A large, high-resolution fluorescence microscopy image of cells. The cells are stained with a green dye that highlights their internal structure, particularly the cytoskeleton, which appears as a dense network of green filaments. The nuclei of the cells are stained with a blue dye, appearing as bright blue, roughly circular structures. The background is black, making the green and blue structures stand out.

Materials Properties Within Cells: A New Frontier

.....
Learn more on page 3



In This Issue:

- 3 Department News**
- › Cover story: Properties in Cells
 - › Bettinger Named Top Innovator
 - › MSE Ranked in Top 10

- 4 Faculty News**
- › McHenry Wins \$1.7 Million
 - › Towe Earns Global Attention
 - › Massalski Recognized Internationally
 - › News Updates

- 8 Alumni News**
- › Profile: Kelly Collier
 - › Profile: Paul Browning
 - › News Updates

- 10 Student News**
- › MSE Debuts New Lounge
 - › Commencement 2011
 - › News Updates

Greetings to our MSE alumni! An exciting development has recently placed Materials Science and Engineering at the forefront of national science policy and spotlighted Carnegie Mellon. On June 24, President Barack Obama visited campus and made a major announcement affecting MSE. In his words, “To help businesses discover, develop, and deploy new materials twice as fast, we’re launching what we call the Materials Genome Initiative.” The Materials Genome Initiative has the overarching goal of compressing the time between materials discovery and incorporation into manufactured devices; therefore, it addresses one of the most significant barriers to innovation. I believe that this initiative has enormous potential to benefit engineering education, the economy, and national security.

There are a number of exciting challenges associated with the Materials Genome Initiative. First, it will be necessary to change the way engineers are educated. Materials engineers must be taught to consider the components that materials are used in, and how they will be manufactured. At the same time, the engineers who design devices must be taught to understand that materials of construction can have multiple and variable properties that can be manipulated and optimized locally through the control of structure.

Second, it will be necessary to closely integrate modeling and simulation with experimental studies throughout all phases of development. High-throughput, automated, low-cost experiments will be needed to generate the data needed to drive these simulations.

Finally, the tools necessary to realize the visionary goals of the Materials Genome Initiative—both databases and software—will have to be developed and made broadly available if the initiative is to be successful.

The MSE Department at Carnegie Mellon is already taking steps to respond to the Materials Genome Initiative. In Fall 2011 we conducted a faculty search to strengthen our expertise in computational materials science. In the next edition of *MSE News*, I should be able to announce the outcome of that search. We are also examining our curriculum to assess how we are incorporating modeling and simulation in our courses, and seeking opportunities to enhance this aspect of our program. You will be hearing more about this as the initiative grows.

There are many other positive developments at MSE that are covered in this newsletter—including *U.S. News & World Report* ranking our undergraduate program in the top 10 nationwide. Our faculty, students, and alumni continue to win awards and recognition. It is an exciting time to be a member of the MSE community!

On a closing note, I’m happy to report that I was joined by about two dozen alums at the annual Saltminer’s Dinner in Columbus at the October MS&T meeting. It was great to catch up with old friends and meet some new alumni. Next year, the MS&T meeting is in Pittsburgh, and we are planning to hold the dinner on campus. Please also mark your calendars for our annual Spring Carnival Deck Party on April 20. I hope to see you there!

Gregory S. Rohrer, W.W. Mullins Professor

“The MSE Department is taking steps to respond to the Materials Genome Initiative.”

COVER STORY

Materials Properties Within Cells: A New Frontier

The materials inside human cells have properties that are similar to complex polymer solutions. There are over three trillion cells in the human body, and each has the same DNA or genetic code. The expression of DNA, which controls most aspects of cell fate, is related to the structure and organization of the genome. The integration of material properties and cell function may yield a new understanding about how forces impact cells during development, during the aging process, and in diseases such as cancer.

Turi Alcoser and Matthew Biegler — undergraduates in Materials Science and Biomedical Engineering — work with **Professor Kris Noel Dahl** to determine how material structures organize inside human cells.

Biegler examines structural proteins inside the nucleus to understand how forces can be transmitted by interconnecting the actin inside the cell, through the nuclear membrane, and into the genome. By characterizing newly discovered spectrin proteins inside the nucleus, Biegler may have found a functional link between structure and function.

