

# MATSE Newsletter

Materials Science and Engineering

## From the Department Head



Gary L. Messing  
Head, Materials Science and Engineering

Dear Alumni and Friends,

What a remarkable time! As we go to press we have just learned that Professor Osseo-Asare was elected to the National Academy of Engineering- which is the pre-eminent recognition of one's contributions. Osseo was cited for "his contributions to the fundamental understanding of interfacial phenomena in leaching and solvent extraction." We will have a one-on-one feature with Osseo in our next issue. We also learned that Emeritus Professor Robert E. Newnham (Bob) will be recognized with a Benjamin Franklin Medal in April for his seminal contributions to the field of acoustic imaging (see story inside). This award is one of the premier awards in the field of science and engineering. The list of awardees is a vertible list of who's who in the U.S. We are exceptionally happy for Bob and Osseo and proud to have them amongst the faculty. Join us in congratulating them with an email or phone call. I know they would like to hear from colleagues, friends and former students.

Major changes are about to take place this spring when the new Earth and Mineral Sciences Museum will open in Deike building with Dr. Russell W. Graham, Chief Curator of the Denver Museum of Science and Nature joining the EMS community as the Director of the new museum. We look forward to moving some of the mineral displays to the new location and to developing new displays extolling the excitement of materials to young people as well as the public. If you have any interest or inside information about exciting materials displays that you've seen lately, please let us know.

Finally, we will be forever grateful to Fred and Peggy Langenberg for contributing major resources to the development and support of the new Langenberg Technology Classroom that will replace the current mineral museum in the middle of Steidle (see story inside).

We have seen many changes in both the department and college since last year. We invite you for a tour this summer at the Open House during Arts Festival week (Jul. 7 – 11). Hope to see you here or on the road.

All the best,

  
Gary

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### Latest News!



Congratulations to **Kwadwo Osseo-Asare**, professor of metallurgy and geo-environmental engineering, on his recent election to the National Academy of Engineering (NAE)! Election to NAE is among the highest professional distinctions accorded to an engineer. Osseo-Asare was cited for his contributions to the fundamental understanding of interfacial phenomena in leaching and solvent extraction. Please join us in congratulating Prof. Osseo-Asare at [asare@matse.psu.edu](mailto:asare@matse.psu.edu) or (814) 865-4882.



## Emeritus Professor Robert Newnham to receive prestigious Benjamin Franklin Medal

The Franklin Institute recently announced that **Robert E. Newnham**, professor emeritus of solid state science in The Department of Materials Science and Engineering, is the recipient of the prestigious Benjamin Franklin Medal in Electrical Engineering for 2004. He will receive the award at the Franklin Institute Awards ceremony and dinner, being held at the Institute in the Benjamin Franklin National Memorial in Philadelphia, Pennsylvania on April 29. Newnham is receiving the award "for his invention of multiphase piezoelectric transducers and their spatial architecture, which revolutionized the field of acoustic imaging."



communications, and the chemical industry. In addition to being a pioneer in the field of electronic composites, Newnham is acknowledged as the father of a unified nomenclature for piezocomposites.

Newnham was educated at Hartwick College (B.S., mathematics), Colorado State University (M.S., physics), The Pennsylvania State University (Ph.D. physics) and Cambridge University (Ph.D., crystallography). Prior to joining the Penn State faculty, he worked at the Laboratory for Insulation Research at M.I.T. The author of more than 500 papers and 20 U.S. patents, Newnham has been active in the Institute for Electrical and Electronic Engineers, the American Ceramic Society, the Materials Research Society, and the American Crystallographic Association. He is a member of the National Academy of Engineers, the International Academy of Ceramics, and has received numerous awards for his teaching and research.

Newnham formulated the basic design rules to aid in fabricating effective composites for electronic and transducer applications. In the late 1970's, he invented the composite piezoelectric transducer that has revolutionized fields of engineering such as underwater acoustics, medical ultrasound, wireless

## Materials researchers receive grant for small-angle x-ray scattering instrument at Penn State

Three Penn State faculty were recently awarded a \$400,000 grant from the National Science Foundation to purchase a small-angle x-ray scattering instrument, the first instrument of its kind at Penn State. **Ralph Colby**, professor of materials science and engineering, **Paul Sokol**, professor of physics, and **James Runt**, professor of polymer science and engineering and associate head for graduate studies in materials science and engineering, received the grant for their proposal, "Acquisition of small-angle x-ray scattering with *in situ* shear for materials research and education."

Small angle x-ray scattering (SAXS) is one of the most powerful analytical tools for probing the structure of materials on 2 – 100 nanometer length scales. These length scales cover a diverse spectrum of research at the University. As the only

existing SAXS instrumentation at Penn State, the acquisition of this instrument is particularly important. Previously, faculty and students were forced to travel to national laboratories to perform even the most preliminary x-ray scattering experiments, severely limiting the number of students exposed to this important technique and the quality of their education.

Also, the new SAXS instrument will strengthen existing research programs of

For nearly 180 years, the Franklin Institute has honored the greatest men and women of science, engineering, and technology. The Franklin Institute Awards identify individuals whose great innovations have benefited humanity, advanced science, launched new fields of inquiry, and deepened our understanding of the universe. The legacy of the awards program is an "honor roll" of scientific and technological accomplishment including such names as Thomas Edison, Marie Curie, Alexander Graham Bell and Albert Einstein, to name a few. These brilliant men and women honor the legacy of Benjamin Franklin.

A special symposium organized by Peter Lewis of Drexel University, Newnham's nominator, and the Materials Research Institute will take place on April 28. The Symposium schedule and participation details can be found at <http://www.mri.psu.edu/conferences/FranklinAwards/>.

