoted from assistant professor to associate professor with indefinite tenure.

Duane Johnson is among nine researchers from Illinois that have been awarded fellowships with the National Center for Supercomputing Applications (NCSA). The funding will be used for his project “GridChem Electronic-Structure Information Workflow and Database.”

Trudy Kriven has been named as one of the eight inaugural Honorary Fellows of the Australian Ceramic Society.

David Cahill and **John Weaver** were recognized by the American Physical Society as “Outstanding Referees” for having been exceptionally helpful in assessing manuscripts for publication in the APS journals.

Student Honors

Po Shan James Hsu was named to the UI Alumni Association’s Senior 100 Honorary. Each year, the Alumni Association and the Student Alumni Ambassadors recognize 100 outstanding seniors through the Senior 100 Honorary. Recipients of this award are honored for their outstanding achievements in leadership, academics and campus involvement throughout their undergraduate education.

Jon Lelah, **Stephen House** and **Ruoshi Sun** were named to the Bronze Tablet. According to the University’s Student Code, students must have at least a 3.5 cumulative grade point-average through the academic term prior to graduation, and rank in the top three percent of the students in their graduating class to be eligible for this honor.

Eric Nelson, Ph.D. student in **Paul Braun’s** group, was selected to receive a 2008-09 Mavis Scholarship award from the College of Engineering.

Adam DeConinck, Ph.D. student in **Jennifer Lewis’** group, was selected to receive a 2008 National Defense Science and Engineering Graduate (NDSEG) Fellowship. The fellowship is sponsored and funded by the Department of Defense.

The 2009 America’s Best Colleges edition of U.S. News & World Report ranks the undergraduate program in Materials Science and Engineering at the University of Illinois Number 1 in the nation.

Changing Faces



Raju Perecherla



John Bukowski



Shen Dillon



Phil Geil

The MatSE Department has seen some changes to faculty and staff this semester. David Payne and Phil Geil retired from the University of Illinois in August and are now emeritus faculty. Both had a huge impact on the students they taught and advised throughout the years. Shen Dillon has recently joined the Department as a new faculty member. Raju Perecherla retired in June, after serving as the undergraduate lab coordinator for the past 15 years. John Bukowski, another MatSE alumnus, has taken over Raju's position. More on the changing faces of MatSE in the stories that follow.

Raju Perecherla Retires from MatSE

Raju Perecherla earned a bachelor's degree from Sri Venkateswara University in Andhra Pradesh and a master's degree from the Indian Institute of Science (IISc), Bangalore, India in Mechanical Engineering with distinction. After a brief stint at DRDL, a Defense Research & Development Laboratory in Hyderabad, as a Senior Scientific Officer, he came to the United States more than 30 years ago in the pursuit of higher education.

He worked as an industrial engineer in Chicago for more than six years after receiving an M.S. degree in Industrial Engineering with high honors from Kansas State University. He came to the University of Illinois in 1985, enrolled in the graduate college and earned an M.S. in 1987 and a Ph.D. in 1992 from the Department of Ceramic Engineering.

Perecherla accepted a job with the Department of Materials Science and Engineering as a Coordinator of Instructional Laboratories in 1993 and was instrumental in developing MSE-307 and 308, the two junior core laboratory courses and revamping the rest of the undergraduate laboratories.

He retired from the University in June 2008 to pursue more challenging personal interests. At present, he is taking care of the family-owned health care business and is deeply involved with its business development.

John Bukowski

John Bukowski is the new Coordinator of Instructional Labs for the Department of Materials Science and Engineering. He has been employed as a Senior Research Engineer at the University of Illinois since 1990 and was most recently the Laboratory Manager for Jennifer Lewis' research group. Before joining the University of Illinois, he served as a Ceramic Engineer for the National Institute of Standards and the U.S. Army Construction Engineering Research Laboratories.

Bukowski received his B.S. in Ceramic Engineering in 1974 and M.S. in Ceramic Engineering in 1976, both from the University of Illinois. In his spare time, he tries to make his farm northeast of Potomac, Illinois, a natural and self-sustaining operation.

Shen Dillon Joins MatSE Faculty

Shen Dillon joined the MatSE faculty at Illinois this fall. Dillon received his bachelor's degree and doctorate in Materials Science and Engineering from Lehigh University. His doctorate thesis focused on segregation and the atomic structure of grain boundaries in ceramics. Following his graduation in 2007, Dillon went to work as a research associate at Carnegie Mellon University and visiting professor at Lehigh University. The dual positions allowed him the opportunity to teach while continuing his research. At Carnegie Mellon, the focus of his work was three-dimensional characterization of microstructures in order to obtain data critical to understanding microstructural evolution. Dillon will spend his first year as a visiting research scientist at the Massachusetts Institute of Technology working on materials for energy storage.

Phil Geil Retires from MatSE

Professor Phil Geil received his B.S. from Wisconsin State College, Milwaukee, in 1952 and his Ph.D. in physics from the University of Wisconsin, Madison, in 1957. Following periods at the E. I. du Pont de Nemours & Co., Camille Dreyfuss Laboratory and Case Western Reserve University, he joined the University of Illinois as Professor in 1979.