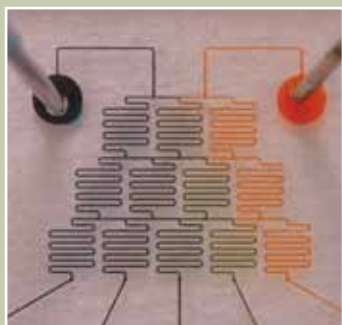
Alcoser is examining how reorganization of genome structures relates to specific gene expression. The stresses imposed within a cell from actin structures can reorganize the DNA when cells are exposed to forces and chemicals. A combination of rheological characterization and gene labeling within the cell allows Alcoser to determine how nuclear structural changes are related to gene expression.

The cover image for this edition of *MSE News* was created by Alcoser. He won the Department's 2011 *Krivobok Brooks Award for Excellence in Metallography* for this image, which shows osteosarcoma actin structural response to compression.



MSE NEWS UPDATES

Bettinger Named Top Young Innovator



Bettinger's research focuses on synthetic microvascular networks for rapid characterization of electronic properties of solution-processed semiconducting biomaterials.

include new synthetic materials that mimic the natural properties of soft tissue and biodegradable electronics that could usher in a new era of electronically active implants.

Assistant Professor **Christopher Bettinger** has been selected to *Technology Review* magazine's TR35 list, which honors top innovators under the age of 35.

Bettinger has worked at the interface of materials science and biomedical engineering for more than 10 years, conceiving and producing a number of innovations that aim to better integrate medical devices with the human body. These technologies

Bettinger's innovative work is designed to lead to broader advances in the field of medical devices to reduce the burden of human disease and improve overall quality of life.

.....

MSE Ranked in Top 10

The Department of Materials Science and Engineering has been ranked as the #10 U.S. undergraduate materials engineering program, according to a recent study by *U.S. News & World Report*. Rankings are based solely on the peer judgments of deans and senior faculty who rate each program they are familiar with. "This honor obviously demonstrates the stellar reputation of MSE among our peers, who best understand what makes an undergraduate engineering program successful," says **Department Head Gregory Rohrer**. "It is a milestone achievement to be ranked in the top 10 among all materials engineering programs nationwide."



McHenry Team Wins \$1.7 Million DOE Grant

Researchers to Focus on Energy Conversion for Large-Scale Transformers



Professor Michael McHenry is the lead researcher on an academic-industry-government team that recently won a three-year, \$1.7 million grant from the United States Department of Energy (DOE). The team is investigating new materials and processes that will improve power invertors for multi-core industrial transformers. The team's

efforts are expected to improve the economic success and global competitiveness of America's manufacturing sector.

"Our research will ultimately help make power transformation in renewable energy conversion more economical and efficient in our complex energy grid system," says McHenry. "Our work aims to bridge materials development, manufacturing, component design, and economic analysis in one cohesive multidisciplinary team."

To develop advanced new technology for lightweight, solid-state, medium-voltage energy converters for large-scale energy grid transformers, McHenry tapped experts from academia, industry, and the Los Alamos National Lab in New Mexico.

"This research is critical to developing high-frequency inductors that can ultimately reduce the cost of site preparation and installation for large-scale power transformers," says team member Joe Huth, Head of Research at Pittsburgh-based Spang Inc., a world leader in the production of soft magnetic materials and cores for industrial control applications.

According to McHenry, one of the primary goals of the research effort is substantially reducing the size of a standard industrial grid transformer.

"In addition to the reduction in size and cost, the new solid-state power convertors inherently enable advanced control techniques," notes team member Michael Bland, Engineer at the Los Alamos Lab. "Smart power convertor substations will help stabilize the grid when a significant fraction of our energy is from renewable resources."

Team member Gregory Reed, Professor of Electrical and Computer Engineering and Director of the Power & Energy Initiative in the University of Pittsburgh's Swanson School of Engineering, will assess complete systems engineering and turnkey installation aspects of the advanced convertor technology for renewable energy applications, including economic impacts. "This grant is an important component of the continued growth of Pitt's electric power and energy research for grid infrastructure efforts, and we are excited to be part of this talented team," Reed says.

MSE: A Tradition of Energy Leadership

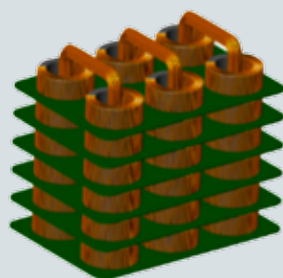
"This is both an outstanding award and an excellent example of the multidisciplinary, problem-solving environment our faculty members promote and develop," says MSE Department Head Gregory Rohrer. "We

are extremely proud of Michael McHenry's innovative research initiatives as we seek to transform energy research and education. This is just the latest success for the leading energy experts within the Department of Materials Science and Engineering."

