

DEPARTMENT OF
MATERIALS SCIENCE AND ENGINEERING

COLLEGE OF EARTH AND MINERAL SCIENCES

Summer 2005
Vol. VIII, No. 1 **Newsletter**

From the Department Head



Gary L. Messing
Head, Materials Science and Engineering

Dear Alumni and Friends,


The students, staff and faculty have been very active this past year. I hope you enjoy hearing of their successes. Our third annual Awards Convocation reminds me that we have many outstanding students in MatSE. We have had so much success recruiting outstanding undergraduate students that we are beginning to run out of scholarship monies. You may want to consider establishing a Trustee Scholarship in MatSE. A Trustee Matching Scholarship can be created with an outright gift or pledge at or above the \$50,000 minimum endowment level between now and June 30, 2007. The Trustees promise to match your contribution and thus double the scholarship dollars available. Of course, any help that you can give us is greatly appreciated.

Governor Rendell visited Penn State to give a check for \$40,000,000 to President Spanier for the new materials building. That is half of the estimated cost of the 200,000 sq ft building that we have been envisioning for almost 10 years. We have many people to thank for moving the materials building onto the funding list. I know I'll miss some but... Dick Tressler was the first to create the vision for a new building. In the last five years Eva Pell, Vice President for Research and Carlo Pantano, MRI Director were key in their constant pursuit of our dream. Now that part of the money has been procured we have lots to do. We don't know where the building will be located but we expect construction will begin in 2007-2008.

We received a wonderful gift for graduate fellowships from 3M Company. Dr. Frank Armatis, Laboratory Manager, 3M Corporate Research Laboratory presented a check for \$225,000 to support the recruiting of outstanding graduate students. The 3M Fellowships will support three new students each year over the next three years. Thanks 3M!

For those in the Pittsburgh area, we will be hosting an Alumni and Friends reception on Tuesday, September 27, at 7:30 p.m. in the Conference room at the Omni Hotel. Please come to meet friends (you do not have to be registered for the MS&T meeting to attend). As always, when in town stop in and see us.

All the best,


Gary

Inside this Issue:

**Department
Details** 2-9

Student Scoop 10-12

Alumni News 12-13

Editor: Gary L. Messing
Writer/Editor and Layout:
Kim Sterndale



Carlo Pantano, Director of MRI, and Gary L. Messing, Head, Materials Science and Engineering



Frank Armatis, 3M, Carlo Pantano and Gary L. Messing

Brand new to Materials Science and Engineering – Discovering Materials Science Camp 2005!

This summer MatSE offered a youth day camp for students in grades 10-12 at the University Park Campus. The camp, run by Drs. Allen Kimel and Chris Muhlstein, gave high school students hands-on experience in materials science.

Materials in Forensic Science: Using Materials Science to Investigate the Failure of Materials was held July 6-8. Students learned about forensic materials science and the materials we use in our daily lives,

investigated incidents where materials have failed and determined why failure happened based on evidence collected, and more.

Congratulations to the following faculty on their recent awards of tenure:

Venkatraman Gopalan, Associate Professor of Materials Science and Engineering

Zi-Kui Liu, Associate Professor of Materials Science and Engineering

Evangelos Manias, Associate Professor of Materials Science and Engineering

New Faces in MatSE



Kim Sterndale joined MatSE as an administrative assistant in the department head's office. Kim came to us from the Department of Biology.

MatSE has a New Look!

Check out our newly designed web site
www.matse.psu.edu



Carinda Kormanik, who previously worked in The College of Science Dean's Office, has joined the financial office staff.



Rachel Fox, who comes to us from University Libraries Human Resources, is one of the newest members of the financial office.



Michelle Matis, who previously worked in the Alumni Association's Office of Data Access and Services, has filled an open position in the graduate studies office.



Allison Albinski has recently joined Penn State and the undergraduate studies office.