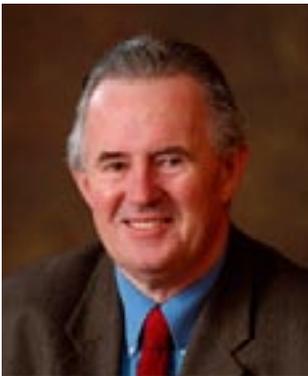
His research interests are related to the characterization of polymer morphology and structure. These include characterization of the morphology, crystal structure and transitions in both main chain thermotropic liquid crystal polymers (LCPs) and several flexible backbone polyesters; the morphology of nascent polytetrafluoroethylene dispersion particles and the effect of deformation and annealing; and the structure and properties of zein (corn protein) packaging films.

Professor Geil has advised 70 M.S. and Ph.D. students. Throughout the years, he has taught courses in polymer science and engineering, polymer synthesis, plastics engineering and polymer physics. He has served on committees covering curriculum, teaching evaluation and improvement, educational policy and information technology priorities.

He is editor of the *Journal of Macromolecular Science (Physics)* and is a Fellow of the American Physical Society. He received a Senior Faculty Fellowship from the Japan Society for Preservation of Science in 1988 and a Doctor h.c. from the Technical University of Brno, Czech Republic in 1999.

In 2005 Professor Geil's former students held a symposium in his honor and established the Geil Scholarship Fund. The symposium announcement stated, "From his students' perspective, Phil has always been a teacher extraordinaire, inspiring a keen sense of inquisitiveness in their research and the need for high standards in all that they do." Contributions may be made to the Phil Geil Scholarship Fund using the form on the inside back cover.

Though now Emeritus Professor, Phil Geil continues to teach in the MatSE Department and still is doing some committee work. In retirement, he plans to work more around his house, continue editing the *Journal of Macromolecular Science (Physics)* and catch up on delayed projects.



David Payne



David Payne Retires from MatSE

David Payne joined the Department of Ceramic Engineering at the University of Illinois as an Assistant Professor in 1974, became an Associate Professor in 1978 and achieved the rank of Full Professor in 1981. He served as Head of the Department of Ceramic Engineering from 1986 to 1988, and Acting Head of the Department of Materials Science and Engineering from 1987 to 1988. He became Professor of Materials Science and Engineering in 1987.

Payne received his Ph.D. in Solid-State Sciences from The Pennsylvania State University in 1973. His industrial experience includes employment as a ferrite-processing engineer at Northern Electric Company, Montreal, 1963-1965; a titanate reliability engineer at Sprague Electric Company, North Adams, Massachusetts, 1965-1967; and a dielectrics research manager at Erie Technological

Products, Inc., State College, Pennsylvania, 1967-1973. He was a post-doctoral research associate in the Materials Research Laboratory at Penn State from 1973-1974.

At the University of Illinois, he was a Research Professor in the Frederick Seitz Materials Research Laboratory, the Microelectronics Center, the Cement Center, the Science and Technology Center for Superconductivity and the Beckman Institute for Advanced Science and Technology. He served as Associate Director for Physical Sciences and Engineering in the Beckman Institute from 1991-1994.

His research interests are electroceramics, and he has published more than 275 technical papers and holds 10 patents. Topics include ceramic processing, crystal growth, microstructure-property relations, ceramic dielectrics, capacitor materials, ferroelectrics, piezoelectrics and the materials chemistry of sol-gel processing. His group pioneered the integration of ferroelectric thin layers. He has graduated 57 Ph.D. and M.S. students; eight are tenured faculty members, including, a vice-provost, dean and director of a center.

Professor Payne was a Fellow of the British Institute of Ceramics and is currently a Fellow of the Institute of Materials, UK. He was elected to the International Academy of Ceramics in 1989. In 2001, he received the International Prize from the Japanese Fine Ceramics Association. He is a member of the Japanese Ceramic Society, Senior Member of IEEE and received the Distinguished Lecturer Award, and the Ferroelectrics Recognition Award from the Ultrasonics, Ferroelectrics and Frequency Control Society (UFFCS) of IEEE.

Payne joined the American Ceramic Society in 1964 and has been a member of the Electronics Division ever since, holding all elected positions. He served on the Ceramic Educational Council, Orton Lecture Committee and Jeppson Award Committee. Major awards include Fellow, 1979; Fulrath Award, 1986; Henry Award, 1995; Outstanding Educator Award, 2003; and Sosman Award, 2007. He was elected a Director of ACerS in 2007.

Throughout his career, Professor Payne has taught courses in ceramic materials and properties, ceramic processing, electrical ceramics, ceramic dielectrics and crystal physics and structure-property relations. At Illinois, he has served on committees covering faculty development, College honors and awards and graduate research.

In his retirement, he plans to travel with his wife, spend more time with family and grandchildren, play tennis and golf and work on projects around the house and garden.

He also will continue with research and writing as an Emeritus Professor and continue to be involved with the American Ceramic Society as a Board Member and Director.

MatSE Hosts ASM Teachers Camp

The Department of Materials Science and Engineering hosted an ASM Teachers Camp the week of June 23-27, 2008, on the University of Illinois campus. Seventeen high school teachers from Illinois, Ohio, Michigan, Maryland, Indiana, Iowa and Kansas participated in the camp. During the camp, teachers learned how to incorporate low-cost or no-cost materials science and engineering experiments into their curriculum. The camp was funded by the MatSE Department, ASM Foundation, ASM Peoria Chapter and the University of Illinois College of Engineering. The Department is seeking company support for the 2009 camp; for more information, contact Cindy Brya at (217) 333-8312 or brya@illinois.edu.