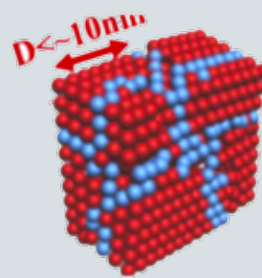
The work of McHenry's multidisciplinary research team supports the principles of the new

Energy Futures Institute at Carnegie Mellon, which will debut in 2012. This initiative is intended to establish Carnegie Mellon University and the Pittsburgh region as the world's leading center for enabling and managing the transition to a sustainable energy future. Through energy-focused research and education—including the new Master's degree program in Energy Science, Technology and Policy (ESTP)—the University hopes to lead in the development of new technologies and policies for the production, transport, and efficient use of energy.

Core courses in the new ESTP program are taught by MSE faculty, including Professors Yoosuf Picard, Sridhar Seetharaman, and Jay Whitacre—further evidence of the Department's continuing leadership in energy-related research topics.



Multi Core Transformer (MCT) Using Nano-composite Magnetic Materials



Towe's Research Earns Global Attention

Investigations Focus on New Substrates for Laser Diodes



Professor Elias Towe is garnering international attention for his cutting-edge research efforts focused on improving the performance of shortwave laser diodes. In his innovative work, Towe is investigating new substrates that will support green laser diodes; one substrate proposed by his group is the ternary compound of $\text{Ga}_{0.85}\text{In}_{0.15}\text{N}$.

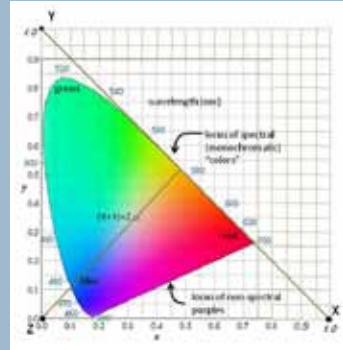
There is a global race to identify new technologies that will support the green portion of the laser-diode spectrum, and Towe's research group at Carnegie Mellon is an acknowledged leader in this effort. An article in *LaserFocusWorld* last summer called Towe's work with innovative new substrates "an intriguing possibility for the future." *Semiconductor Today* has also published two articles highlighting Towe's groundbreaking materials research.

Green Laser Diodes: The Last Frontier

Ever since the introduction of laser technologies, there has been a global push to expand into shorter and shorter laser-diode wavelengths. The initial effort was focused on moving from the infrared to visible red wavelengths, which resulted in the development of red laser diodes, now a common technology. In 1995, researchers created the first viable blue laser diode. The only remaining gap is in the green portion of the spectrum, which requires emissions of around 530 nm.

Today, with the emergence of full-color laser displays and other applications, there is a new urgency around developing practical green laser diodes. Scientists have filled the technology gap temporarily by doubling the frequency of Yttrium Aluminum Garnet (YAG) lasers doped with the element neodymium to create green colors for displays—but true green lasers would be more compact, able to be directly modulated, and deliver a larger bandwidth that eliminates "speckle," or wavelength interference in displays.

Why is the development of green laser diodes such a challenge? Green lasers require larger direct bandgaps than are commonly available from standard laser materials such as arsenides and phosphides. While gallium indium nitride (GaInN) materials have shown promise in emitting green light outputs, the indium concentration must be increased when compared to the concentration of gallium—and this results in a semiconductor crystal that is especially subject to defects.



This illustration is the color space defined by the International Commission on Illumination, used to describe color perception by humans. The common standard used in most display systems is known as the CIE XYZ and xyY color space. Notice from the illustration how the color "white" can be reached from the coordinates X, Y, and Z to give $X+Y+Z$. There is a mathematical (matrix) relationship that links X, Y, Z, and the conventional primary colors of red, green, and blue (R, G, B).

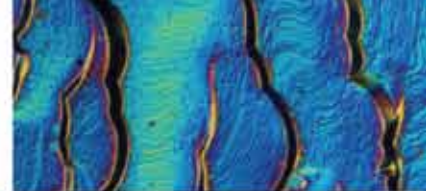
Pioneering Research at MSE

At the Center for Nano-Enabled Device and Energy Technologies (CNXT), Towe works to solve this problem using non-standard GaN substrates. By varying the concentrations among gallium, indium, and nitride, Towe's investigations seek to eliminate strong polarization-induced electric fields that separate positive charge carriers and negative charge carriers—which must combine to produce light. Such polarization can cause a significant shift in the light spectrum.

An important focus of Towe's work is optimizing lattice matching among the various materials used to grow device structure on his substrates. Because these materials have different lattice constraints, increasing the content of indium—which increases wavelength—also increases strains, defects, and dislocations in the device layers. Towe is attempting to overcome this challenge by using InGaN templates or "application-oriented nitride substrates" (AONS) to create longer wavelengths, while also maintaining strong lattice matching and structural integrity of the materials.