Congratulations may be passed on to Prof. Newnham at [bobnewnham@psu.edu](mailto:bobnewnham@psu.edu) or (814) 865-1612.

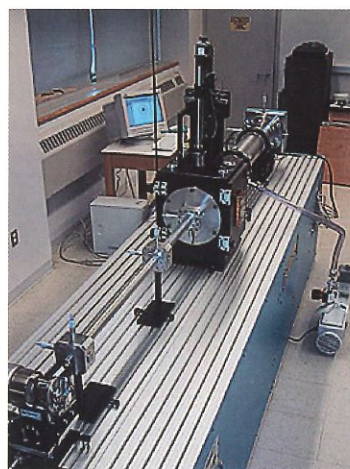


Photo of SAXS system courtesy of Molecular Metrology, company from whom the University purchased the instrument.

all users and enable new research and collaboration. The equipment is located in Hosler building and is part of the Materials Characterization Laboratory (MCL), a fully staffed analytical laboratory serving the University's materials community and offering a range of state-of-the-art analytical techniques and support services.

For more information on the SAXS instrument, please contact Mark Angelone of MCL at [msa3@psu.edu](mailto:msa3@psu.edu) or 883-9350 or visit 7 Hosler building.

## Ultra-thin coating traps DNA on a leash

A coating that tethers DNA to a glass surface and allows the molecule to attach in three different places could make DNA microarrays denser and more affordable, according to Penn State materials scientists.

DNA is the basis of enormous efforts in research and development in pharmaceutical and chemical industries across the country. To assay large numbers of DNA fragments, researchers use DNA microarrays – sometimes called biochips or genome chips. Currently, manufacture of these chips is time consuming and expensive.

flexible leash is able to act as if it were free floating."

The organic molecules that make up the coating have one end that attaches to the glass and the other end with three functional amine groups where DNA strands can interact and attach.

Retention of DNA is more than 50 percent better than found on DNA microarrays using traditional coatings.



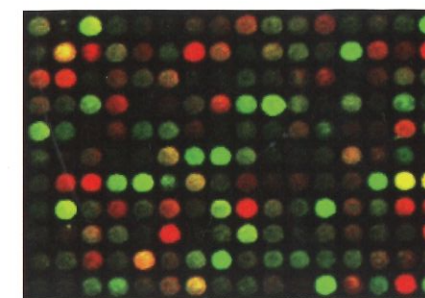
Carlo G. Pantano

Glass is the common, inexpensive substrate base for optical detection in DNA microarrays. However, the glass surface is slippery and DNA will not stick in place. Penn State researchers have developed a coating made of molecules with one side that binds to glass and the other side that grabs on to DNA strands to solve this problem.

"The coating is a single molecule thick, about one nanometer," says **Dr. Carlo G. Pantano**, distinguished professor of materials science and engineering and director of Penn State's Materials Research Institute. "The DNA that attaches to this

Because fluorescent markers are routinely used with DNA microarrays to locate specific DNA fragments that have hybridized, the underlying glass and the coating need to be as non-fluorescent as possible.

Pantano, working with Samuel D. Conzone and Daniel Haines, research scientists at Schott Glass Technologies, and EzzEldin Metwalli, Penn State postdoctoral fellow, chose a variety of glasses, including pure silicon dioxide, Borofloat and flat-panel display glass, to test for self fluorescence of the glass and the coated glass. The researchers found that the coating did not change the self-fluorescence of the slide.



A DNA microarray is a platform for sensing fluorescently-labeled DNA samples. The intensity and color of each spot represents a match between the unknown sample of DNA with the known DNA fragments immobilized in spots on the array. These sensors provide genetic information to diagnose diseases or to develop drugs.

"Research on coatings for DNA microarrays is driven by the need to put more spots on each slide so that more potential drugs or genes can be tested at once," says Pantano. "With less self fluorescence, better adhesion of the DNA probes, and more functionality of the tethered

DNA, we are moving in the right direction. Perhaps we will find a way to produce re-usable microarrays."

Schott Glass Technologies of Duryea, Pa., who has now licensed the coating, supplied the glass used in development. Penn State has filed for a patent on this work which was supported by Schott Glass and Penn State's National Science Foundation Materials Research Science and Engineering Center (MRSEC).

Contact: A'ndrea Messer, [aem1@psu.edu](mailto:aem1@psu.edu), 814-865-9481. For the full article go to: <http://live.psu.edu/story/4928>



## Printing plastic circuits stamps patterns in place

When Benjamin in "The Graduate" was told to go into plastics, computers were in their infancy and silicon technology ruled. Now, conducting organic polymers are infiltrating the electronics sphere and the watchword is once again plastics, according to Penn State researchers.

"For plastic circuits we cannot use the old processing," says **Qing Wang**, assistant professor of materials science and engineering.

"Photolithography and silicon technologies require harsh environments and plastics cannot hold up to them."

Wang, working with **Ziqi Liang** and **Kun Li**, graduate students in materials science and engineering, are looking into novel processing methods for production of organic conducting polymer circuits. One method that is low cost, easy to do, fast and adaptable to large areas and non-flat surfaces, is micro contact printing.

"We use conducting polymers that are functionalized," Wang told attendees at the annual meeting of the American Chemical Society in New York. "They have functional groups attached that allow them to be soluble and to attach to the surface."

Attachment is important as most polymers are slippery and do not want to adhere to surfaces. In conventional ink printing, ink is held onto the paper by surface interactions, but not by chemical reactions. When printing a plastic electronic device, surface interactions are not strong enough to hold the polymer "ink" onto the surface.