Opportunities for Giving

Private support is very important to the Material Science and Engineering Department in a wide variety of ways. Steadily dwindling state appropriations create a critical need for private funds for scholarships, programs, facilities, faculty, and outreach. In the 2004-05 academic year, the

Commonwealth of Pennsylvania appropriations to Penn State comprise 11.4 percent of the University's annual budget. We are infinitely grateful to the many wonderful alumni and friends of the department who have made gifts and created endowments to support the mission of the Department.

If you would like to make a pledge to support an endowed scholarship, please contact Kathy Spicer at 814-863-1779 or by e-mail at kkm1@psu.edu.

Department of Materials Science and Engineering Undergraduate Funds

Yes, I want to support MatSE with my gift of:

- \$50.00
- \$100.00
- \$250.00
- Other:

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.

Name _____

Address _____

Phone _____

Email _____

Please use my gift for the following area of need:

- New Undergraduate Processing Lab Fund
- International Internships in Materials
- Undergraduate Equipment Fund
- Undergraduate Travel Fund

Students and Staff Recognized at Annual MatSE Awards Convocation

The MatSE Department celebrated the achievements of its students, staff and faculty at the annual Awards convocation on April 27, 2005, at the Nittany Lion Inn.

More than 175 students, staff, and faculty gathered for a reception and dinner followed by an awards program. After a warm welcome and remarks by **Gary Messing**, department head, **Robert Newnham**,

Professor Emeritus, Alcoa Professor of Solid State Science, addressed the group sharing his remarkable 50 years of Penn State experience. The program was then handed over to the student emcees. Undergraduate students, **Nathan Murphy** and **Kyle Hoff**, presented the undergraduate awards, while graduate students **Matt Heidecker** and **Nazanin Bassiri Gharb** presented the graduate awards.

Undergraduate awards were presented in the categories of Academic Excellence, Service, Leadership, and the Undergraduate Poster Competition for Excellence in Undergraduate Research. Graduate student awards were presented for Outstanding Service to the Department and for the Graduate Poster competition. Presentation of the MatSE Staff Excellence Award concluded the program.



MatSE Award for Academic Excellence
Jeffrey Bender



MatSE Leadership Award
Jennifer Rygel



MatSE Service Award
Paul Cha



MatSE Graduate Service Award
Brian Erwin and Brian Marx

MatSE Awards for Excellence in Undergraduate Research



1st Place: **Alejandro Levander**
"Synthesis of Anisotropic SrTiO₃"



2nd Place: **Kevin Yocca**
"Influence of Crosslinking Lithium Ion Conduction in Poly(ethylene imine) Gel Electrolytes"



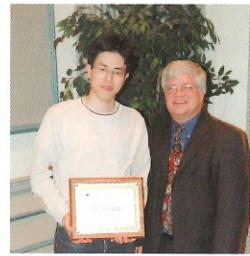
3rd Place: **Craig McCann**
"MEMS Summit V Polycrystalline Silicon: Investigating Fracture Strength at Room and Elevated Temperatures"



3rd Place: **Kurtis Chiang**
"Preparation of Porous Xerogel-metal Nanocomposites Through Sacrificial Dendrimer Templates"

Undergraduate Team Winner:
Bert Team, **Brad Jones, Erica Redline, Robert Mizikar and Thomas Winkler**
"Ceramic Tubes for Gun Barrel Applications"

Graduate Research Poster Awards



1st Place Individual
Kun Li
"Synthesis and Multiple Self-Assembled Nanostructures of an Oligo (p-phenyleneethynylene) Containing Rod-Coil-Rod Triblock Copolymer"



2nd Place Individual
Amit Kumar
"A Bi-directional Model to Calculate Weld Geometry Using a Phenomenological Model, a Neural Network"



3rd Place Individual
Lisa Edge
"Thermo Stability of Amorphous Lanthanum Aluminate Thin Films on Silicon"



3rd Place Individual
Olivier Pierron
"MEMS Reliability: The Role of Environment in the Fatigue Behavior of Silicon Thin Films"