The $\text{In}_{0.15}\text{Ga}_{0.85}\text{N}$ substrates proposed by Towe could cover the blue, green, and red portions of the laser spectrum. This means that all the laser diodes needed for a full-color display could be produced on a single, monolithic substrate, resulting in simpler and less expensive fabrication.

"Although InGaN AONS do not exist at the present time, it is reasonable to challenge wafer manufacturers to create them in light of the envisioned numerous device applications that would be enabled by this class of substrates on various orientations," says Towe. Based on his research findings to date, Towe believes that his novel substrate material may also have exciting applications in ultraviolet detectors and emitters.



FACULTY NEWS UPDATES



Professor Marc De Graef has been announced as the recipient of the 2012 *Educator Award* from the Minerals, Metals, and Materials Society (TMS). This award is given to an individual who has made outstanding contributions to education in materials science and engineering. The honor recog-

nizes contributions in the classroom as well as the writing of textbooks, building of strong academic programs, outreach to high school students, or innovative ways of educating the general populace. De Graef will receive his award at the TMS annual meeting held in Orlando, Florida, in March.



Professor Sridhar Seetharaman has been selected to receive the 2011 *John F. Elliott Lecturer Award* from the Association for Iron and Steel Technology (AIST). This award was established in 1990 to honor the late Professor John Elliott of the Massachusetts Institute of Technology for his many accomplishments and

leadership. The award objective is to acquaint students and engineers with the exciting opportunities in chemical process metallurgy, and to inspire them to pursue careers in this field. The recipient presents a lecture at three to five universities throughout the year following selection. The award is presented annually "in recognition of distinguished contributions in chemical process metallurgy and materials chemistry to the iron and steel industry."



Professor David Laughlin has been selected as an Honorary Member of the American Institute of Mining, Metallurgical, and Petroleum Engineers (AIME). *AIME Honorary Membership* is one of the highest honors that the Institute can bestow on an individual. It is awarded in appreciation of outstanding service to the Insti-

tute or in recognition of distinguished scientific or engineering achievement in the fields embracing the activities of AIME and its member societies. Laughlin was recognized for his "outstanding service to AIME through its TMS Society in the field of publishing as well as sustained excellence in teaching and research in the field of metallurgy and magnetic materials."



Assistant Professor Christopher Bettinger joined more than 70 of the brightest U.S. scientific researchers in September at the National Academy of Engineering's 17th annual U.S. Frontiers of Engineering Symposium, held at Google headquarters in Mountain View, California. Symposium participants,

ranging in age from 35 to 40, were selected from a pool of 315 applicants for their exceptional research and technical work in industry, academia, and government. Bettinger is developing new biomaterials for use in a wide range of biomedical applications, including regenerative medicine and drug delivery.



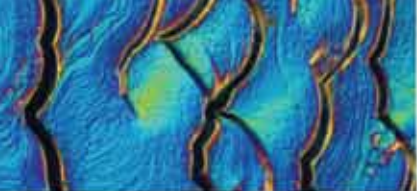
Professor Jay Whitacre — who recently received the *Gerard Elia Professorship* at MSE (see photo) — is already realizing incredible success with his MSE spinoff company called Aquion Energy, which was profiled in *MSE News* in Fall 2010. The company, which focuses on identifying viable, cost-effective

battery technologies, has won the *World Technology Award* in the category of Corporate Energy. Fellow winners in other categories include such household names and well-known innovators as Apple, Amazon, 3M, and Skype. Whitacre accepted his award at a ceremony held in October at the United Nations in New York City. The annual awards are presented by the World Technology Network (WTN), a global meeting ground, a virtual think tank, and an elite club whose members are all focused on the business and science of bringing important emerging technologies of all types. The WTN's membership is composed of approximately 1000 members from more than 60 countries, judged by their peers to be the most innovative in the technology world.



Left to right: MSE Department Head Gregory Rohrer, CIT Dean Predeep Khosla, and Jay Whitacre are shown at an October reception celebrating Whitacre's receipt of the Gerard G. Elia Career Development Professorship. Gerard Elia earned a B.S. in 1972, an M.S. in 1973, and a Ph.D. in 1977 in Mechanical Engineering from CIT. When he died in 1995, his parents Benjamin and Rose established the professorship to support an assistant or associate faculty member in CIT.