Qing Wang

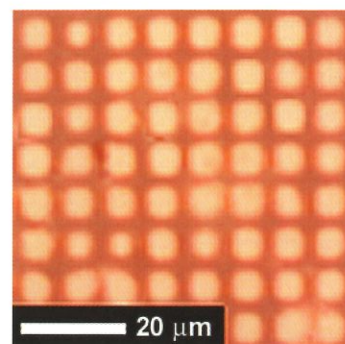
In conventional printing, ink is placed on the plate and then the ink

and paper are brought together for a very short time during which the wet ink is transferred to the paper. When printing polymers on organic acid coated gold, the process is different. The researchers use a pliable stamp of the submicron pattern they wish to transfer. They then apply the polymer "ink" to the stamp surface and dry it. The stamp and the substrate are held in contact for 30 minutes while the polymer transfers to the substrate.

Because the stamp is pliable, this printing method is applicable to curved surfaces. A wide variety of opto-electric devices are possible, including light-emitting diodes,

field effect transistors, lasers, solar cells and chemical and biological sensors.

Wang has investigated the resulting patterns using a variety of macroscopic techniques to ensure that the pattern created on the surface is continuous and usable. Micro contact printing does create patterns with some defects, but the researchers believe that the resultant product is usable.



The optical micrograph of the patterned conducting polymer thin films.

"Micro-printed patterns of conducting polymer need to be used in applications where some defects can be tolerated," says Wang. "Although we do optimize the printed pattern as much as possible."

The Commonwealth of Pennsylvania's Lehigh/Penn State

Center for Optical Technologies supported this work.

Contact: *A'ndrea Messer*, aem1@psu.edu, or *Vicki Fong*, vfong@psu.edu, 814-865-9481. For the full story go to: <http://live.psu.edu/story/3991>

## Department Details

### MatSE welcomes newest faculty member Ron Hedden

The department is proud to welcome its newest faculty member, **Ronald Hedden**, who joined the department at the beginning of the fall semester as an assistant professor of materials science and engineering. Hedden returned to the University in August 2003 after receiving his B.S. from Penn State in 1995 and his Ph.D. from Cornell University in 2000, both in chemical engineering. He was employed as



a National Research Council Research Associate from 2000-2003 at NIST in Gaithersburg, MD.

Prof. Hedden's research group investigates fundamental concepts in polymer physics by synthesis and characterization of model

polymers with well-defined structures. Current and past research

topics include liquid crystalline polymers, networks and gels, and thin films for microelectronics applications. He also teaches two undergraduate courses—Advanced Processing Technology and Solid State Properties of Polymeric Materials.

Hedden's position is co-funded with the Materials Research Institute.

## MatSE honors Charles Lieber with 2003 Nelson W. Taylor award; 2004 lecture series planned

"Materials at the Nanoscale," was the theme of the 2003 Nelson W. Taylor Lecture Series in Materials Science and Engineering, held on September 4 and 5, 2003 on the University Park campus.

Charles M. Lieber who holds the Mark Hyman, Jr. Chair of Chemistry and a joint appointment in the Department of Chemistry and Chemical Biology and the Division of Engineering and Applied Sciences at Harvard University received the 2003 Nelson W. Taylor Award in recognition of his outstanding contributions in nanoscale materials. He presented, "Nanoscience and nanotechnology: Building a big future from small things" to a standing room only crowd at the HUB-Robeson Center Auditorium. The lecture series also included presentations from Penn State faculty from the departments of electrical engineering, chemical engineering, chemistry and materials science and engineering, who are experts in various aspects of nanotechnology.

A native of Philadelphia, Lieber received his bachelor's degree in chemistry from Franklin and Marshall College. After completing his Ph.D. at Stanford University and postdoctoral work at the California Institute of Technology, Lieber began his career as an assistant professor

at Columbia University in 1987. Since moving to Harvard in 1991 as a professor of chemistry, he has won numerous awards including the Feynman Award in Nanotechnology, ACS Pure Chemistry Award, NSF Creativity Award, and Leo Hendrik Baekeland Award. He is a Fellow of the American Academy of Arts and Sciences, American Physical Society and the American Association for the Advancement of Science, and serves on the Editorial and Advisory Boards of a number of science and technology journals. He has published more than 200 papers in peer-reviewed journals and is the principal inventor on more than 15 patents.

The Nelson W. Taylor Lecture Series honors the memory of Nelson W. Taylor, professor and head of the Department of Ceramics, 1933-43, who was responsible for establishing Penn State as an important center for ceramic research.

The 2004 Nelson W. Taylor Lecture on "Functionally Active Materials" will be held on Friday, September 17.



Nelson W. Taylor Awardee Charles Lieber with head, Gary L. Messing (MatSE), and other Penn State faculty who presented lectures during the series. Front (left to right): Charles Lieber (Harvard), Gary L. Messing, (MatSE), and Christine Keating, (Chemistry); Back (left to right): Seong Kim (Chemical Engineering), Evangelos Manias, (MatSE), James Adair (MatSE), Tom Mallouk (Chemistry) and Joan Redwing (MatSE and Electrical Engineering). Missing from photo is Paul Weiss (Chemistry and Physics).

## Paul Becher named distinguished speaker in MatSE; 2004 distinguished speaker series planned

**Paul F. Becher** of the Metals and Ceramics Division at Oak Ridge National Laboratory was an honored speaker at the department's Distinguished Speaker Series last fall. Becher presented, "The Effects of Additives on the Microstructure and Properties of Silicon Nitride Ceramics."



