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MSE news

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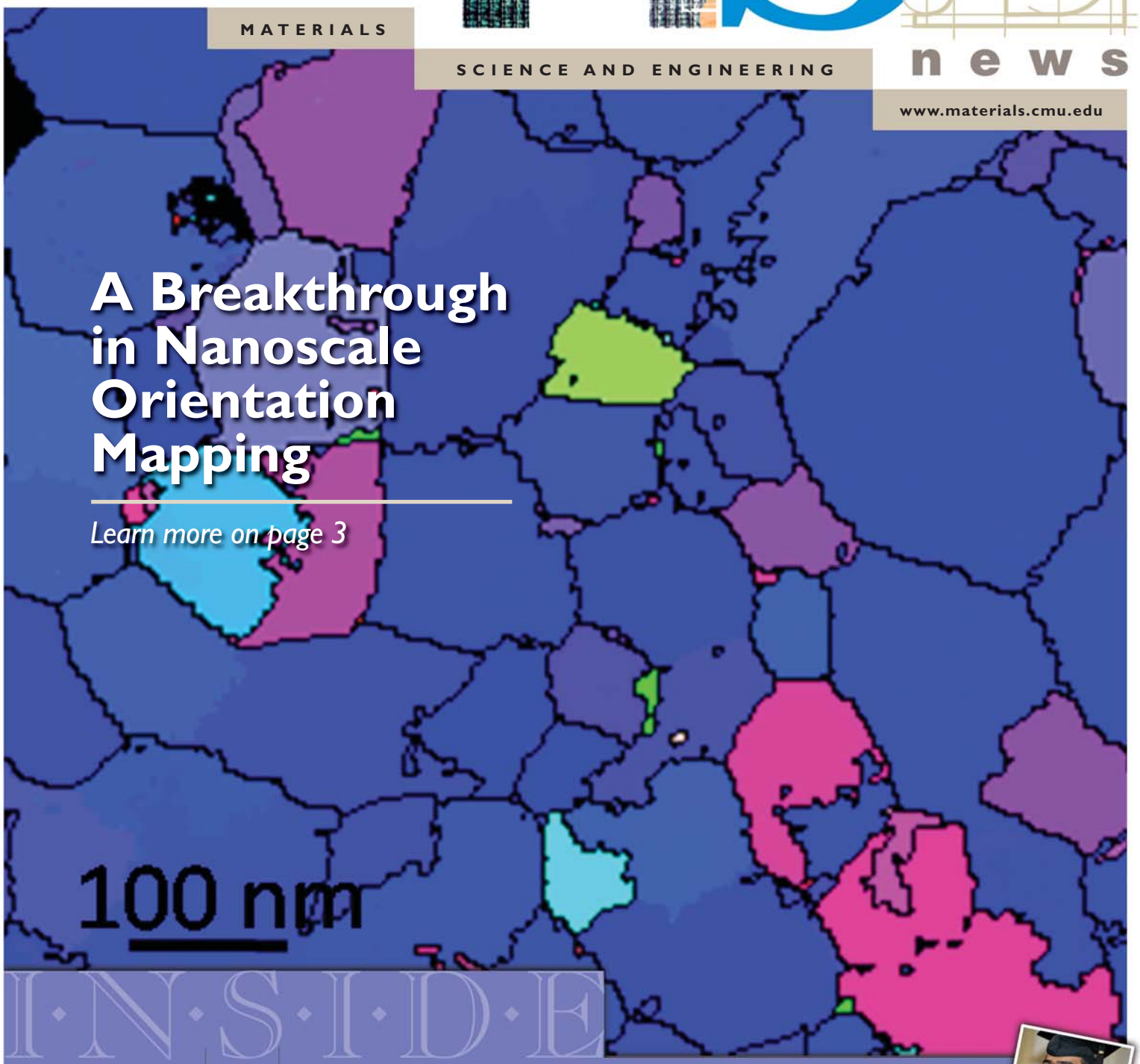

A Breakthrough in Nanoscale Orientation Mapping

Learn more on page 3

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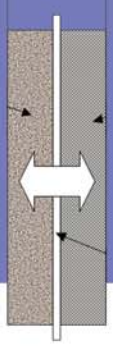


A Note From the Department Head

Gregory S. Rohrer, W.W. Mullins Professor

Dear MSE Graduates:

Like all organizations, the Department of Materials Science and Engineering (MSE) regularly sets goals—and then takes action to achieve those goals. On a periodic basis, we evaluate our accomplishments and compare them to the goals that we've set. Recently we benchmarked our progress and, while we cannot say that every goal has been met, the good news is that most of our targets have been achieved. Our own internal metrics indicate that we continue to be among the best MSE departments in the country.