3rd Place Individual
Joseph Ryan
"Surface Area Characterization of Sculptured Thin Films"

1st Place Group: (tie)
Dr. Jim Adair's group
"Particle Science and Technology"
Dr. Jim Runt's group
"Structured and Ionic Polymers"



Staff Excellence Award
Katina Bartley

3rd Place Group:
Dr. John Hellmann's group
"Thermomechanical Properties and Performance of Materials at the Nano-, Micro-, and Macroscale"

Chen Receives Guggenheim Fellowship



Dr. Long-Qing Chen is a 2005 recipient of a Guggenheim Fellowship. The 2005 Fellowship winners include

186 artists, scholars, and scientists selected from over 3,000 applicants

for awards totaling \$7,112,000. Guggenheim Fellows are appointed on the basis of distinguished achievement in the past and exceptional promise for future accomplishment.

The purpose of a Guggenheim Fellowship is to help a fellow to secure a block of time, free from other duties, in which to pursue their own scholarly

or creative work. Chen will use this fellowship to study the structures and properties of ferroelectric and multiferroic thin films that have potential applications in various functional devices including actuators, sensors, spintronics, electrooptics, and storage devices. He will spend an extended period of time with researchers at the Rutgers University

More Alumni News

Donald Kupp (B.S. 82) was appointed as associate director of Penn State's Industrial Research Office (IRO). His primary focus is materials research, building on his background and experience in materials as well as his familiarity with material researchers at Penn State. Kupp served in various capacities at Penn State's P/M Lab and with the Department of Materials Science and Engineering during the 1980's and 1990's.

Congratulations to **Kyle Strenski** (B.S. 97) and his team the Cincinnati Dockers (combined with the Pittsburgh Wallabies), an Australian Rules Football Team, for their victory over Kansas City making them the Division 3 National Champs. What is Australian Rules Football, you ask? Check out www.cincinnati-dockers.com to find out!

Andrea Statz (B.S. 03) is part of a research group led by Phillip Messersmith of Northwestern

University that is working on biologically inspired polymers for antifouling medical surfaces. Many medical implants fail because cells stick to them and interfere with their operation. Statz is part of a team that is working on a new coating that consists of two linked parts. The first part is a proteinlike polymer designed to prevent cells from sticking to it and is resistant to enzymatic degradation. The second part emulates the adhesive protein in mussel glue, which could prove to be more durable. Statz, who received her B.S. with honors in Materials Science and Engineering in Polymer Engineering and a minor in Bioengineering, is a graduate student in the Messersmith Research Group at the Northwestern University in Evanston. While at PSU, she was advised by Paul Painter, Professor of Polymer Science, and did her honor's thesis, *"Osteoblast Interaction with Orthopedic Biomaterials,"* under the advisement of Erwin Vogler, Associate Professor of Materials Science and Engineering and Bioengineering.



Dr. Robert Kumpf (Ph.D. 88, M.S., B.S., Polymer Science), Vice President of Future Business for Bayer MaterialScience LLC, has been selected to receive

the 2005 GEMS Alumni Achievement Award. This is the highest recognition given by GEMS, the Alumni Society of Penn State's College of Earth and Minerals Sciences.

Dr. Kumpf joined Bayer in 1988 as a research chemist after graduating from Penn State University. He held various positions in research and product development, and currently leads the group responsible for developing the materials of the future by focusing on innovation-driven polymer products. He has been actively engaged with the Department of Materials Science and Engineering for many years and is a member of our Industrial Advisory Panel.

Obituaries

We are saddened to learn of the deaths of **Edward M. Anderson** (M.S. 67) on September 21, 2004, and **Henry Mauzee (George) Davis**, Professor Emeritus of Chemical Metallurgy at Penn State, on April 19, 2004, at the age of 101 years.

Mr. Anderson was employed by Baikowski Malakoff Inc. with prior affiliation with Reynolds Metals Co., Alcoa Industrial Chemicals, Lanxide Corp., Exxon Research & Engineering Co., Babcock & Wilcox Co., and General Refractories Co. Anderson was a Fellow of the American Ceramic Society and a member of NICE.