Paul Becher

Becher received his B.S. and M.S. in Metallurgical Engineering from the University of Missouri-Rolla in 1963 and 1964, respectively, and his Ph. D. in Materials Engineering from North Carolina

State University in 1970. Becher's research activities span the areas of microstructural design of ceramics, toughening mechanisms in ceramics, interface structure and behavior in ceramics, composites, coatings, films, deformation, fracture, fatigue, thermal stress and creep behavior of ceramics and

composites, and ceramic processing. He is past-president of the American Ceramic Society and a member of the National Academy of Engineering. He has authored

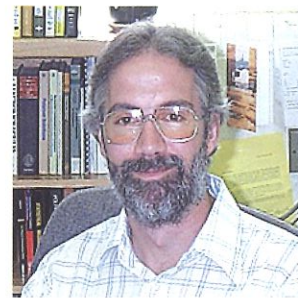
or co-authored over 240 technical publications in these fields and presented numerous invited lectures in the U. S. and overseas.

This spring semester the 2004 Distinguished Speaker Series in Materials Science and Engineering will recognize **Robert Davis** of North Carolina State, **Sheldon Weiderhorn** of the National Institute of Standards and Technology, **Austin Chang** of the University of Wisconsin, and **Matthew Tirrell** of the University of California at Santa Barbara. (Please see page 12 for dates.)



### Professor Ralph Colby named Fulbright Scholar and authors new textbook

**Ralph H. Colby**, professor of materials science and engineering, has been named a Fulbright Senior Scholar for 2004-05. Under the Fulbright grant, Professor Colby will travel to New Zealand where he will teach and conduct research at Victoria University of Wellington from January through June of 2005. There he will be



working with Dr. Paul Callaghan, professor of chemical physics, on NMR imaging of albumin aggregation in synovial fluid. Professor Colby will also be teaching a graduate course from his new textbook, *Polymer Physics*, which he co-authored with Michael Rubinstein of The University of North Carolina at Chapel Hill and was published by Oxford University Press in 2003. Professor Colby's wife and youngest son will travel with him to New Zealand next year.

The Fulbright Scholar Program is sponsored by the U.S. Department of State's Bureau of Educational and Cultural Affairs and administered by the Council for International Exchange of Scholars (CIES). Each year the traditional Fulbright Scholar Program sends some 800 U.S. faculty and professionals to 140 countries to lecture, do research or participate in seminars, and some 800 foreign faculty come to the U.S.

For more information, visit <http://www.cies.org/>

### MatSE staff honored by the College of Earth and Mineral Sciences

**Cindi Mihalik**, staff assistant in materials science and engineering (MatSE), recently received the College of Earth and Mineral Sciences (EMS) Outstanding Staff Award. Eric Barron, dean of EMS, presented Mihalik with the award at the college's Staff Appreciation Luncheon held annually at the Nittany Lion Inn. Mihalik, who currently works in the MatSE financial office, received the award for her contributions to the College and dedication to her job. Mihalik's nominators and supporters said of her, "Cindi is being nominated for her



exceptional growth as a professional. She is courteous and has the complete trust of the faculty and staff in her support of the department. Cindi's positive outlook on the department is very refreshing; both faculty and staff appreciate her enthusiasm." Mihalik has been with the college and department for nearly 21 years.

Two other MatSE staff were honored at the luncheon. **Debbie Evock**, staff assistant in the MatSE department office, received a Five Years of Service Award for her service to the University. **Frank Driscoll**, computer lab supervisor and facilities coordinator, received the On-the-Job-100% Award, which is given to EMS staff who do not use sick time.



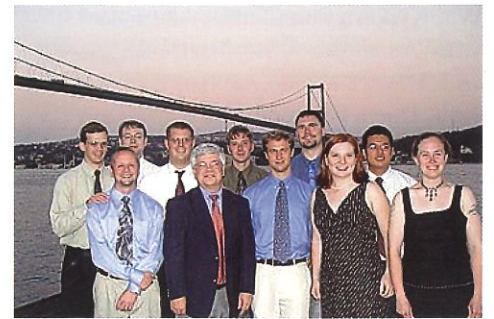
Five Years of Services Awardees: Debbie Evock, pictured third from the right.



On-the-Job-100% Awardees: Frank Driscoll pictured second from right in front row.

### Graduate students receive travel fellowships to ECerS meeting in Turkey and PacRim conference in Japan

A contingent of 12 graduate students and faculty were awarded travel fellowships to participate in the July meeting of 8th European Ceramic Society (ECerS) meeting in Istanbul, Turkey. The theme of the meeting was "Let's meet where the continents meet." There were 675 participants from 51 countries and a total of 720 papers presented. Two hundred companies participated in the Ceramic Exhibition and Fair.



ECerS Travel Fellows at the conference dinner, which was held in an outdoor location below the bridge across the Bosphorus linking Europe with Asia.

The fellowships were supported by Dr. Joan Fuller, Manager of Ceramic and Non-metallic Materials in the Air Force Office of Scientific Research. **Gary L. Messing** (Penn State) and Ender Suvaci (Anadolu University, Turkey) organized the travel program. The graduate students awardees included Dustin Beeaff (Univ Missouri-Rolla), **Kristen Brosnan** (Penn State), Beth Carroll (Drexel), Adam Chamberlain (Univ Missouri-Rolla), Glen Kirby (Univ Illinois), **Matthew Krohn** (Penn State), Liam D. Noailles (UCLA) and Ryan Ong (Univ Illinois). The faculty awardees included Professors David Cann (Iowa State), **Allen Kimel** (Penn State) and Jon-Paul Maria (North Carolina State Univ).

Nine graduate students were awarded National Science Foundation supported travel fellowships to participate in the September meeting of 5<sup>th</sup> Pacific Rim meeting in Nagoya, Japan and to tour Japanese ceramic manufacturing plants. There were 24 symposia and a total of 1150 presentations at PacRim 5.



PacRim Travel Fellows (left to right, Messing, Fox, Sigman, Sakamoto, Gicondi, Juliano, Naguib, Hall, Bickford, and Hoffman) at the conference banquet.