2008–2009 Undergraduate Awards

Paul A. Beck Scholarship:

Pamela Wojtulewicz

Clifton G. Bergeron Scholarships:

Gerald Marchand, Samuel Waldo

Louis R. Berner Scholarships:

Jonathan Bartelt, Tyler Cain,
Kevin Spencer

Gerson B. Bilow Scholarship:

Nicole Cieslak

Robert Bohl Scholarships:

Ting-Kai Chang, Amanda Homce, Jason Jewell,
Douglas Kelkhoff, Dan Kim, Siburu Kuruvilla,
Francis Yuen

Caterpillar Scholarships:

Will Chemelewski, Sibel Leblebici,
Stephen Menke

Earl J. Eckel Scholarships:

Samik Basu, Clarabelle DeVries

Elkay Scholarship:

Patrick Coyle

M. Laird and Charisann Froberg Scholarships:

Varistha Chobpattana, Caitlin Tribout

Phillip H. Geil Scholarship:

Timothy Huang

Henry E. Grein Jr. Scholarship:

Joseph Kao

Kevin Moore Memorial Scholarship:

Kelsey Green

G. Ronald and Margaret H. Morris Scholarship:

Evelyn Huang

James A. Nelson Scholarship:

Michael Brendel

Cullen W. Parmelee Scholarships:

Jian Wei Cheng, Matthew Dejarld, Daniel
Fairfield, Luke Jungles, Kang Jie Lim, Chuan
Hui Moh, Jonathan Naber, Elizabeth Rehwoldt,
Blake Stevens, Dylan Stradley

Cullen W. Parmelee International Research Scholarships:

Timothy Dunne, Sarah Treece

Norman L. Peterson Scholarships:

Brian Lin, Lisa Mazzocco

Larry D. and Carol Rakers Scholarships:

Michael Odlyzko, James Young

Lucille and Charles Wert Scholarships:

Nyrene Haque, Alexander Hryn, Jason Lang,
Meghan McKelvey, Varun Nayini, John Sadlik,
Yost Smith, Donald To, Julie Vroman

Alfred W. Allen Awards:

Michael Brendel, Tracey Brommer, Jian Wei
Cheng, Varistha Chobpattana, Matthew Dejarld,
Daniel Fairfield, Luke Jungles, Kang Jie Lim,
Chuan Hui Moh, Jonathan Naber, Blake
Stevens, Dylan Stradley

Materials Science and Engineering

Alumni Board Award: Courtney Skinner

Arthur L. Friedberg Awards: Kristina Bond,
Sandhya Chandrasekaran, Jonathan LeLah

2008 Alumni Awards

Loyalty Award

Christopher W. Ervin (B.S. Metallurgical Engineering '95)

Chris Ervin received his B.S. in Metallurgical Engineering from the University of Illinois in 1995. He began his career with The Timken Corporation in Canton, Ohio. While at Timken he worked as a Steel Business Associate, Process Metallurgical Engineer and Operations Coordinator on the Harrison Rolling Mill. In 2000 Ervin joined Gerdau Ameristeel as a Rolling Mill Senior Process Engineer in Jacksonville, Florida, and eventually held the position of Rolling Mill Superintendent. In 2006 he and his wife, Paula, relocated to the Quad Cities when he became the Plant Manager of the Wilton, Iowa facility.

He served on the University of Illinois Department of Materials Science and Engineering Alumni Board for five years and is a lifetime member of the UI Alumni Association. In addition, he has recruited MatSE undergraduates for his companies and given back to the department. Most recently, he visited campus to talk to undergraduates about Gerdau Ameristeel and careers in the steel industry.

Loyalty Award

Larry L. Fehrenbacher (B.S. Ceramic Engineering '61, M.S. Ceramic Engineering '62, Ph.D. Ceramic Engineering '69)

Larry L. Fehrenbacher received a bachelor's, master's and doctorate degrees in Ceramic Engineering at the University of Illinois. A distinguished Military ROTC graduate, he spent 20 years as an active duty officer in assignments which included 15 years of laboratory experience at Wright-Patterson AFB in conducting, managing and transferring in-house R&D technologies and expertise to military product divisions, repair depots and private industry. His last five years in the Washington, D.C. area involved special staff assignments to the Chief Scientist and Deputy Chief of Staff, Contracting and Manufacturing, of Air Force Systems Command and Deputy Under Secretary of Defense for Research and Advanced Technology, where he assisted in the development of major technology and productivity strategies for the Air Force and Department of Defense.

On military retirement, Fehrenbacher started Technology Assessment and Transfer, Inc. in 1983 with the goal of developing and commercializing new ceramic and tribological materials and processes for a variety of defense, biomedical and industrial applications, primarily through government funded R&D. The transition into commercial products has been occurring through the establishment of wholly owned

subsidiaries such as Ceramic Composites, Inc. in 1991, cooperative development programs with end-users and technology licensing. TA&T and CCI's primary areas of interest are magnetron sputtered, multilayer thin films for superior wear, erosion and corrosion resistance, low cost chemical vapor infiltration of fiber reinforced ceramic composites, improved interface coatings for ceramic composites, toughened monolithic ceramics, freeform fabrication of functional ceramics for thermal management, propulsion and medical applications and intelligent process control of advanced materials processes.