Dr. Davis began his career at Penn State in 1936 as a Research Associate in the Ceramics Department which was then in the School of Mineral Industries. He transferred to the Metallurgy Department where he advanced over time to Professor of Chemical Metallurgy. Davis was very active in the Penn State Chapter of the American Society for Metals (ASM). He retired from Penn State as Professor Emeritus in 1962. Davis then worked at the Army Research Office as Director of the Metallurgy and Materials Science Division until his retirement in 1974.

Thank you to all who have contributed to MatSE!

(The following is a list of donors to the department from July 1, 2004 – June 1, 2005. We have checked our records carefully but if you do not see your name listed, please contact us at (814)865-0497 so that we can correct our records.)

Individuals

Peter F. Baumann
Angela Baumann
Charles L. Booth
Esther H. Booth
Daniel L. Brillhart
Konni Herrold Brillhart
Elias Burstein
Mary L. Cannito
Ryan J. Carr
Charles G. Carson, III
Donna Handschuh Carson
Ming-Yuh C. Chung
Tze-Chiang Chung
Christopher S. Cleveland
Delbert E. Day
Melanie K. DelleCurti
John M. DelleCurti, Jr.
Dorothy P. Enright
Katherine T. Faber
Thomas F. Rosenbaum
Daniel R. Frazier
Eric E. Gallo
Lisa Gallo
Alison W. Gee
Brenda Bartges Giles
Christine V. Graf
John F. Graf
David J. Green
Keiko Green
John A. Halchak
Yurie Halchak
Donald W. Hamer
Marie Bednar
Ralph W. Harris
Jean E. Harris
John R. Hellmann, Jr.
Kathleen Cossick Hellmann
Kirstin S. Hemphill
David L. Houck
Brenda S. Webster-Houck
Thomas A. Houston
C. Donald Jamison, Jr.
Jane K. Jamison
John A. Kaniuk
Rosemary Kaniuk
Paul T. Kelly
John F. Kelso
Judith A. Nemetz-Kelso
William G. Kohlman
Susan Derosa Kohlman

David M. Koncsics
John C. Kosco
Mary M. Kosco
Eleanor W. Krebs
Thomas M. Krebs
Amitabha Kumar
Kakoli Kumar
Isabel Knowlton Lloyd
Errol L. Lloyd
James E. Loftus
Kimberly Diane Loftus
V. Jeffrey Martin
Christine Szocki Martin
Daniel R. Marx
Penny S. Marx
Karen Bickel Mason
Thomas O. Mason
James P. Materkowski
Roberta Materkowski
Denise Scovel McCarthy
G. J. McCarthy
Ronald A. McCauley
Eleanora Vanderberg McCauley
John A. Miller
Joanne N. Miller
Lance R. Miller
Cynthia Kreider Montgomery
Andrea L. Morrison
Matthew J. Morrison
Suzette K. Pangrle
Barry M. Pangrle
Carlo G. Pantano
Jacqueline A. Pantano
Howard R. Peiffer
Alberta Zilinski Perrotta
Anthony J. Perrotta
Robert J. Petcavich
Linda R. Young
Howard W. Pickering
Judith A. Pickering
Stephen R. Preisler
Aaron D. Proper
Jeffrey J. Rathfon
Nancy L. Rathfon
Gregory R. Ruschau
Jill C. Ruschau
Lucy Geryak Rusinko
Kathleen Schumacher Schuyler
Roy L. Schuyler, III
Jeffrey R. Shallenberger
Trish Shallenberger