The Department currently enrolls 8.5 percent of all undergraduates in the Carnegie Institute of Technology, the engineering college at Carnegie Mellon. Our enrollment has been steadily increasing for almost a decade, and we are well on our way to meeting our goal of 10 percent. As part of our recruitment strategy, we have planned a complete renovation of the undergraduate facilities in the A300 wing of Doherty Hall—including the laboratories, the lounge, and the computer cluster. Until this is completed some years from now, we have obtained new space on the third floor of Wean Hall (about 1000 square feet) to accommodate an upgraded undergraduate lounge and computer cluster.

In the area of graduate education, our goal is to maintain Ph.D. enrollment at a level of five doctoral students per faculty member. With a current ratio of 5.2 doctoral students per faculty member (full-time equivalent), we have met this goal, ensuring vibrant research groups. Our aggressive recruitment efforts have led to a steady increase in selectivity in the admissions process, as well as in the average qualifications of our Ph.D. candidates, as measured by undergraduate grade point average. The overall excellence of our doctoral students is one factor that has allowed us to decrease the time it takes to earn a Ph.D., thereby increasing graduation rates. Over a period of about four years, the average time to earn a Ph.D. at MSE has decreased from more than 5 years to just under 4.5 years.

Our research programs have also flourished during this period. The Department's total expenditures of external research funds rose to $7.9 million last year, or about $480,000 per faculty research group. One way that we are working to enhance our core research strengths is by hiring faculty who can contribute in multiple areas. This is exemplified by our recent hiring of **Assistant Research Professor Yoosuf Picard**, who specializes in electron microscopy and materials characterization. We are also supporting new research areas and currently are conducting a search—in conjunction with the Department of Biomedical Engineering—for a faculty member with expertise in biomaterials.

The outstanding progress that MSE has made has resulted from the work of students, staff, and faculty who are dedicated to continuously improving the Department of Materials Science and Engineering. While we are happy with these accomplishments, we have new goals for 2010, and we know that we must continually change in order to improve. On behalf of the entire MSE Department, I wish a happy and rewarding new year to all of our alumni in 2010.

Gregory S. Rohrer
W.W. Mullins Professor and Department Head

COVER STORY

A Breakthrough in Nanoscale Orientation Mapping

Crystal orientation mapping based on automated indexing of electron backscatter diffraction (EBSD) patterns in the scanning electron microscope (SEM) has revolutionized the study of polycrystalline materials with grain size in the micron scale. Carnegie Mellon and its National Science Foundation (NSF) funded Materials Research Science and Engineering Center (MRSEC) in the MSE Department have been at the center of this revolution. However, for nanocrystalline samples, with sub-100 nm grain sizes, the spatial resolution of EBSD is not adequate. Hence, it is necessary to use the transmission electron microscope (TEM).

Professor Katayun Barmak is one of the first materials scientists worldwide to successfully map the orientation of polycrystalline structures on a nanoscale in the transmission electron microscope. Critical to her success have been the dedicated help of **Thomas Nuhfer**, Director of Electron Microscopy and Materials Characterization, the work of **Amith Darbal**, her doctoral student, and the improvements implemented by the inventor of the technique, Dr. David Dingley, and his team.

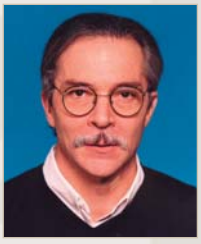
The orientation mapping method is based on dark-field conical scanning in the TEM. The beam is tilted and rotated to generate a series of dark-field images. A pixel in the dark-field image will become bright when the incident beam has an orientation such that it satisfies the Bragg condition at that point, and the diffracted beam passes through the objective aperture. A polar plot of the intensity variation of the same point in each of the dark-field images with the incident beam orientation gives a reconstructed diffraction pattern (RDP).