The fellowships were supported by Dr. Lynnette Madsen, Program Director of Ceramics, Division of Materials Research, National Science Foundation. The students were teamed with Japanese students and visited NTK and NGK manufacturing plants in Nagoya, and Murata in Kyoto. In addition the students were taken on a sight-seeing tour of Ryouanji, Kinkakuji and Kiyomizu temples in the Kyoto area.

Wataru Sakamoto (Nagoya University) and **Gary L. Messing** (Penn State) co-organized the travel program. Travel fellows included **Elise S. Bickford** (Penn State), **Kevin Fox** (Penn State), Jennifer Gicondi (MIT), Matthew Hall (Alfred University), and from Drexel University were Elizabeth Hoffman, Jennifer Jordan, Tom Juliano, Nevin Naguib, and Michael B. Sigman, Jr. (University of Texas).

### MatSE develops undergraduate research opportunities in biomaterials

Students whose interests cut across the boundaries of materials research and biology are choosing materials science and engineering as an undergraduate major and are gaining valuable research experience in the emerging field of biomaterials. Biomaterials can be classified as any material used in modern healthcare that comes into contact with the body, from sterile disposables (such as syringes, needles and sample collection containers) to implantable devices for drug delivery and organ replacement (such as insulin pumps, stents and the artificial heart). Materials Science and Engineering (MatSE) is providing research experience for undergraduate students



Arwen Wilson

interested in this growing area of biomaterials research, including a minor in bioengineering. **Arwen Wilson** was recently awarded a National Institute of Health (NIH) fellowship supporting undergraduate research in biomaterials. Wilson's project, "Surface Engineering in Contact Activation of Blood Coagulation" is led by **Erwin Vogler**, associate professor of materials science and engineering, who is her advisor, and **Christopher Siedlecki**, assistant professor of surgery and biomedical engineering at Hershey Medical Center. Wilson's research is being conducted in Dr. Vogler's Biomaterials Surface Science Laboratory in Steidle building. The focus of Wilson's research is specifically aimed at discovering ways to reduce blood clotting in the application of medical



Amra Tabakovic

devices. One of the ways to solve this problem is to understand how blood proteins interact with biomedical surfaces and cause clotting. Wilson is working together with **Anandi Krishnan**, graduate assistant in bioengineering. **Amra Tabakovic**, another undergraduate student in MatSE, is also gaining experience in biomaterials research under the supervision of Dr. Vogler. Tabakovic's project, "Orthopedic Biomaterials," focuses on the interaction of osteoblasts with bone-analog materials. Orthopedic biomaterials are important in the development of prostheses and bone cements used in orthopedic health care. Tabakovic is working with **Xiaomei Liu**, graduate assistant in bioengineering.

### Student Scoop

#### Congratulations to the following MatSE students on their Fall '03 graduation:

**B.S. Degrees**  
Rebecca Klossner  
Jamie Morley  
Robert O'Neill  
Thomas Pribicko  
Shannon Rummel  
Stephen Sollenberger

**M.S. Degrees**  
Timothy E. Bogart  
Steven C. De Blasio  
Yajun Fan  
Maruti C. Uppalapati  
Seyit O. Ural  
Hsiao-Yuan Wang

**Ph.D. Degrees**  
Caner Durucan  
Richard E. Eitel  
He Huang  
Vikram K. Kuppa  
Steven J. Montgomery  
Metin Ozgul  
Junwu Shen  
Shihai Zhang



## Undergraduate scholarship recipients for 2003-04 academic year

**AVX/Kyocera Foundation:** Alexander Adler, Adam Barci, Stephen Benko, Aaron Bua, David Cassada, Alexana Cranmer, Leslie Dunn, Krystle Dzienis, Matthew Fimiano, Michael Kelly, William Rouse, Jennifer Rygel

**Francis Hamilton Byers:** Aaron Dawes, Daniel Frazier, Mark Haraczak, Lori Hoch, Jessica Kohler, Jayson VanShura

**Charles G. & Donna H. Carson:** Kurt Chiang, Brad Jones

**Michael & Mary Jane Coleman:** Lori Hoch

**C. Philip Cook Jr. Memorial:** Eric Heinbaugh, Jaclyn Shearer, Amra Tabakovic, Jayson VanShura

**Richard P. & John N. Davis:** Rebecca Klossner, Andrew Shindyapin

**DuPont:** Jayson VanShura

**Dorothy Pate Enright:** Michael Dankanich, Jacob Smail

**Glass Container Industry Res.:** Jennifer Rygel, Katherine Williams, Melissa Zimmerman

**Donald W. Hamer:** Andrew Mackey, Dennis Shay

**Hommell Scholarship:** Robert Smith, Craig Thomas

**F. Hummel:** Erin Henry

**Harvey Kocher Scholarship:** Matthew Benzio, Gary Burke, Paul Hauge, Justin Hyska, Ho-Ching Li, Sarah Mansuetti, Jennie McGuire, Ioanna Mina, Robert

O'Neill, Brandon Ribic, Shannon Rummell, Nevin Sherlock, Philip Williams, Arwen Wilson, Andrew Woodruff, Kevin Yocca, John Zaharoff

**Mr. & Mrs. Frank D. Lovett, Sr.:** Stephen Sollenberger

**Anthony & Alberta Perrotta:** Kelli Friedrichs, Christopher Gold, Michael Kelly, Julie Sutsko

**Slachta Scholarship:** Katherine Williams

**Starsinic Scholarship:** Jessica Kohler

**State of the Art:** Sarah Dilts, Nathan Murphy, Amish Shah, Daniel Shir, Tyler Wise

**James & Mary-Ellen Tietjen:** Melissa Lackey, Tyler Moyer

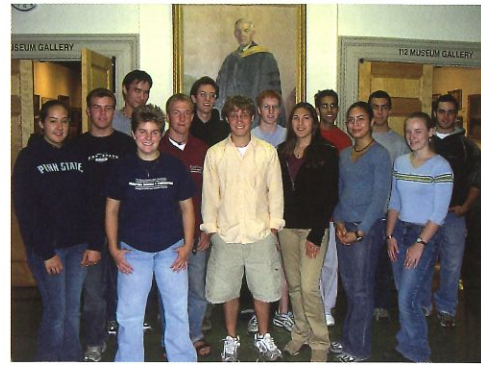
**George & Madeleine Todd:** Jeremy Rathfon