Gregory A. Slachta
Patricia Annette Slachta
Trevor B. Spence
Ronald F. Spitzer
Joyce Spitzer
Richard M. Spriggs
Jane Locker Sproat
Robert L. Sproat
Michael E. Starsinic
Donald F. Stock
Mary Stock
Jack F. Strange
Loretta M. Strange
Michael J. Suscavage
Theresa Kerly Suscavage
Tseng-Ying Tien
Chin Kai Tien
John C. Turn, Jr.
Mary Ann S. Turn
William A. Turney
Estelle Graessle Turney
Cynthia M. Ward-Vieira
Paul Vieira
Steven A. Warner
Gail Weiss
Lon L. Weiss
Eric J. Whitney
Ann B. Whitney
Ruth Dudenhoefer Wood
Martha Zerfoss
Ping Zhang

Foundations

Alcoa Inc.
American Piezo Ceramics, Inc.
Bayer Corporation
Boeing Company
Camille & Henry Dreyfus Fdn. Inc.
Employees of Defense Dist. Ctr.
GE Foundation
Grier School
Honeywell International Foundation
Kennametal Foundation
Keramos Nat'l Ceramic Eng. Frat.
Materials Modification, Inc.
National Starch and Chemical Fdn.
Pennsylvania Ceramics Association
Raytheon Company
State of the Art Inc.
Zircoa, Inc.
3M Foundation

and the University of California-Berkeley. He will also travel to Hong Kong, China, and Germany to attend conferences and workshops as well as to visit a number of research groups during his fellowship. Chen's aim is to develop theories and multiscale computational models for predicting

the structures and behaviors of ferroelectric and multiferroic thin films.

Dr. Chen received his B.S. in materials science and engineering from Zhejiang University in China in 1982, an M.S. in materials science and

engineering from the State University of New York at Stony Brook in 1985 and a Ph.D. in materials science and engineering from the Massachusetts Institute of Technology in 1990. Chen joined the faculty in the Department of Materials Science and Engineering in 1992.

Christopher Muhlstein Receives NSF CAREER Award



Dr. Christopher Muhlstein has been awarded an NSF CAREER Award for his proposal, "Education and

Research in Nanomaterials Degradation: The Road to Molecular Fatigue Studies." This five-year grant is one of the National Science Foundation's most prestigious awards, and is intended to support the development of future academic leaders. Dr. Muhlstein joined the faculty of the Department of Materials Science and Engineering at Penn State in September 2002 after receiving his Ph.D. at the University of California, Berkeley. Since his arrival, he has built a research group and laboratory facilities to explore the limits of

structural materials at micro- and nanometer length scales.

The promise of revolutionary technologies has driven an aggressive investment in the science of nanomaterials at Penn State. However, the ability to effectively utilize these materials is ultimately limited by how they degrade and fail. Recent studies suggest that nanoscale materials can accumulate fatigue damage, but how and why such damage accumulates is unknown. As nanotechnology continues to evolve, it will be essential to understand the fatigue behavior of ever-smaller structures, such as macromolecules and metallic nanowires, in order to avoid unanticipated, in-service failures. In Dr. Muhlstein's program four families of nanomaterials that have been shown to be susceptible to

fatigue degradation (brittle nanomaterials, ductile nanomaterials, organic monolayers, and macromolecules) will be characterized using electron microscopy and mechanically tested under monotonic and fatigue loading conditions using novel sample preparation and testing techniques with the ultimate goal of identifying the mechanisms underlying damage accumulation in these nanomaterials. This research program is a collaborative effort that will include an educational outreach program with Penn State Public Broadcasting and contributions from faculty at Penn State (Drs. Elizabeth Dickey and Joan Redwing) and technical staff at the National Center for Electron Microscopy at Lawrence Berkeley National Laboratory.

Dr. Howard W. Pickering Receives AESF Scientific Achievement Award for 2004



Howard W. Pickering, Distinguished Professor of Metallurgy, was selected as the 2004 recipient of the

AESF Scientific Achievement Award. This award is the American Electroplaters and Surface Finishers Society's (AESF) most prestigious award. Its purpose is to recognize

those whose outstanding scientific contributions have advanced the theory and practice of electroplating, metal finishing and allied arts; have raised the quality of products and processes; or have advanced the dignity of the profession.