To index the RDPs and determine the orientation, an automated program uses a mask of predefined size to scan the pattern and identify the spots. Using a table of hkl reflections against Bragg angle, the spots are assigned possible miller indices. A series of two-dimensional grids are generated using the found spots and the pattern center to determine the best fit reciprocal lattice plane corresponding to the RDP. The orientation of the given point is then established through a voting/ranking scheme, which takes into account any deviation from the base reciprocal lattice plane as indicated by the different intensities of the reflections. The spatial resolution of the technique can be as high as the spatial resolution of the dark-field images; therefore, orientation maps for grain sizes below 10 nm are certainly viable.

Shown on the cover are the bright-field image and the inverse pole figure map of a nanocrystalline Pt film. An inverse pole figure map is colored according to the crystal plane that is exposed at the surface of the film, with red signifying {100}, green {110}, and blue {111}. The very strong <111> fiber texture, as evidenced by the abundance of blue in the image, is apparent.

Orientation imaging in the TEM will be critical to the success of engineered systems that harness nanoscale materials. Examples of such applications are integrated circuits and data storage systems, photovoltaics, fuel cells, batteries, medical devices, and drug delivery systems.

Nuhfer Wins Andy Award



The Department extends its congratulations to **Thomas Nuhfer**, MSE's Director of Electron Microscopy and Materials Characterization. Nuhfer recently won a Carnegie Mellon *Andy Award* in the category of "Outstanding Dedication," which honors University staff members who have a "can-do" attitude and consistently overcome obstacles in order to accomplish their goals. There were 20 nominations in this category.

Professor Marc De Graef, Nuhfer's direct supervisor, supported his nomination. "Tom works long hours, often during the weekend and at night, pushing our instruments to their theoretical limits of resolution. He works tirelessly to train students, to provide whatever technical support is needed during microscope observations, and to identify which experimental observation modes are most appropriate for a given sample," says De Graef.

Adds **MSE Department Head Gregory Rohrer**, "Tom's reputation as one of the best facility directors is well known in the academic electron microscopy community. Managing our state-of-the-art facilities and juggling so many users represent an incredibly large task—and we are most fortunate to have Tom as part of MSE."

A member of the University staff for 42 years, Nuhfer calls the award a "capping glory" for his long-time work at Carnegie Mellon.

DEPARTMENT NEWS

Whitacre Leads Large-Scale Energy Storage Project for DOE

Assistant Professor Jay Whitacre is the primary technical investigator for a project that was awarded $5 million in funding from the U.S. Department of Energy (DOE) in November. Whitacre's effort to develop aqueous sodium battery chemistries is one of 16 new "smart grid" energy storage projects to receive funding from the DOE.

The award—which is matched by more than $5 million in cost sharing from funding partners—is part of a $1.6 billion package supported by the American Recovery and Reinvestment Act of 2009. By matching public funds with private investments, the DOE is hoping to rapidly develop new technologies that integrate renewable energy resources into the overtaxed U.S. power grid.

Whitacre, who holds a joint appointment in the Department of Engineering and Public Policy, will direct the technical aspect of the project work, which will be shared between research labs at Carnegie Mellon and a new University spinoff company called 44 Tech, which is based in Lawrenceville, Pennsylvania.

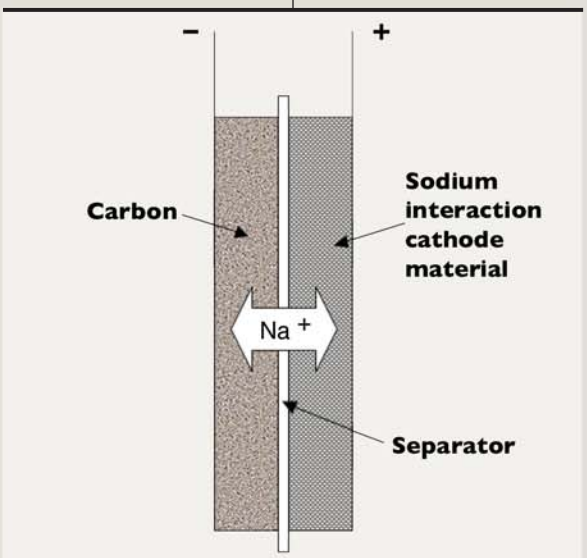
This project reflects Whitacre's overall research focus on developing new functional materials for electrochemical energy storage and generation—as well as investigating the economic and public policy implications of these new materials.