During the past eight years, Fehrenbacher has spearheaded the development and commercialization of transparent spinel armor and optical components at TA&T. This has involved extensive development and refinement of both hot pressed and pressureless sintering fabrication methods. He also provides scientific and technical consulting on advanced materials technologies for government agencies such as DARPA and the National Science Foundation.

Distinguished Merit Award

Dale Holloman (B.S. Mining Engineering '58)

Dale Holloman enrolled at the University of Illinois in 1954 following a tour of active duty in the U.S. Army during the Korean War. He graduated in 1958 with a B.S. in Mining Engineering and began his professional career as a Petroleum Engineer with Texaco, Inc. Holloman was employed by Texaco in drilling and production for more than 20 years, beginning as a field engineer and eventually becoming Assistant Division Engineering



Chris Ervin



Larry Fehrenbacher



Dale Holloman

Manager (Operations) for Texaco's Midland, Texas division. He left Texaco and was employed as the Operations Manager for a Midland-based independent producer for a short period. He then became employed as Chief Petroleum Engineer for Deminex U.S. Oil Company, a Dallas based independent oil and gas producing company. Deminex was a relatively large producer with oil and gas interests in 14 states, active in development and exploratory drilling. Four years after joining the company, Holloman became President and Chief Executive Officer of the company and named to its Board of Directors. He held that position until the company was sold in 1992. In 1994, he and his wife decided to return to their roots in southern Illinois. He is a Licensed Professional Engineer in Illinois and Texas (and formerly Oklahoma). After returning to Illinois, he served as a petroleum industry engineering and management consultant.

During this time, Holloman also continued his military career and retired as a colonel with more than 30 years service. He has two outstanding achievement Freedoms Foundation at Valley Forge awards, and he is a graduate of the U.S. Army's Command and General Staff College in Ft. Leavenworth, Kansas. He was honored in a formal ceremony at Ft. Benning, Georgia, in 1987 by being placed on the Honor Roll in the Infantry Officer Candidate School's Hall of Fame. In 1998 he was presented with the Legion of Merit, recognizing his earlier service culminating as Commander of the 4266th U.S. Army Logistics Command in Midland, Texas.

Young Alumnus Award

Paul Clem (Ph.D. Ceramic Engineering '96)

Paul Clem is a Principal Member of the Technical Staff in the Microsystem Materials Department at Sandia National Laboratories, where he has worked for the last 12 years on functional materials development and device fabrication for integrated electronics, MEMS devices, RF devices and superconducting applications. He has published 70 papers, received three US patents and is chair-elect of the Electronics Division of the American Ceramic Society, a general chair of the IEEE Ultrasonics, Ferroelectrics and Frequency Control Division and an associate editor of the Journal of the American Ceramic Society. Clem served as chair of the 2008 IEEE International Symposium on Applications of Ferroelectrics and received the 2007 IEEE UFFC Ferroelectrics Young Investigator Award for work on integration of ferroelectric and superconducting films with copper and nickel electrodes. He is a third-generation Illini and lives in Albuquerque with his wife, Christina, and three-year-old son Stephen.

His management experience started in 2003 as a Team Leader for the Alloy Design and Development Team which primarily investigated processing-structure-property relationships of materials as they relate to engineering and physics requirements.

Distinguished Merit Award

Robert M. Jecmen (B.S. Ceramic Engineering '71)

Robert Jecmen worked for Intel Corp. for 24 years before retiring in 2000. His most recent position at Intel Corp. was Vice President of the Intel Architecture Group and General Manager of the Intel Mobile Products Group. During his tenure as General Manager of Intel's Mobile Products Group, he managed the development and implementation of new mobile PC building block products and technologies that more than doubled the performance of mobile PCs while reducing system power consumption. Intel's Mobile Products Group revenue also doubled to several billion dollars during Jecmen's tenure as Vice President and General Manager. Prior to that, he was Vice President of Intel's Technology and Manufacturing Group where he was responsible for multiple generations of microprocessor and flash memory silicon technology development and production. Jecmen managed the operation of Intel's California cleanroom fabrication plant. He holds two patents in silicon technology.

Presently, he is working as a private consultant and is Chairman of the Board of PolyFuel Corporation. PolyFuel is a developer of fuel cell technology and membranes for portable power applications. He also is an independent director of Ovonyx, Inc. and Evox, Inc. Ovonyx, Inc. is a private technology company developing alloys in the emerging phase change memory field. Evox, Inc., another private technology company, has developed secure wireless communication technologies for both commercial and military applications.

Jecmen received a B.S. degree with highest honors in Ceramic Engineering from the University of Illinois in 1971 and an M.S. degree in Materials Science Engineering from the University of California, Berkeley in 1973.



Department Head Ian Robertson presents Robert Jecmen with the Distinguished Merit Award at his home in Alamo, California.

All in the Family

This past spring, the MatSE Department welcomed another generation to its ranks of 3,000 plus alumni. **Tom Miller** (BS MatSE '08), son of **Patricia Scopelite-Miller** (BS Met '79, MS Met '86) and **Tom Miller** (BS Met '79) graduated with **Kristina Bond** (BS MatSE '08), daughter of **Tom** (BS Met '77, MS Met '78) and **Lynn Bond** (BS Industrial Eng '77, MS Industrial Eng '78).

than calculations," Patricia said. Like Tom Sr., her father also recommended Metallurgical Engineering. She is a Senior Technical Manager for Bohler Uddehon in Elgin, Illinois.