Massalski Earns International Recognition



Emeritus Professor Thaddeus Massalski has received a broad range of international recognition recently for his lifetime career accomplishments. An MSE faculty member since 1959, Massalski's research and scientific achievements range from alloy phase structures and stability to phase transformations, martensites, phase diagrams and thermodynamics, amorphous alloys, and magnetic materials.

On November 15, Massalski received the *Commander's Grand Order* from the President of Poland, Bronislaw Komorowski, at a special session of the University Senate at the Technical University of Warsaw. This honor recognizes those who have rendered great service to the Polish nation.

A native of Poland, Massalski was just 13 years old when World War II began. At the age of 16, and already fluent in English, he escaped from occupied Warsaw, followed a long and dangerous path through Germany and Austria to Switzerland and then to southern Italy. There, he joined the Polish Army Corps of the Eighth British Army, which was engaged in combat in that region. When the war ended, Massalski began his college education first in Italy, in Italian, and finally at Birmingham University, where in 1954 he obtained his Ph.D. in Physical and Theoretical Metallurgy.

On November 9, Massalski was recognized by the Technical University of Turin with a *Lauree Magistrali ad Honorem* in Materials Engineering. This honor was presented to celebrate Massalski's "great scientific merits and in particular for the excellence achieved by investigating phase diagrams, phase transformation, microstructures of metastable and glassy phases concerning nonferrous alloys."

Massalski was also recently chosen to receive ASM International's 2012 *J. Willard Gibbs Phase Equilibria Award*. Massalski was cited for "outstanding research and professional contributions to the field of alloy phase stability, phase diagrams, and thermodynamics." This award was

established in 2007 to recognize outstanding contributions to the field of phase equilibria. The award honors J. Willard Gibbs, one of America's greatest theoretical scientists. In addition to many other contributions, Gibbs laid the thermo-dynamic foundations of phase equilibria theory with his brilliant essay "On the Equilibrium of Heterogeneous Substances," published in 1876 and 1878 in the *Transactions of the Connecticut Academy*. The award presentation will be made at the ASM Awards Dinner during MS&T 2012, at a location and date yet to be determined.

Over the course of a long and distinguished career, Massalski has published over 200 papers and delivered more than 300 invited lectures and presentations. His textbooks have been translated into eight languages. He pioneered research on "massive transformations" and published a seminal paper on this topic in *Acta Materialia* in 1958. He is a member of three Foreign Academies and has been elected Fellow of numerous societies.

The Department of Materials Science and Engineering congratulates Professor Massalski on his most recent honors!



The chief of the Polish President's office, Minister Jacek Michalowski, presents Thaddeus Massalski (right) with the Commander's Grand Order for contributions to Poland as an internationally recognized professor and scientist.

SAVE THE DATE!

On Friday, April 20, the Department of Materials Science and Engineering will host its annual Deck Party in conjunction with Carnegie Mellon's 2012 Spring Carnival. This fun event grows in popularity each year—and we hope to see you there!



Alumni Profile: From Classroom to Boardroom



With a dual major in MSE and Biomedical Engineering, Kelly Collier (B.S. 2011) was planning to enter graduate school upon earning her degree. However, an innovative senior project completely changed her plans.

Collier collaborated with five other students — including MSE's Brianne Burton (B.S. 2011) and Divya Krishnamoorthy (B.S. 2011) — to develop a wearable bodysuit that prevents and rehabilitates back injuries. Working with Dr. Gary Chimes at the University of Pittsburgh, the students created a unique low-profile brace with specific areas of tension and compression that support the spine during physical activity.

As a four-year swimmer at Carnegie Mellon, as well as a runner and soccer player, Collier immediately recognized the device's commercial potential. "Our bodysuit combines extreme comfort with the structural stability athletes need to promote back and spine health," notes Collier. Her confidence was strengthened when the project won *Honorable Mention* in the prestigious BMESStart competition, sponsored by the National Collegiate Inventors and Innovators Alliance.

While her fellow team members entered graduate school, today Collier is managing a local start-up company,

ActivAided Orthotics, that plans to commercialize the brace. With a patent application under way, the company hopes to launch the product in Spring 2012.

As Chief Executive Officer, Collier is exploring topics — such as manufacturing feasibility and consumer beta testing — that are new to her. But she is still applying her MSE coursework, as well as the skills she learned on campus.

"I apply my analytical engineer's mindset every day, although I may be studying different challenges than I imagined," says Collier. "In addition, the strong work ethic, time management skills, and drive to succeed that I learned at Carnegie Mellon will continue to serve me well — no matter where my career takes me."



This unique bodysuit developed by ActivAided Orthotics should be commercially available in Spring 2012.