Storing Energy From Renewable Sources: A Critical Challenge

"Our goal is to develop a new room-temperature sodium-ion battery technology that improves both the reliability and efficiency of the U.S. power grid—by capitalizing on stored energy from renewable sources," says Whitacre, whose research team has been focusing on this emerging technology for more than 18 months. "Hopefully, the resulting product will create stability in the U.S. electricity grid by storing energy from intermittent renewable power sources, and using this energy at times of stress."

Whitacre's new battery technology is aimed at leveraging existing investments in solar, wind, and other renewable power sources by making it much easier—and far less expensive—to store this energy. Using new aqueous battery technologies, energy can be collected and then cost-effectively stored for future use.

Sodium-ion batteries are similar to lithium-ion batteries in that they rely on the movement of positive and negative ions across an electrolyte medium. However, they have significant cost advantages because sodium is more readily available—and significantly less expensive—than lithium. In addition, Whitacre's new batteries can operate at lower voltages, enabling the replacement of organic electrolytes with water-based alternatives. These water-based electrolytes are not only easier to work with, but also require less supporting materials—creating obvious manufacturing advantages.



This schematic shows the aqueous sodium ion battery being developed by the DOE project team. Na ions are moved from the cathode to the anode when the cell is charged, and move back into the cathode material when the cell is discharged. This is similar to the functionality of a traditional Li-ion battery—but is far less expensive, making it a better solution for large-scale energy storage.

"There has always been an interest in collecting natural energy when the sun is shining or the wind is blowing, then 'banking' that energy for the future," says Whitacre. "However, existing technologies have proven too cost-prohibitive to implement on a large scale. Our hope is that this new aqueous technology will support the creation of a next-generation U.S. power grid, which has ample stored energy to rely upon during peak demand periods."

"There are few materials science topics today that are more relevant and pressing than energy storage, and I am delighted to see one of our faculty members taking a national leadership role in this area," says **MSE Department Head Gregory Rohrer.** "By winning this prestigious DOE funding, Professor Whitacre has earned broad recognition that reflects very positively on both Carnegie Mellon and the Department of Materials Science and Engineering."

MSE Hosts Summer "Materials Camp"

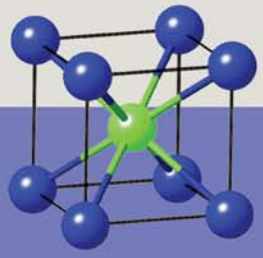
In June, 27 high school teachers from the Pittsburgh area attended a unique one-week "Materials Camp" hosted by the Department of Materials Science and Engineering. According to **Professor Anthony Rollett**, this innovative summer camp was created to give secondary science teachers hands-on experience in incorporating materials science into their classrooms.

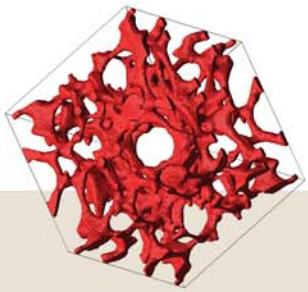
During the one-week workshop, held in MSE's undergraduate laboratories, the local teachers learned the basics of materials science technology as taught at the high school level. By working first-hand with leading-edge metals, ceramics, polymers and composites, they had the chance to develop a greater appreciation for the importance of these materials in everyday life—as well as learn how they can expose their students to this same experience.

"This program is an excellent tool to bring together academic and vocational instructors with a common goal of getting their students excited about science, technology, and engineering," says Rollett. "We hope the program might inspire a new generation of young people to become interested in a career in materials science and engineering."

MSE's 2009 Materials Camp was co-sponsored by The Minerals, Metals & Materials Society (TMS) Foundation, in conjunction with the ASM Materials Education Foundation, the Association for Iron & Steel Technology (AIST) Foundation, and the ASM Pittsburgh Golden Triangle Chapter.

Some of the schools participating in the novel program included the Pittsburgh Public Schools, Penn Hills School District, Shady Side Academy, The Ellis School, Winchester Thurston School, Woodland Hills High School, Oakland Catholic High School, Chartiers-Houston Junior/Senior High School, and West Mifflin Area High School.





MSE Alums Reconnect at 2009 Saltminers Dinner

On October 25, nearly 40 alumni of the Department of Materials Science and Engineering gathered for the 2009 Saltminers Dinner, held every year in conjunction with the Materials Science and Technology (MS&T) Conference and Exhibition.