Dr. Pickering has been a leader in corrosion research, in particular as it applies to metal coatings, specifically electroplated coatings. His work has led to an understanding of the

mechanisms of corrosion processes for over 30 years. He has advanced the knowledge and science of the corrosion field and has mentored more than 60 graduate students who have since entered the field.

Dr. Pickering delivered the 2005 William Blum Memorial Lecture at SUR/FIN 2005 in St. Louis, Missouri, where he received the AESF Scientific Achievement Award.

Elizabeth Dickey Appointed as a Ryan Faculty Fellow



The Materials Science and Engineering Department is pleased to announce that **Elizabeth C. Dickey** has been appointed as a 2005-2006 John T. Ryan, Jr. Faculty Fellow.

Professor Dickey, Associate Professor of Materials Science and Engineering, has been a faculty member at Penn State since 2001, focusing her research in the area of interface science where she strives to develop atomic-level structure/property relationships for internal interfaces, correlating atomic structure and chemistry with interfacial mechanical and electrical properties. Dickey advises a research group of 2 undergraduate students, 7 graduate students and 3 post-doctoral scholars. Her group's experimental forte is in

transmission electron microscopy, which provides spatially resolved structural and chemical information of materials down to the sub-nanometer length scale. She has an NSF-funded research program, which focuses on understanding segregation of solute atoms to grain boundaries in oxide ceramic and the implications for electrical behavior of the material. Similar interfacial issues are studied in several research projects related to capacitors materials within the Center for Dielectric Studies at Penn State.

Dickey also has a research thrust in the area of nanomaterials. Through collaborative projects with Professor Peter Eklund, Department of Physics, and Professor Joan Redwing, Materials Science and Engineering, Dickey's group is studying structure and chemistry of semiconducting nanowires. Of particular interest is the study of interfaces in radially and axially heterostructured wires.

With support from AFOSR, Dickey's group studies directionally solidified ceramic eutectics (e.g. $\text{Al}_2\text{O}_3\text{-ZrO}_2$ and $\text{LaB}_6\text{-ZrB}_2$) for high-temperature structural applications. While part of this program involves studying the interface between the constituent phases, other work focuses on residual stresses which accumulate due to thermal expansion mismatch between the two phases during processing. She has developed techniques for measuring residual stresses in these highly textured materials by x-ray diffraction.

John T. Ryan, Jr. was a mining engineering graduate of Penn State in 1934. The Ryan Fellowships were created to provide supplementary funds to outstanding members of the College of Earth and Mineral Sciences faculty to assist them in continuing and furthering their contributions in teaching, research, and public service.

Pantano and Green Elected to the World Academy of Ceramics



Carlo G. Pantano, Distinguished Professor of Materials Science and Engineering and Director of the Materials Research Institute, and **David J. Green**, Professor of Ceramic Science and

Engineering, were elected to the World Academy of Ceramics. The World Academy of Ceramics is located in Italy, and joins internationally renowned individuals who have made a significant contribution to the advancement of the ceramics field. Professors Green and Pantano were elected as Professional Members (Academicians) in the

class of "Science;" of which 26 new members were elected in 2004 worldwide. This brings the number of Penn State faculty to nine. Sridhar Komarneni, Professor of Clay Mineralogy, was also elected in 2004. They join Professors R. E. Newnham, L. E. Cross, R. Roy, D. M. Roy, R. E. Tressler, and G. L. Messing as members of the academy.

More Student Awards

Jennifer Rygel, a junior in the Integrated Undergraduate/Graduate MatSE Degree Program, received the **2005 Evan Pugh Scholar Award**. Jennifer is involved in many clubs and committees, including President, Earth and Mineral Sciences Interest House, Irvin Hall; Vice President, Keramos National Professional Ceramic Engineering Fraternity; and Penn State Chapter President, Penn State Material Advantage Club.