ALUMNI NEWS UPDATES

Jonathan Pickering (M.E. 1988) was recently appointed President of JA Solar, Americas Region, and Vice President of JA Solar. Headquartered in China, the company is a leading manufacturer of high-performance solar power products. Pickering joined JA Solar from California-based Lumeta Inc. As General Manager and Executive Vice President of Lumeta, he led the development and commercialization of the company's PowerPly solar module designed for commercial rooftop applications.

Siddhartha Misra (M.S. 2001, Ph.D. 2004) writes that he has "managed to stay in the steel industry" since graduating from Carnegie Mellon. He has joined TATA Steel Ltd. in Jamshedpur, India, as Head of Technology in the Flat Product Technology Group. In this new role, Misra is managing the technology

needs of TATA Steel for its ongoing expansion program, including a new steelmaking and thin slab casting and rolling facility.

Lisa Roudabush (B.S. 1982) has been named Managing Director, Product Quality, for U.S. Steel's American flat-rolled product quality assurance organization. In her new role, Roudabush will coordinate customer quality requirements across all of U.S. Steel's North American flat-rolled steel-making facilities. Her organization, which will include existing plant-level quality organizations as well as the customer technical services group, will serve as a direct link between U.S. Steel's customers and the company's operating facilities.

Alumni Profile: Finding His Destiny



Growing up in Cleveland, Paul Browning (B.S. 1990) had two passions: engineering and football. A standout high school player, he also had a lifelong interest in taking things apart to see how they worked. One day a Carnegie Mellon football coach called him. “I had just been looking through a brochure on engineering programs at

Carnegie Mellon,” remembers Browning. “It seemed like destiny.”

Originally an Electrical Engineering major, Browning soon gravitated toward MSE. “I was always interested in how material properties could contribute to performance,” he says. Browning captained the buggy team for his fraternity, Beta Theta Pi, using composite materials to give the vehicle a stronger, lighter body that was extremely innovative at the time.

Upon graduation, Browning spent eight years at GE’s Corporate Research Center as a self-described “lab rat,” mastering a range of material technologies—from tungsten wires for light bulbs to superconducting materials for imaging equipment. There, he met his wife Janel Koca Browning (B.S. 1993), also an alum of MSE.

Browning left GE for a job in Caterpillar’s solar turbines business in 1998. He and Janel—and eventually their

two children—moved around North America and Europe as he assumed ever-greater leadership positions.

In 2010, Browning returned to GE. Today, the former “lab rat” is now President and CEO of Thermal Products for GE’s Energy division, a \$7.5 billion company with 10,000 employees. Browning also holds the position of Campus Representative to Carnegie Mellon, which brings him back to Pittsburgh frequently to recruit students, as well as form close relationships with deans and department heads.

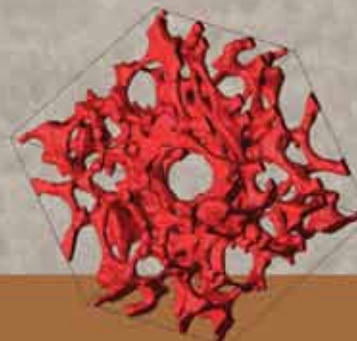
“Carnegie Mellon has very strong students, and it’s important that we add these standouts to our team at GE,” says Browning. “Just as I was recruited back in the 1980s, I hope to help promising young engineers and other professionals find their own destinies—while also advancing GE’s mission to lead the world in innovative energy solutions.”

“As GE’s Campus Representative to Carnegie Mellon, Browning maintains close ties with the University.”

Cliff Brangwynne (B.S. 2001) is an Assistant Professor in Chemical and Biological Engineering at Princeton University. In his Soft Living Matter group, he and his team seek to understand the physical principles underlying self-assembly of biological materials, including the cytoskeleton, sub-cellular organelles, cells, and tissues. His research combines the tools of soft matter physics and molecular cell biology to understand the way in which the properties of biological materials play a role in fundamental biological processes—in particular, embryonic development.

Jennifer Giocondi (B.S. 1998, M.S. 1999, Ph.D. 2003) writes that she is working with the Engineered Finishes Division at the Alcoa Technical Center in New Kensington, Pennsylvania.

Steven Spurgeon (B.S. 2009) was recently awarded a three-year Department of Defense National Defense Science and Engineering Graduate Fellowship to support his doctoral work at Drexel University. These fellowships are awarded to applicants pursuing a doctoral degree in, or closely related to, an area of interest within a critical discipline determined by the Department of Defense. Spurgeon works in the Dynamic Characterization Group in the Department of Materials Science and Engineering at Drexel.