With Pittsburgh playing host to MS&T 2009, the Department hosted this event on the Carnegie Mellon campus—making the dinner a real "homecoming" for many MSE graduates. Gathering in the Singleton Room of George A. Roberts Engineering Hall, alumni and faculty members had a rare chance to share news about their careers and families, as well as reminisce about their shared experiences at Carnegie Mellon.

"As a world leader in materials science and engineering, our Department is in a unique position to recruit students from all over the world—and to watch as our graduates pursue careers in every corner of the globe," says **MSE Department Head Gregory Rohrer**. "While this is a positive reflection on our Department, it also makes it difficult to find a time and place to reconnect with our alumni—and that's what makes the annual Saltminers Dinner such a special event for the MSE 'family.'"

Adds Rohrer, "I was very pleased with the number of alumni who were able to attend our 2009 event, and I hope to see even more members of our extended family at the 2010 Saltminers Dinner." He notes that, since MS&T 2010 will be held in Columbus, Ohio, the location should once again be a convenient gathering place for MSE alumni.

In the meantime, MSE graduates can keep in touch via the growing MSE Alumni Group on Facebook.com. Managed by **Professor Michael McHenry**, this online alumni network is an easy way for alums to stay connected with friends, faculty, and staff members at MSE.

If you're interested in joining, you will need a Carnegie Mellon alumni e-mail account. To establish one, simply log on to http://www.alumniconnections.com/olc/pub/CMU/. You will also need to establish a Facebook account at http://www.facebook.com/. When both accounts are set up, go to the Facebook Web site, and add Mike McHenry or the Class Administrator from your graduation year as a "Friend." They will then invite you to join the MSE Alumni Group.

Alum Steve Fyfitch

Professor Emeritus Paul Wynblatt

Alum Kenneth Russell

Alums Becky Wehrer and Carsen Kline

Professor Anthony Rollett, Professor Gregory Rohrer, and Dr. George A. Roberts (alum)

Two MSE Alums Join Academia

Kim and Martin Named Assistant Professors

Two alumni of the Department of Materials Science and Engineering have been recently hired as Assistant Professors, beginning this Fall. **Changsoo Kim** *(Ph.D. 2004)* is the newest Materials faculty member at the University of Wisconsin-Milwaukee (UWM), while **Lane W. Martin** *(B.S. 2003)* has joined the Materials Science and Engineering faculty at the University of Illinois at Urbana-Champaign (UIUC).

Changsoo Kim

Before earning his doctorate at MSE, Kim received an M.S. in Metallurgical Engineering at Seoul National University (1999) and a B.S. in Materials Science and Engineering from POSTECH in South Korea (1997).

Following his graduation from Carnegie Mellon, Kim served as a Postdoctoral Research Associate at MSE for one year. From 2005 to mid-2009, he worked as a Materials Scientist and Research Associate at the U.S. Food and Drug Administration.

At UWM, Kim's research will focus on multi-scale computational materials science, drug delivery, structures in nano and bio materials, phase transformation, microstructure/crystallography, structure-property relationships, and surface/interface phenomena.

Lane W. Martin

After receiving his undergraduate degree at Carnegie Mellon, Martin earned an M.S. (2006) and Ph.D. (2008) in Materials Science and Engineering from the University of California, Berkeley. He then served as a Postdoctoral Fellow in the Quantum Materials Program, Materials Science Division, Lawrence Berkeley National Laboratory.

At UIUC, Martin's research team will explore novel oxide materials—both thin film heterostructures and nanostructures—in pursuit of two major research thrusts: multiferroic and multifunctional materials and devices, and solar energy conversion (specifically, oxide materials for photovoltaics and photocatalysis of water). The foundation of Martin's research is based on the controlled growth of oxide thin film heterostructures and nanostructures via pulsed laser deposition and molecular beam epitaxy.

Please Join Us!

In conjunction with Spring Carnival 2010, the Department of Materials Science and Engineering will be hosting a Deck Party on Friday, April 16. We hope many of our alums will join us as they return to the Carnegie Mellon campus for Carnival!

Alumni News Bits

Abhilasha Bhardwaj *(Ph.D. '09)* is employed by Intel as a Process TD Engineer at the company's Ronler Acres Campus facility in Hillsboro, Oregon.