**Richard E. & Sue A. Tressler:** Andrew Mackey, Thomas Mrotek

**William & Estelle Turney:** Jessica Kohler, Jamie Morley, Melissa Zimmerman

**Virginia S. & Philip L. Walker, Jr.:** Patrick McGee, Glen Ottinger, William Rouse

**Sam Zerfoss Memorial:** Jeffrey Bender, Paul Cha, Erin Henry, Ju Pyo Hong, Craig McCann, Stephen Sollenberger, Craig Thomas



(Pictured from left to right.) Row 1: Krystle Dzienis and Jen Rygel. Row 2: Glen Ottinger, Jeremy Rathfon, Craig McCann, Julie Sutsko, Arwen Wilson and Zana Cranmer. Row 3: Paul Cha, Tom Mrotek, Patrick McGee, Amish Shah, David, Cassada and Andrew Mackey.



(Pictured from left to right.) Row 1: Melissa Zimmerman, Shannon Rummel, William Rouse and Daniel Shir. Row 2: Jeff Bender, Jennie McGuire, Amra Tabakovic, Andrei Shindyapin and Sarah Mansuetti.

## Neighborhood News

## Alan Scaroni appointed associate dean for graduate education and research



**Alan Scaroni** was recently appointed associate dean for graduate education and research in the College of Earth and Mineral Sciences (EMS).

Scaroni began his new duties on January 2, continuing a long succession of administrative position advancement in the College. Scaroni began his long affiliation with EMS in the mid-1970s earning his M.S. in 1979 and his Ph.D. in 1981, both in fuel science. He joined the

faculty as an assistant professor in 1981, was promoted to associate professor in 1986, and then, professor in 1992. In 1992, Scaroni was appointed director of the EMS Energy Institute (formerly the Energy and Fuels Research Center) where he administered the activities of over 130 faculty, staff and students with an annual budget of approximately \$3.4 million per year. In 1996, Scaroni was appointed chair of the fuel science program in the Department of Materials Science and Engineering and in 1998 was appointed head of the Department of Energy and Geo-Environmental Engineering.

Scaroni's publication history is extensive with approximately 200 books and papers. He has been the principal or co-principal investigator on over 57 projects with total funding exceeding \$36 million.

"I am thrilled that Alan has accepted the challenge of enabling and advancing our research enterprise and promoting graduate education in EMS," said **Eric Barron**, dean of the College.

## EMS deans contribute to new Trustee Scholarship

The three most recent deans of the College of Earth and Mineral Sciences have joined in the effort to help keep a Penn State education accessible by creating a Trustee Scholarship in their college. The Trustee Scholarship Program, launched University-wide last year, aims to ensure that a Penn State degree remains within the reach of all qualified undergraduates, regardless of financial means.

Contributing to the EMS Deans Trustee Scholarship were **Eric J. Barron**, who has served as dean since July 2002, and his wife, Molly Barron; **John A. Dutton**, dean from 1985 to 2002, and his wife, Elizabeth Dutton; and **Charles L. Hosler**, dean from 1965 to 1985.

"With more than 50 years of combined overall service to the College of Earth and Mineral Sciences, these administrators

know firsthand the effects that higher education's rising costs have had on students and their families," said Penn State President Graham B. Spanier. "The wonderful example of collaboration and generosity they and their spouses have set by making a personal commitment to the Trustee Scholarship Program is an inspiration for the entire University community."

The University launched the scholarship initiative in July 2002, aiming to secure \$100 million in endowed gifts for Trustee Scholarships by June 30, 2007. To underscore its commitment to this effort, the Board of Trustees agreed to match 5 percent of the gift, and to make these matching funds available to assist students as soon as the donor completes scholarship pledge forms and guidelines. The matching funds continue in perpetuity

and are combined with income from the endowment to increase the financial impact of the scholarship. A \$50,000 minimum gift is required.

In 2002-03, 77 percent of Penn State undergraduates received more than \$450 million in student financial aid. However, almost 60 percent of those funds (more than \$250 million) were in the form of loans, resulting in an average student loan debt of \$18,200 at graduation.

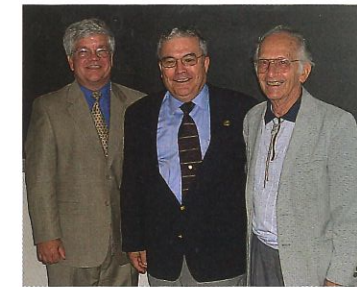
The Trustee Scholarship program, when fully endowed at \$100 million, will increase the amount of privately funded endowed spending on scholarships, as opposed to loans, by 40 percent.

Contact: Michael Bezilla, [mx13@psu.edu](mailto:mx13@psu.edu), 814-863-4512 or Laura Stocker, [lsp1@psu.edu](mailto:lsp1@psu.edu), 814-863-4512, <http://live.psu.edu/story/4197>

## Alumni Annals

## Day receives Charles L. Hosler Alumni Scholar Medal

**Dr. Delbert E. Day**, curators' professor emeritus of ceramic engineering and former director of the Graduate Center for Materials Research at the University of Missouri-Rolla, received the Charles L. Hosler Alumni Scholar Medal from Penn State's College of Earth and Mineral Sciences at the College's Obelisk Society reception and dinner on September 19, 2003.