STUDENT NEWS UPDATES

Doctoral student **Dhishan Kande** recently won funding to travel to the IEEE International Magnetism Conference in Taipei, Taiwan, as well as the IEEE Magnetism Society



Summer School, held in New Orleans. (See *MSE News*, Spring 2011.) He shared some photos from the Taipei conference, as well as photos from the New Orleans event that include fellow Ph.D. student **Hoan Ho**. Both Kande and Ho work with **Professor David Laughlin**.



Four MSE students are authors of a poster that received the *Best Poster Award* at the 56th Annual Magnetism and Magnetic Materials Conference held recently in Scottsdale, Arizona. Graduate students **Ashfaq Habib** and **Siyang Xu** collaborated with undergrads **Matthew Ondeck** (*B.S. 2011*) and **Emily Walker** on the winning poster, entitled “The Role of Eddy Current Losses and Particle Size on AC Magnetic Field Induced Reflow in Solder/Magnetic Nanoparticle Nanocomposites.” Other authors of the poster are MSE **Professor Michael McHenry** and Raja Swaminathan of Intel. The Best Poster Award includes a check for \$50, along with a blue ribbon placed on the poster for the duration of the session. The poster was also prominently displayed in a separate location during the duration of the conference. The selection was made on the basis of the poster’s appearance, quality of the research, and knowledge and clarity of the presenter.



Seniors **Robert Tisherman** and **Parth Naidu** have been named *ACS Scholars* as part of the Andrew Carnegie Society (ACS) Scholars Program. ACS Scholars are selected for this honor by their deans and department heads. These undergraduate seniors embody high standards of academic excellence combined with multi-dimensional characteristics such as volunteerism, involvement in student organizations, participation in sports or the arts, and leadership. Each ACS Scholar receives a \$1,500 award that supports their academic and personal growth. In addition, they receive \$200 and have the opportunity to work together throughout their senior year to decide how best to contribute their money

back to the University. The ACS hopes to empower them by providing the opportunity to experience the joy of philanthropy. Since its inception in 1975, the program has recognized more than 726 undergraduate seniors.

MSE Debuts Grad Student Lounge

As the Department has struggled with physical space challenges over the last decade, one missing component has been a dedicated lounge space for graduate students. With these hard-working students spending so much time on campus, they can benefit greatly from a private space for studying, having meals, or conducting informal meetings.

In October, MSE debuted a new graduate student lounge that will meet these needs. Comfortable upholstered furniture will be perfect for relaxing, studying, or even watching Steelers games on a cable-equipped, flat-screen 70-inch television. Counter seating will provide a space for working on a laptop or enjoying a meal. Magnetic marker boards will be ideal for sharing ideas and working on group projects.

“This Fall, MSE welcomed the largest group of new graduate students in our history,” notes **Department Head Gregory Rohrer**. “We recognized that it was time to provide our grad students with their own space here in the Department. I hope the new lounge will be enjoyed and used productively for years to come.”



Before and after photos of kitchen (top) and lounge spaces



Congratulations to the Class of 2011

On May 15, the Department of Materials Science and Engineering celebrated its annual Commencement ceremony. Faculty, staff, friends, and family members gathered to honor the hard work and commitment that culminated in this special day.

The Department awarded 33 B.S. degrees and 24 M.S. degrees. An additional 15 students earned Ph.D. degrees. Some members of the Class of 2011 will go on to a variety of professional positions, while others will pursue additional degrees. "We're extremely proud of these graduates, and we wish them the best as they move forward — no matter what their future plans are," says Department Head Gregory Rohrer. "We hope they will look back fondly on their time at MSE."

A number of graduates received special recognition at this year's Commencement ceremony. They are listed below.



★ The 2011 *William W. Mullins Undergraduate Award* was presented to **Kelly Collier**. This honor is given annually to a graduating senior in the Department who best exemplifies the qualities associated with **Professor William Mullins**: hard work, dedication, scholarship, and breadth of knowledge within a wide range of academic interests.

★ **Marianna Sofman** received the *Hubert I. Aaronson Undergraduate Award*, which was created in memory of the late **Professor Hub Aaronson** to support a deserving undergraduate metallurgy student who is planning to attend graduate school.

★ The annual *James W. Kirkpatrick and Jean Kirkpatrick Keelan Scholarship Award* went to **Nicole Reilly**. This award honors the graduating senior who best exemplifies the qualities described in the scholarship bequest by "supplementing his/her intellectual abilities with effort and work ethic."

★ **Yue Ma** was chosen as the recipient of the 2011 *William T. Lankford, Jr. Memorial Scholarship Award*. This honor recognizes the graduating MSE student who best exemplifies the qualities described in the award bequest: scholarship, commitment to the profession, and future potential.