In addition to Tom Jr., they have three other children: Jennifer Clare, 24; Joseph Edward, 20 and Daniel Phillip, 17. Tom Jr. is now employed at Arcelor Mittal and living in South Bend, Indiana.

Tom Jr. went into metallurgy like his parents and decided upon the University of Illinois because of its No. 1 ranked undergraduate program in materials. "Could it have been the dinner conversation between mom and dad?" Tom Sr. said. It sounds like parental influence strikes again.

Tom Sr. said he would like to see a reunion of his classmates and encourages fellow alumni to donate to the department.

The Bond Family

Tom Bond decided to study metallurgy when he was a senior in high school. He was good in science and math, so engineering was a good choice. "My counselor told me I had to choose a major, and metallurgy looked more hands-on, so that is what I chose," Tom said. He spent 10 years at Caterpillar and 20 years as President of a family business (technical sales).

A few years ago, he made a career change—to a high school math teacher. Both Tom and his wife, Lynn, teach math at Plainfield High School. He credits Professor Bob Bohl with influencing his decision to go into education. He said he has sent a few students to the College of Engineering at Illinois, but none to MatSE yet. "I am working on it," he admitted.

The Bond family includes Diana, 26; Alan, 24 and Kristina, 22. Alan is a Mechanical Engineering student at the University of Illinois-Chicago, and Diana is a math teacher like her parents. Kristina is back at Illinois, working toward her master's degree in Materials Science and Engineering.



Tom Miller Sr., Pat Scopelite-Miller, Tom Miller Jr., Kristina Bond and Tom Bond are pictured at the MatSE Graduation Lunch.

The Miller Family

Tom Miller Sr. came to the University of Illinois for Electrical Engineering but changed his mind. "My father suggested Metallurgical Engineering," he said. He is now using his degree as the Vice President of Manufacturing for Chicago Powdered Metal Products Company in Schiller Park, Illinois.

Tom Sr. met Patricia in the winter of 1978 when they were both in study groups and shared classes. They married in 1981. "I had wanted to go into engineering, but wanted a field which would be focused on science rather

Donald W. Hamer Fellows 2008–2009

Front row: Corissa Lee, Andrew Hafeli, Brett Walker, Brayden Glad, Stephen House

Back row: Kevin Arpin, Andrew Cloud, Austin Pickett, Max Gibiansky, SukWon Hwang, Wenjiao Wang, Analisa Russo

Not pictured: Kyou Hyun Kim



Lawrence Gagin (BS Cer '42) used his education at Illinois as an Army Engineer in World War II, including a year in Europe, throughout his career and as a consultant. He developed Dyna Quartz pure silica fiber insulation for Boeing Dyna-Soar, the first vehicle designed to return from space. This product is now the exterior insulation on all space shuttles. His achievements include patents for low lead television glass, low viscosity glass for glass fibers, high temperature glass for fibers and improved glass for fibers for reinforcing plastics.

Allen Hollett (BS Mining '46) visited the University of Illinois in July. He said much had changed in the 20 years since his last visit to campus. Allen and his wife live in Gig Harbor, Washington. He worked in consulting in North Carolina and worldwide.

William Jandeska (BS Met '67, MS Met '68, PhD Met '71) has joined Prima Problem Solving's new Operational Specialist Services. He provides advisory services for clients in the areas of automotive applications, current and future needs, powder metallurgical process development, application problem solving, technical management and new product launch assistance. During his 34-year career with General Motors, he has been dedicated to the technical advancement of materials and processes.

James Frakes (BS Cer '68, MS Cer '72) is clinical professor of medicine at the University of Illinois College of Medicine at Rockford and in private practice with Rockford Gastroenterology Associates, Ltd., in Rockford. He has presented approximately 300 invited presentations at national and international meetings and has authored almost 100 articles and edited four books. In 2007, the American Society for Gastrointestinal Endoscopy presented him with one of their highest honors, the Distinguished Service Award.

Michael Morache (BS Cer '72) is CEO of Plato Learning Inc. in Minneapolis.

Steve Grant (BS Cer '81) joined TriQuint as Vice President of worldwide operations following 27 years at Intel Corp., where he most recently served as vice president of Intel's technology and manufacturing group in Oregon. Steve will be responsible for TriQuint's global manufacturing including purchasing, manufacturing quality and

supply chain operations. During his tenure at Intel, he managed the fab manufacturing network and was key to driving the manufacturing structure and efficiency improvements to record performance levels.

Greg Roberts (BS Met '88) is employed with Crystal Vision, Inc. in their Quality & Technical Consulting division. He lives in St. Petersburg, Florida.

Michael Conlon (BS Met '90) visits the University of Illinois campus to recruit students for his employer I/N Tek and I/N Kote. His wife is expecting their third child this fall. The Conlon family lives in South Bend, Indiana.

David Forbes (BS Met '90, PhD MatSE '95) is currently an Associate Research Professor in the NanoPower Research Labs at Rochester Institute of Technology. His research is focused on next-generation photovoltaic cells and nanomaterials. David's wife, Peggy, and children Cameron, 15 and Sydney, 10 currently live in Medina, Ohio.