Gary L. Messing (left), distinguished professor and head, and Guy Rindone (right), professor emeritus of ceramic science with Delbert Day (center), recipient of the Charles L. Hosler Alumni Scholar Medal for 2003.

Day is an internationally renowned glass scientist who has been involved with containerless melting of glass in space, the development of therapeutic glass spheres, TheraSphere™, which are used to locally irradiate cancerous organs, and the invention of Glasphalt™, a commercial product that is used to recycle glass. Day is co-founder and serves as chairman and CEO of MO-Sci Corp.; a company which has commercialized a number of his discoveries. He is the author or co-author of over 280 technical publications, the editor of three books, and holds 42 U.S. and foreign patents.

Day earned both his M.S. in 1960 and his Ph.D. in 1961 in Ceramic Technology from Penn State. In 1997 he was named a Centennial Fellow of the College of Earth and Mineral Sciences and has received numerous other awards and honors throughout his career including being named Fellow of the American Ceramic Society (1973). From 1995-96 he served as president of the American Ceramic Society.

The Hosler Alumni Scholar Medal recognizes the distinguished career of Dr. Charles L. Hosler, professor emeritus of meteorology and dean of the College from 1965 to 1985, who served Penn State as senior vice president for research and dean of the Graduate School.

Late-breaking news...  
Day elected to National Academy of Engineering

Alumnus Delbert Day ('60 M.S. and '61 Ph.D.) was recently elected to the National Academy of Engineering (NAE). He was cited for "the development of radiotherapeutic glass microspheres and their transfer to medical applications." Election to NAE is among the highest professional distinctions accorded to an engineer. Congratulations, Delbert!



**Profile: Frederick Langenberg (Metallurgy, '55 Ph.D.)**

MatSE alumnus and chairman of Langand Corporation in McMurray, Pennsylvania, **Frederick Langenberg** (metallurgy, '55 Ph.D.) and his wife Peggy recently donated \$300,000 to the Department of Materials Science and Engineering.



*Frederick Langenberg (metallurgy '55 Ph.D.) and his wife Peggy.*

Through the Langenberg's generous gift, "The Frederick and Peggy Langenberg Fund for Excellence in Materials Science and Engineering" was established to support innovative research, education and service opportunities in the department. As a result, a new information technology classroom named "The Frederick and Peggy Langenberg Classroom," will be located in Steidle building, where students will have wireless access to the Internet and state-of-the-art audio-visual equipment.

"Innovation leads to new materials and new products," said Langenberg of his decision to support the department in this way. "Through the cultivation of innovative people and ideas, materials science and engineering will continue to stay on top in the development of new technologies."

With a distinguished career in the metals industry, Langenberg knows first-hand about being on top in the development of new technologies. Launching his career as a metallurgist with U.S. Steel in 1951, Langenberg soon found himself in decision making roles. He progressed up the executive ladder, becoming president of Colt Industries' Trent Tube Division and later of Jessop Steel. In 1975 he was elected president of the American Iron and Steel Institute, headquartered in Washington, D.C., maintaining a voluminous library and extensive research programs to serve the industry's manufacturers.

As president from 1979-81 and president, chairman, and chief executive officer of Interlake Corporation from 1981-91, Langenberg was the driving force in converting the company from a maker of capital-intensive commodities to a technology-driven, multinational

producer of engineered materials, including metal powders, aerospace components, and handling/packaging systems. Colleagues regard him as an enlightened leader who has used his foresight about a changing world to help create a revolution in his profession.

Langenberg is a Distinguished Alumnus (1989) and an Alumni Fellow (1977) who earned his Ph.D. in Metallurgy in 1955 and then spent one year as a visiting fellow at Massachusetts Institute of Technology. He has been active in the American Society for Metals (ASM) ever since his undergraduate days at Lehigh, and was given the Penn State ASM Chapter's David Ford McFarland Award for achievement in metallurgy in 1973. He is a Distinguished Life Member of ASM and is also active in the Association for Iron and Steel Technology.

As members of the University's Mount Nittany Society, Obelisk Society and President's Club, the Langenbergs are among Penn State's most loyal supporters. At least twice per year they visit University Park, "...Usually for football games and the Mount Nittany and Obelisk Society meetings," said Langenberg. In 2001, they established the Langenberg Scholarship Fund in Materials Science and Engineering to support outstanding undergraduate and graduate students studying metals science and engineering. The Langenbergs reside in Upper St. Clair, Pennsylvania.

**We want to hear from you!**

Please visit us online at [www.matse.psu.edu/alumni/](http://www.matse.psu.edu/alumni/) where you can read our alumni **News and Notes** online, send us your news using the **Alumni News Form** or update your contact information with the **Penn State Alumni Association**.

Please keep checking back to our alumni web pages as we will be adding more information in the future!

**News and Notes**

**Tabbatha Dobbins** ('02 Ph.D.) accepted a position as an assistant professor of physics at Louisiana Tech University and a joint appointment with The Department of Physics at



Grambling State University. This spring semester, she is teaching Quantum Mechanics to undergraduate students at Grambling. Her research on nanoparticle synthesis and sizing using small-angle x-ray scattering and light scattering is focused on the synthesis of systems for hydrogen storage, including the design of a MEMS based electrochemical test cell for the hydrogen storage tests.

"Since Grambling is a historically black college and Louisiana Tech is not, the State of Louisiana Board of Regents has designed a Joint Faculty Program between the two--which should be mutually beneficial," said Dobbins. Along those lines, she is proposing an NSF-Nanotechnology Undergraduate Initiative to grant Physics and Chemistry degrees with nanotechnology emphasis provided that the students take 2 courses (one laboratory class and one lecture class) and perform one semester of practicum research with a professor on nanoscience/nanotechnology.