Sukwon Choi *(Ph.D. '08)* is also working as a Process Engineer at Intel. Choi is employed by the company's Portland Technology Development group.

Rodrigo Corbari *(Ph.D. '08)* is a Melt Shop Senior Process Engineer with V&M Star Steel.

Kerrie Holguin *(B.S. '09)* is working at Raytheon Integrated Defense Systems in the Materials Engineering Department in Andover, Massachusetts.

Mitchell Kosowski *(B.S. '09)* began work in July for the proprietary trading firm Optiver, where he will trade financial instruments.

Herbert M. Miller *(B.S. '02, M.S. '03, Ph.D. '09)* is working as a Research Scientist for Integran Technologies, USA.

Kelly Ann Sumie Nakamura *(B.S. '09)* has accepted a position with Intel as a Process Engineer.

Paul Ohodnicki *(Ph.D. '08)* is an R&D Researcher in New Product Development for the Vacuum Coatings Group of PPG Industries, working in the company's Glass Business and Discovery Center.

Jane E. O'Sullivan *(B.S. '09)* is an Associate Scientist at Bettis Laboratory.

Stephen Hoan Vu *(B.S. '09)* is an Analyst with SRA International in Fairfax, Virginia.

Bryan Webler *(Ph.D. '08)* is currently working in the Plant Materials Engineering Group of the Bettis Laboratory as a Senior Engineer.

ALUMNI NEWS

MSE Thanks Its Alumni Donors!

During the 2009 fiscal year, nearly 120 alumni and friends of the Department of Materials Science and Engineering made generous donations totaling more than $180,000. These donations help ensure that the Department remains at the forefront of innovation and research—with the facilities and equipment needed to reflect the leading edge of materials science. We thank each one of our graduates and friends for their generous support.

Robert L. Albert
Alcoa Inc.
John E. Allison
Thomas B. Andersen
Maurice F. Baldy
Ronen Assaf Berechman
Dennis F. Bickford
The Boeing Company
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Weier Larry Lu
Carl F. Lutz
Robert J. MacDonald
David S. Mapes
John Edward Matz
Robert C. Maxton
Celeste Lynn McCallen
Frank L. McGeary
Herbert M. Miller
Timothy Alan Miller
Hugh C. Minton, Jr.
Eugene A. Mizikar
Allen M. Montgomery
Garrick R. Mullins
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Matthew A. Willard
Robert K. Williams
Robert E. Wolf
Richard A. Wolfe
John Randolph Wood
William Thomas Wood, II

in memorium

Joseph Danko *(B.S. 1951)* died on August 20 at the age of 82. A native of Homestead, he received his undergraduate degree in Metallurgical Engineering at Carnegie Mellon, followed by Masters (1954) and Ph.D. (1955) degrees in Metallurgical Engineering from Lehigh University. He earned his Professional Engineer License in Corrosion in 1977 from the state of California.

During his professional career, Danko worked for Westinghouse, General Electric, and the Electric Power Research Institute, moving on to become Vice President of the American Welding Institute in Knoxville, Tennessee. He ended his career as the first Director for Materials Processing, Center of Excellence, College of Engineering, University of Tennessee—a position he held from 1985 to 1992.

Danko held several patents and published more than 100 papers on his research in pipe cracking, welding, and corrosion. He received many honors, including being named a Fellow by the American Society of Metals. He also was a member of the American Welding Society, American Nuclear Society, American Society of Corrosion Engineers, and Sigma Xi.

Danko retired to Vancouver, Washington, with his wife **LaVerne** in 1991. He is also survived by three children—**Christopher**, **Kimberly Ann**, and **Mark**—and five grandchildren.

The Department of Materials Science and Engineering extends its deepest sympathies to the Danko family.

Faculty News Bits

Professor Emeritus Thaddeus Massalski will add to his lifetime achievements in 2010, when he receives the prestigious *Gold Medal* award from the Japan Institute of Metals (JIM). The Gold Medal is the most honored award given by JIM, which annually recognizes individuals and groups around the world for their outstanding achievements in advancing the science and technology of metallurgy and materials science. Massalski is the first professor at Carnegie Mellon to be recognized with this international honor.