Kevin Stanger (BS Cer '92) is Senior Property Claim Specialist for Southwest Property Claims in Irvine, California. He has worked on insurance claims including large commercial losses, involving manufacturing losses (cheese plants in SoCal, an arc furnace loss in Indiana, waferfab facility in France), commercial construction, resorts losses (ski resorts, Yosemite Lodge), stock losses, business income losses, ocean cargo/marine surveying, farm ranch/vineyard, residential, etc. "Although the degree was not utilized for its intended purpose, I found an engineering degree really helps in assessing damage, critical thinking and running the numbers in this type of business," Kevin said. "There are even some companies, like FM Global Insurance, that want only adjusters with an engineering background."

Nathaniel Mohler (BS MatSE '01) recently started a new position with the Portland Cement Association as a concrete engineer.

Gerald Wilson (PhD MatSE '07) will marry Kristen Gilbert on November 29, 2008. Gerald is a development scientist at Automatic Materials in Champaign. Kristen received her master's degree in social work from the University of Illinois and is a coordinator of residential services at the Mental Health Center of Champaign County.

Alumni Gifts Provide New Scholarships for MatSE Undergraduates

The Materials Science and Engineering Department is pleased to add two new undergraduate scholarships to its roster of student awards: The G. Ronald and Margaret H. Morris Scholarship and The Gerson B. Bilow Scholarship.

These scholarships were awarded for the first time on April 4, 2008, at the MatSE Awards Banquet, held this year at the Alice Campbell Alumni Center. With the soaring cost of tuition at the University of Illinois and elsewhere, students and families depend on these scholarships even more to help finance their education. The department would like to express its gratitude to Ron and Peg Morris and Gary Bilow for their support of undergraduate materials education at Illinois.



Gary Bilow and his scholarship recipient, Nicole Cieslak.

Gerson (Gary) Bilow (BS Met '65, MS Met '67)

After reaching his 40th anniversary with The Boeing Company, Gary Bilow decided to establish an undergraduate scholarship. He reflected on his career in many different non-management and management assignments working in R&D and production, then came to the conclusion that he owed something to the University of Illinois. "Without the excellent education and faculty in the Department of Metallurgical Engineering, I would not have had all these opportunities," he said.

Gary considered the many ways of contributing to the MatSE Department. In the end, he settled on a living contribution of a student scholarship so that subsequent students could follow in his footsteps and have a satisfying, productive and long career.

Gary did not have a scholarship when he was at the University of Illinois. He worked as an undergraduate research assistant under Professor Paul Beck. He was a graduate research assistant with Professor Marvin Wayman as his master's thesis advisor.

He said he visits campus for MatSE Alumni Board meetings and attended the spring awards banquet where he met his award recipient in person. "Even though I live in the St. Louis area, I still have close ties to Chicago," he said. "My two sons live there; neither are engineers."

The first Gerson B. Bilow Scholarship recipient, Nicole Cieslak, is from Wood Dale, a suburb of Chicago. Nicole is in the biomaterials area of concentration in the MatSE Department. This past summer she interned at Baxter Healthcare in Round Lake, Illinois. As an undergraduate at the University of Illinois, she has visited grade schools to perform lessons in hands-on science (Kids and Chemistry Outreach Program, 2005-2007) and to teach high



Ron Morris and his scholarship recipient, Evelyn Huang.

school students about materials science (MatSE Mobile, 2008). She enjoys running and is a member of the Illini Runners Run Club.

Ron (BS Met '59) and Peg Morris

When Ron Morris graduated from East St. Louis Senior High School, scholarships were not nearly as prolific as they seem to be today. While he received a monetary award from Washington University in St. Louis, the University of Illinois was his only choice because it was the best engineering school in the state and the only one he could afford.

Ron's wife, Peg, did not receive any scholarship help either. She had great academic credentials out of Thornton Township High School in Harvey, but no funds came her way, even though her father passed away during her high school senior year. With help from her mother, plus part-time work, she paid her way.

"Neither of us endured financial hardship as do some students today," Ron Morris said. "We remain mindful of our success, and continue to search for ways to repay for the value that we received at the University of Illinois."

Several years ago, the couple decided to make a financial commitment to Illinois in support of the various entities in which they were involved as students. Their financial support has been directed to MatSE through the establishment of the Morris Professorship, to the University Library Fund through the acquisition of specific literary materials and to the athletic department through its Fighting Illini Athletic Fund.

Over the years, Ron talked to his former professors, Bob Bohl and Charlie Wert, about the scholarship funds that they had established within MatSE. "Both talked of the great pleasure they received by involving themselves in the lives

continued, page 16

Alumni Gifts Provide New Scholarships, continued

of their student scholarship recipients," he said.

This past year, Ron and Peg decided to initiate a similar program by establishing the Morris Scholarship within MatSE. Ron attended the spring awards banquet and had dinner with the 2008-2009 Morris Scholar, Evelyn Huang. The couple is proud to be able to support her academic progress through their scholarship.

Evelyn Huang was born in Urbana in 1987 when her father **Jia-Hong Huang** (Ph.D. Met '89) was studying for his Ph.D. at the University of Illinois. Her family returned to Taiwan in 1989, but she came back to Illinois as a teenager and attended Champaign Centennial High School.

Huang said she enjoys meeting new people from different backgrounds and trying international foods. She has

been involved in extracurricular activities at the University of Illinois and is an active member of Illini Chinese Christian Fellowship (ICCF), serving in various positions such as bible study leader, quad day coordinator and Spring Retreat games coordinator. In addition, she has been working with Professor Gerard Wong since her freshman year on a Cystic Fibrosis project and an antimicrobio oligomer project.