**Thank you to all who have contributed to MatSE!**

(The following is a list of donors to the department from July 1 - December 31, 2003. We have checked our records carefully, but if you do not see your name listed, please contact the editor at: (814) 865-2746 so that we can correct our records.)

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| <p><b>Individuals</b></p> <p>W. Scott and Ann Marie Aaron<br/>                 Jason P. and Victoria E. Arndt<br/>                 Peter F. and Angela Baumann<br/>                 Andrew K. and Martha Powell Birchenall<br/>                 H. Dean and Alicia Bunnell<br/>                 Charles G. Carson, III and Donna Hanschuh Carson<br/>                 Theodore P. and Kathleen Christini<br/>                 John Dash<br/>                 Delbert E. Day<br/>                 P. James and Theresa Diffenbach<br/>                 Dorothy P. Enright<br/>                 Katherine T. Faber and Thomas F. Rosenbaum<br/>                 Alison W. Gee<br/>                 Brenda Bartges Giles<br/>                 Charles D. and Anna Maria R. Greskovich<br/>                 Douglas C. and Lynette D. Hague<br/>                 Donald W. Hamer and Marie Bednar<br/>                 John R. Hellmann, Jr. and Kathleen Cossick Hellmann<br/>                 David J. Hofmann, Jr. and Margaret Ann Hofmann<br/>                 David L. Houck and Brenda S. Webster-Houck<br/>                 Thomas A. Houston</p> | <p>John F. Kelso and Judith A. Nemetz-Kelso<br/>                 Donald A. and Carol Sleeth Kenagy<br/>                 William G. and Susan Derosa Kohlman<br/>                 John C. and Mary M. Kosco<br/>                 Stanley J. Kozmiski<br/>                 Leslie D. and Lynn Kraighman Kramer<br/>                 Thomas M. and Eleanor W. Krebs<br/>                 Mildred Rickard Landis<br/>                 Errol L. Isabel Knowlton Lloyd<br/>                 James E. Kimberly Diane Loftus<br/>                 Daniel R. and Penny S. Marx<br/>                 Thomas O. and Karen Bickel Mason<br/>                 Gary L. and Rebecca Lynn Messing<br/>                 John A. and Joann N. Miller<br/>                 Lance R. Miller<br/>                 Eric J. and Toni Wagner Minford<br/>                 Jai A. Pathak<br/>                 Howard R. and Rosemarie C. Peiffer<br/>                 Syamala Perisastry<br/>                 Howard W. and Judith A. Pickering<br/>                 Andrew and Mary Jane Pocalyko<br/>                 Aaron D. Proper<br/>                 Harry W. Rauch, Sr.<br/>                 Joel G. and Kim Boeshore Reed<br/>                 Roy L. Schuyler, III and Kathleen Schumacher<br/>                 Schuyler<br/>                 Douglas J. Sekelik</p> | <p>David M. and Mrs. Kathleen Cook Simpson<br/>                 Trevor B. Spence<br/>                 Richard M. Spriggs<br/>                 Robert L. and Jane Locker Sproat<br/>                 Paul T. and Maurice Ann Stecko<br/>                 Jack F. and Loretta Strange<br/>                 Kyle D. Strenski<br/>                 Michael J. and Theresa Kerly Suscavage<br/>                 Tseng-Ying and Chin Kai Tien<br/>                 James F. Tressler<br/>                 Eric R. and Kristin Trumbauer<br/>                 John C. Turn, Jr. and Mary Ann S. Turn<br/>                 Paul Vieira and Cynthia M. Ward-Vieira<br/>                 Steven A. Warner<br/>                 Lon L. and Gail Weiss<br/>                 Eric J. and Ann B. Whitney<br/>                 Martha Zerfoss</p> <p><b>Foundations</b></p> <p>Alcoa Foundation<br/>                 Dow Chemical Company<br/>                 Hewlett-Packard Co.<br/>                 Kennametal Foundation<br/>                 Mildred R. Landis Foundation<br/>                 Sprint Foundation<br/>                 State of the Art Inc.<br/>                 World Reach, Inc.</p> |
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Please use my gift for the following area of need:

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To make a gift, please complete and return this form, including a check made payable to The Pennsylvania State University, to 121 Steidle Building, University Park, PA 16802.

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## Upcoming Events

**Graduate Open House**

**Engineering Open House**

**Spring Break**

**Robert Davis**, Kobe Distinguished Professor of Materials Science and Engineering, North Carolina State, 26 Hosler building, 11:15 a.m.

**American Physical Society, Montreal**

**MatSE Undergraduate Open House**

**EMEX**

**American Chemical Society, Anaheim CA**

**Sheldon Wiederhorn**, Senior Fellow, NIST, 26 Hosler building, 11:15 a.m.

**Austin Chang**, Distinguished Professor of Materials Science and Engineering, University of Wisconsin, 26 Hosler building, 11:15 a.m.

**Materials Day**, "Materials for Advanced Manufacturing"

**Matthew Tirrell**, Richard A. Ahull Professor of Materials and Dean, College of Engineering, University of California, Santa Barbara, 26 Hosler building, 11:15 a.m.

**ACerS Annual Meeting, Indianapolis**

**IPAC Meeting and MatSE Awards Convocation**

**McFarland Banquet and Blue/White Game**

**Commencement**

**American Chemical Society, Philadelphia**

**ISAF, Montreal**

**February 27**

**February 28**

**March 8 - 12**

**March 18**

**March 22-27**

**March 26**

**March 27**

**March 28-April 1**

**April 1**

**April 8**

**April 14-15**

**April 15**

**April 18 - 21**

**April 22**

**April 24**

**May 14 - 15**

**August 22-26**

**August 24 - 27**

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