Professor Katayun Barmak received the 2009 *Philbrook Prize*, which is awarded annually to a faculty member in the Department of Materials Science and Engineering who has made substantial, sustained contributions to excellence in education, or to the application of materials science to important problems. The award was created in order to preserve the memory of the late **Professor William O. Philbrook's** many contributions to the teaching of metallurgy and to his successful application of metallurgical principles to practical problems.

Picard Joins MSE Faculty

Yoosuf N. Picard has joined the Department of Materials Science and Engineering faculty as an Assistant Research Professor.

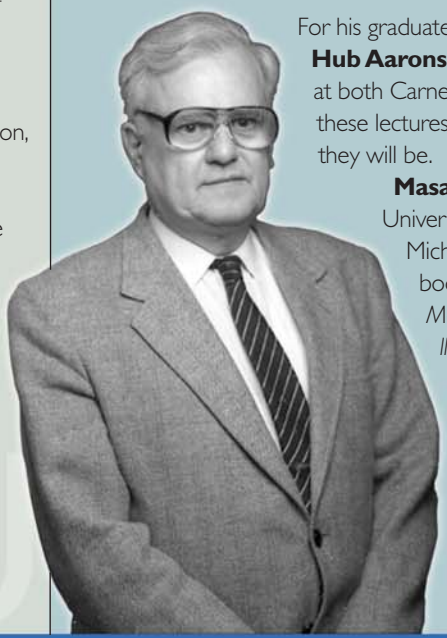
Picard earned a B.S. in Mechanical Engineering from Louisiana Tech University in 2001 and a Ph.D. in Materials Science and Engineering from the University of Michigan in 2006. During his graduate career, he was a Microsystems Engineering and Science Applications Fellow at Sandia National Laboratories, where he researched focused ion beam applications as well as pulsed laser ignition phenomenon in energetic thin films.

Following his doctoral research on materials modifications by femtosecond lasers, he was a Postdoctoral Research Associate at the U.S. Naval Research Lab (NRL), where he conducted electron microscopy studies of GaN devices, SiC thin films, and metal-oxide nanowires. He was subsequently hired as a Staff Scientist at NRL to carry out electron microscopy studies of metal alloy surfaces and magnetic metal-oxide thin films.

Picard's research results have been widely published, and he has won awards from the National Research Council, Louisiana Tech, the University of Michigan, Sandia National Laboratories, and other organizations.

At Carnegie Mellon, his research will focus on transmission electron microscopy, scanning electron microscopy, electron channeling contrast imaging, electron backscatter diffraction, dislocation analysis in semiconducting materials and devices, structural analysis in nanoscale materials, and atomic scale imaging/analysis of interfaces.

New Book Captures Aaronson's Lectures



For his graduate courses on phase transformations, the late **Professor Hub Aaronson** prepared lecture notes of considerable size, and used them at both Carnegie Mellon and Michigan Tech. Many students who attended these lectures believed they should be shared with the world—and now they will be.

Masato Enomoto *(Ph.D. 1982)*, who is a Professor at Ibaraki University in Hitachi, Japan, has worked with Professor Jong K. Lee of Michigan Tech to edit Aaronson's notes for publication as a textbook from CRC-Press/Taylor & Francis. It will be published as *Mechanisms of Diffusional Phase Transformations in Metals and Alloys*, with Aaronson, Enomoto, and Lee as authors. The book is expected to be on the market within six months.

Royalties from the book will be equally divided between Carnegie Mellon and Michigan Tech, where they will be used to support memorial funds in Hub Aaronson's name.

STUDENT NEWS

Ph.D. student **Jacob Melby** received a *2009-10 Dowd-ICES Fellowship* for his project entitled "Improving the Efficiency of p-Contacts in Nitride-Based Light Emitting Diodes via Polarization Doping." The Philip and Marsha Dowd Engineering Seed Fund was established in 2001 through a generous gift to the College of Engineering from **Philip** (*B.S. Materials Science and Engineering, 1963*) and **Marsha Dowd**. This fellowship grant program, administered through the Institute for Complex Engineered Systems (ICES), provides support for graduate students working on cutting-edge research projects which do not have other sources of funding. Melby presented his research project to the Carnegie Institute of Technology community, and to Philip and Marsha Dowd, at the annual Dowd Fellowship Symposium, held on October 16.