"It is always an honor to receive a scholarship, and this scholarship means much since I got to meet with Mr. Morris," she said. "Mr. and Mrs. Morris' generosity also provided me a model that I hope to follow someday. I hope one day I can also contribute back to the department that has given me so much."

MatSE Calendars for Sale

Attractive 12-month calendar features artistic images from graduate student research in the Department of Materials Science and Engineering at the University of Illinois. The calendar includes TEM, SEM, STM and optical images, as well as images from computer simulations. All black and white images have been enhanced with color, so every month has beautiful, full-color images.

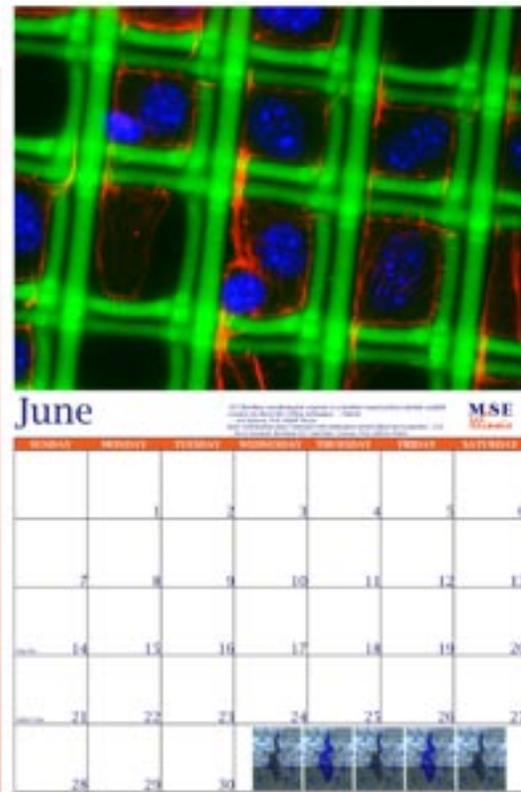
Calendar dimensions are 17" x 11" when fully opened; pages are 8.5" x 11."

Cost for each calendar is \$18, which includes shipping within the United States. There is an extra charge for shipping overseas. To order your calendar, please send a check (made payable to Corissa Lee) to:

MatSE Calendar

Department of Materials Science and Engineering
1304 W. Green Street
Urbana, IL 61801

For more information, e-mail matsecalendar@gmail.com.



The calendar was created by graduate students in the Materials Research Society (MRS) chapter at the University of Illinois.

In Memoriam

Fredrick Adolf Petersen (BS Cer '37) died September 9, 2008, in Lexington, Massachusetts. Petersen was born and raised in Chicago and graduated from the University of Illinois. He received his graduate degree from Ohio State University. He worked for the University of Illinois as a research engineer in the Ceramics Department, then moved to Cleveland Heights, Ohio, in 1952 where he worked for Hunter Thomas Associates, eventually became president of that company and retired in 1978. He was a devout member of the Lutheran Missouri Synod church his entire life. Petersen traveled extensively with Gladys, his wife of 61 years, and summered for more than 30 years in Chilmark, Martha's Vineyard, where he spent his best moments racing his sunfish, the Flying Frog, in the Wednesday and Saturday Menemsha Pond races until he was in his late

80s. His life was full to the end and surrounded by family. Survivors include his daughters, Karen, Ingrid and Kristin, grandchildren and great-grandchildren.

Robert Giles Sr. (BS Cer '42) passed away February 11, 2008, in Herrin, Illinois. Robert married Mary Katherine Knight on December 27, 1941. Together they shared 66 years of marriage. He was a member of the First Baptist Church in Marion, Ill., where he served as deacon, treasurer and chairman of ushers. He was vice president of Giles Electric for more than 40 years. He received his Life Master as a bridge player, for which he had accumulated many points. Survivors include his wife, Mary Katherine, two sons, two daughters, 11 grandchildren and 16 great-grandchildren.

In Memoriam

William L. Rudin (BS Met '42) died March 15, 2008. His education and experience as a metallurgical engineer combined with his Executive MBA made him a highly sought out consultant to foundries and manufacturing companies. He was an avid bike rider, tennis player and golfer up until his passing and was featured as a senior rider in "Bicycle Magazine." Survivors include his wife, Leona, two children and five grandchildren.

William Prentice Jr. (BS Cer '44) died December 7, 2007. He served in the U.S. Navy from 1943 to 1946 and later worked for 39 years as a ceramic engineer for General Electric in Kentucky, Pennsylvania and Ohio, specializing in glass technology and manufacturing. He married Evaree Buffin in 1952 in Lexington, Kentucky. She died in 1961. He married Margaret Reid in 1963 in Willoughby, Ohio; she survives him. He is also survived by a daughter, Carolyn; son, Richard and two grandchildren.

Lewayne Nicholas Wall (BS Met '47) died January 26, 2008, in Guntersville, Alabama. He served as captain in the Army Air Force in WWII. He married Mary Maher and then graduated from the University of Illinois. He then moved his young family to Chattanooga to work as a metallurgical engineer and then as a manager of quality assurance at Combustion Engineering. He retired after 35 years. His wife, Mary, died in 1982. He married Emily Pepper Smotherman in 1984. While in Chattanooga, Lewayne was a member of the Catholic Serra Club, serving as vice president. He was a parishioner at our Lady of Perpetual Help and later at St. Jude Catholic Church. He was a member of both councils of the Knights of Columbus and was honored as a lifetime member after 60 years of service. He also was active in Chattanooga Senior Neighbors, Memorial Hospital, the American Red Cross and the Boy Scouts. In Guntersville, he volunteered for Hospice of Marshall County and RSVP, teaching chair caning. He was a member of St. Williams Catholic Church and the Knights of Columbus Holy Council 12618. Survivors include his wife of 24 years, Emily Wall, son, three daughters, stepson, stepdaughter, six grandchildren and three great-grandchildren.