★ **Ellen Tworkoski** won the *Outstanding College Senior Award*, an honor presented each year by the ASM Golden Triangle Chapter.

★ The 2011 *Paxton Award for Best Doctoral Dissertation* was given to **En Yang**. Funded through the generosity of **Ann and Harry Paxton**, this honor promotes excellence in doctoral scholarship by recognizing the best Ph.D. dissertation each year.

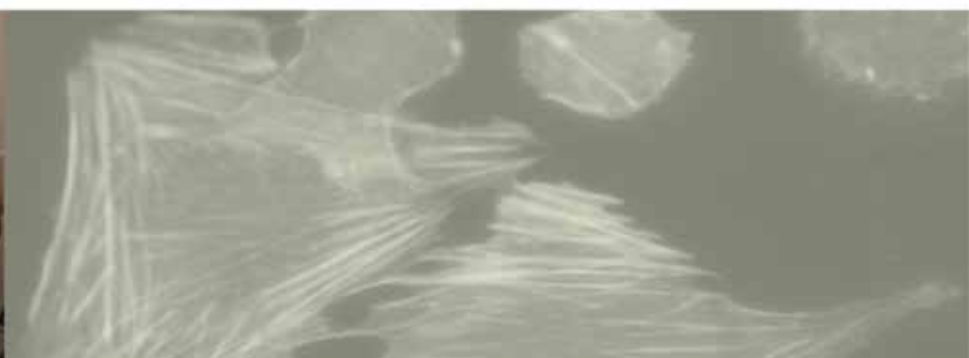
★ This year, three students were recognized with the *Krivobok Brooks Award for Excellence in Metallography*. The undergraduate recipient was **Turi Alcoser**. There were two graduate recipients: **Brian Hoskins** and **Hyung Ju Ryu**.

★ **Professor P. Chris Pistorius** was recognized with the 2011 *Philbrook Prize in Engineering*. This annual honor recognizes an MSE faculty member who has made substantial, sustained contributions to excellence in education, or to the application of materials science to important problems. The award honors the late **Professor William O. Philbrook's** many contributions to the teaching of metallurgy and his successful application of metallurgical principles to practical problems.

Matthew Ondeck (B.S. 2011) celebrates his special day with sister **Courtney Ondeck (B.S. 2008)**. Matthew is pursuing his doctorate at the University of California, San Diego, while Courtney is at Washington University's St. Louis School of Medicine.



Department of Materials
Science and Engineering
Carnegie Mellon University
Pittsburgh, PA 15213-3890



Carnegie Mellon
ENGINEERING

Carnegie Mellon University does not discriminate, and Carnegie Mellon University is required not to discriminate, in admission, employment, or administration of its programs or activities on the basis of race, color, national origin, sex, or handicap in violation of Title VI of the Civil Rights Act of 1964, Title IX of the Educational Amendments of 1972, and Section 504 of the Rehabilitation Act of 1973 or other federal, state, or local laws or executive orders.

In addition, Carnegie Mellon University does not discriminate in admission, employment, or administration of its programs on the basis of religion, creed, ancestry, belief, age, veteran status, sexual orientation, or gender identity. Carnegie Mellon does not discriminate in violation of federal, state, or local laws or executive orders. However, in the judgment of the Carnegie Mellon Human Relations Commission, the Presidential Executive Order directing the Department of Defense to follow a policy of "Don't ask, don't tell, don't pursue" excludes openly gay, lesbian, and bisexual students from receiving ROTC scholarships or serving in the military. Nevertheless, all ROTC classes at Carnegie Mellon University are available to all students. Inquiries concerning application of these statements should be directed to the provost, Carnegie Mellon University, 5000 Forbes Avenue, Pittsburgh, PA 15213, telephone 412-268-6684, or the vice president for enrollment, Carnegie Mellon University, 5000 Forbes Avenue, Pittsburgh, PA 15213, telephone 412-268-2056.

Carnegie Mellon University publishes an annual campus security report describing the University's security, alcohol and drug, and sexual assault policies, and containing statistics about the number and type of crimes committed on the campus during the preceding three years. You can obtain a copy by contacting the Carnegie Mellon Police Department at 412-268-2323. The security report is also available online.

Obtain general information about Carnegie Mellon University by calling 412-268-2000.

Department Head:
Gregory S. Rohrer

Editor:
Suzanne B. Smith

Designer:
Dan Hart

Contributing Writer:
Cynthia Fusco

Photographers:
Ken Andreyo
Glenn Brookes