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Doctoral student **Hyung Ju Ryu** was recently awarded a *CIT Bertucci Graduate Fellowship*. Created through the generosity of **John** and **Claire Bertucci**, this highly competitive fellowship was established to provide merit fellowships to graduate students pursuing doctoral degrees in the College of Engineering. Financial awards are given to outstanding graduate students to help with their tuition costs.

MSE junior **Ellen Tworkoski** has received the *Joseph Mulach Jr. and Louise A. Mulach Scholarship* to help fund her undergraduate studies. Created by The Pittsburgh Foundation, this scholarship provides tuition support for students in the fields of engineering, biological sciences, chemistry, mathematics, or physics. Applications are accepted from students at Carnegie Mellon, Carlow College, Chatham College, Seton Hill College, and the University of Pittsburgh. Tworkoski submitted essays about her inspiration to become a scientist, as well as how she hopes to make a difference in her chosen field.

• • • • •

Ph.D. student **Sarthak Havelia** was chosen as a finalist for the *GEMS (Graduate Excellence in Materials Science) Award* from the American Ceramic Society, based on his presentation at the 2009 Materials Science and Technology (MS&T) Conference and Exhibition, held in Pittsburgh in October. Finalists for this prestigious award are selected based on their scientific and academic accomplishments, the quality of the research they present at the annual MS&T meeting, and the quality of their oral presentation. A recent MSE graduate, Havelia is currently working as a Senior Process Engineer in the Lithography Group at Intel in Portland.

Doctoral student **Kelsey Miller** won the MS&T 2009 Graduate Student Poster Competition in October, which included a monetary award. Last spring, Miller also won the graduate student poster competition at ASM International's Young Member's Night (Pittsburgh Golden Triangle Chapter).

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MSE junior **Nicole Reilly** was recently named a recipient of the *Gilman International Scholarship*. The Gilman Scholarship Program offers a competition for awards for undergraduate study abroad and was established by the International Academic Opportunity Act of 2000. Sponsored by the U.S. Department of State Bureau of Educational and Cultural Affairs, this Congressionally funded program is administered by the Institute of International Education. Reilly was awarded financial support for study in France during the Spring semester.

MARK YOUR CALENDARS!

The 2010 MSE Diploma Ceremony will be held on Sunday, May 16. We hope you will save the date—and join the Department in celebrating the next generation of MSE success stories!

Commencement 2009: MSE Celebrates Student Achievements

On May 17, the Department of Materials Science and Engineering held its annual Diploma Ceremony at Winchester Thurston School. This event celebrated the accomplishments of the MSE Class of 2009, which included 27 B.S. recipients, 27 M.S. honorees, and 10 Ph.D. awardees. In addition, a number of special awards were presented.

Carolyn Sawyer won the *William T. Lankford, Jr. Memorial Scholarship Award*, which is given each year to the graduating student who best exemplifies the qualities described in the award bequest: scholarship, commitment to the profession, and potential of the student.

The 2009 recipient of the *William W. Mullins Undergraduate Award* was **Jane O'Sullivan**. This award is given 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.

Kelly Ann Sumie Nakamura was recognized with the *James W. Kirkpatrick and Jean Kirkpatrick Keelan Scholarship Award*, presented to the MSE senior who best exemplifies the qualities described in the scholarship bequest by "supplementing his/her intellectual abilities with effort and work ethic."

The *Hubert I. Aaronson Undergraduate Award* was given to **Aswin Tejasukmana**. This honor, created in memory of **Professor Hub Aaronson**, recognizes a deserving undergraduate metallurgy student who is planning to attend graduate school.

Mitchell Kosowski won the *Outstanding College Senior Award*, which is presented each year by the ASM Golden Triangle Chapter.

Finally, **Paul R. Ohodnicki, Jr.,** was recognized with the *Paxton Award for Best Doctoral Dissertation*. This award, made possible through the generosity of **Ann** and **Harry Paxton**, is intended to promote excellence in doctoral scholarship by recognizing the best Ph.D. dissertation of the year. Ohodnicki's thesis is entitled "Crystallization and Magnetic Field Processing of Co-Rich Co, Fe-Based Nanocrystalline and Amorphous Soft Magnetic Alloys." His advisors were **Professors Michael McHenry** and **David Laughlin**.

The Department of Materials Science and Engineering congratulates these special award winners—as well as every member of the Class of 2009!

MSE news

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