Lynn Rowells (BS Met '48) died in February 2008 in Western Springs, Illinois. He was retired from Sears Roebuck and Company where he had been employed as a Metallurgical Engineer. He was a veteran of the U.S. Navy and served in World War II. He leaves behind a wife, Carol, two daughters and two grandchildren.

Marvin Arthur Pohlman (BS Met '51) died February 25, 2008, in Florence, South Carolina. He developed a fatigue testing laboratory for jet engine metals, skin materials for the Mercury Space Capsule and the Apollo and special wire for the Polaris Submarine. He established the first steel mill in South Africa. Marvin was a Vice President of Nucor Corporation and of Eastern Stainless Steel and President of Tally Metals Tech. Inc. As president of Pohlman Steel Inc., he was a consultant to various domestic and international steel mills and oversaw the building of a steel mill in Trinidad and provided senior technical specialists for the operations. He held patents on two alloys, extensively used in jet engines and in aerospace applications.

Richard B. "Dick" Greenwalt (MS Met '53) passed away in San Mateo on April 12, 2008. He was known around the world as an expert in direct reduction, iron making and electric steelmaking. He earned his bachelor's degree in materials science and engineering from the Massachusetts Institute of Technology in 1951. His career took him around the world and spanned from 1957, where he began working for Cleveland-Cliffs, McKee, Kaiser Engineers and Bechtel Mining and Minerals, where he retired in 2002. He was affiliated with the American Iron and Steel Technology Institute and the American Society for Metals. He also worked for the EPA and started the Diablo Deli in Danville. In 1955, he met and married Irene Braunel of Manitowoc, Wisconsin, his constant companion of 48 years, until her passing in 2004. A loving husband, father and grandfather, he enjoyed traveling, reading, music and family activities. He is survived by a daughter, Janell; a son, Richard and grandchildren. Memorial contributions may be made to UCSF Foundation, Cancer Programs—Prostrate, Box 45339, San Francisco, CA 94145-0339.

Kenneth Roger Wilson (BS Met '56) passed away on January 6, 2007. He came to California to work in the Aerospace industry as an engineer in Metallurgy. He lived in Rolling Hills Estates for more than 30 years, and retired in Simi Valley. He always will be remembered for his dry sense of humor and ability to engage in friendly conversation to all. He was an intelligent, well read man of high moral character. His passion was model railroading and he was actively involved in the NMRA and had many friends who will miss his expertise and willingness to help. His lifelong love of gardening has created a beautiful place for his family to remember him. He is survived by his wife of 50 years, Barbara J. Wilson, and children Linda, Diana, Leslie and Clarke and five grandchildren. Always a charitable man in life, the family would like to continue donations in his name to the Alzheimer's Association, the Yosemite Fund and PBS.

Edwin Jackson (BS Met '55, MS Mining E '57), of Houston, Texas, passed away December 12, 2007. He and his wife of 55 years, Laura Jolly, had a varied and exciting life, living in and visiting several foreign countries. He also served in the U.S. Navy during the Korean War in the communications division and was stationed near Casablanca. He was born and raised in Champaign, attending Champaign schools and graduating from the University of Illinois. His career was in banking, investments, and oil interests. He is survived by his wife, three daughters, two sons, 15 grandchildren and eight great-grandchildren.

Dale Giesecking (BS Cer '60) died January 25, 2008, in Kent, Washington. He was retired from Boeing where he had worked as a manager in Research Development. He is survived by his wife, Patricia; son, Scott; daughters, LeeAnn and Loni and seven grandchildren. Memorials may be made to the MatSE Department, University of Illinois, 1304 W. Green St., Urbana, IL 61801.

Thank you for your support of MatSE!

The student awards highlighted in this issue would not be possible without your support.

The list of donors includes alumni and friends who have helped maintain MatSE's outstanding reputation. Included are individuals who have directed their gifts to MatSE between July 1, 2007 and June 30, 2008.

We check the list carefully, but if we have overlooked you, please contact us so that we can correct our records. Some MatSE alumni chose to support other units of the University of Illinois; those gifts are not listed here but will be acknowledged by those units. If you wish to direct gifts to MatSE, please indicate MatSE on your check and on the donor form. For further information about making a gift, contact Cindy Brya, brya@illinois.edu, (217) 333-8312. Individuals listed in boldface are first-time donors to MatSE.

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Professor John Abelson enjoys a meal with Shayma Mouhammed, a junior in MatSE, at the undergraduate picnic on September 16.



Professor Jim Economy visits with his Ph.D. student Chaoyi Ba and Chaoyi's wife, Ting Liu, at the graduate student picnic on August 20.

We want to hear from you!

Send comments and letters to the editor to MatSE News, Department of Materials Science and Engineering, University of Illinois at Urbana-Champaign, 201B MSEB, 1304 W. Green Street, Urbana, IL 61801 or email brya@illinois.edu

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