Alejandro Levander received the **2005 President's Freshman Award**. Alejandro is a 2004-2005 MatSE Undergraduate Research Fellow, a member of the Materials Advantage Club, and was recently accepted into the NSF Research Experience for Undergraduates program. Alejandro's research interests lie in protective polymeric coatings. Jennifer and Alejandro received their awards at the University Park Student Awards recognition event on Saturday, April 9, 2005.

Undergraduate student **Melissa Lackey**, studied abroad with the Education Abroad program at the University of Leeds during the 2005 spring semester. Melissa was a Leeds student from January through June taking a variety of classes including some in materials.

Kevin Fox, graduate research fellow in Materials Science and Engineering, was awarded a scholarship to attend the 2005 Winter School on High Resolution Electron Microscopy, held in January at Arizona State University. Kevin attended lectures and laboratory demonstrations, with an emphasis on "hands-on" experience of high resolution operation. He is advised by Dr. John Hellmann.

Graduate student **David Scrymgeour** has won the prestigious **Truman**

Fellowship at the Sandia National Labs, Albuquerque, NM. He was one of only five finalists, and one of only two awardees this year. David graduated with a Ph.D in Materials Science from Penn State in December 2004 with Prof. V. Gopalan as his advisor. His thesis work titled "Local structure and shaping of domain walls for photonic applications," involved nanoscale probing and phenomenological modeling of a single ferroelectric domain wall, and shaping domain walls to demonstrate a number of novel electro-optic devices. His thesis won the "MRI Best Thesis Award" in 2005. At Sandia, David will continue to explore his interests in nanoscale science and optical materials.

MatSE graduate students, **Saurabh Mishra, Sara Prins, Michael Ugorek, Jingxian Zhang and Yancheng Zhang**, are the recipients of the 2005 Kennametal Graduate Student Fellowship Awards. These awards are for continuing MatSE graduate students who have exhibited academic excellence at Penn State; and who are working on topics related to Kennametal's interests. Awardees will be expected to visit Kennametal during the academic year to discuss their research projects.

Nazanin Bassiri Gharb, a graduate student in Materials Science and Engineering, was the recipient of the General Motors Corporation 2005 Society of Women Engineers Scholarship Award. Nazanin's poster, Non-Linear Dielectric and Piezoelectric Response in $\{111\}$ and $\{100\}$ Oriented $0.5\text{Pb}(\text{Yb}_{1/2}\text{Nb}_{1/2})\text{O}_3\text{-}0.5\text{PbTiO}_3$ Thin Films" was also the winner of the 2004 IEEE UFFC Joint 50th Anniversary Conference student poster competition. She is advised by Dr. Susan Trolier-McKinstry.

Francelys Medina, graduate student advised by Professors Michael Lanagan and James Adair, received the NSF Graduate Research and Education in Advanced Transportation Technologies fellowship for 2004/2005.

Shenyang Hu received the 2005 MRI Student Research Award in the Ph.D. category. Shenyang graduated with a Ph.D. in Spring 2004 and was advised by Dr. Long-Qing Chen. Shenyang also received a two year Director's Postdoctoral Fellow appointment at Los Alamos National Laboratory where he will be doing research in the area of computational simulations of phase stability and microstructure evolutions in Pu-Ga and Al-Cu alloys with hybrid molecular dynamics, thermodynamic calculation and phase-field approaches.

Ravi Dhurjati won 2nd place in the category of Engineering, at the 20th Annual Graduate Poster Exhibition held at Penn State in March, 2005. Ravi is a graduate student in MatSE under the advisement of Dr. Erwin Vogler.

John Creek won 3rd Place in the Physical Sciences Category at the 20th Annual Graduate Poster Exhibition held at Penn State in March, 2005. John, a graduate student in MatSE, is co-advised by Dr. James Runt, MatSE, and Dr. Greg Ziegler, Food Science.

Bernd Wittek, a Ph.D. student in the metals option, won 1st place in the poster competition of the chemistry and materials science division at the 7th Annual Environmental Chemistry Student Symposium held at Penn State. Bernd is advised by Dr. Howard Pickering.

Congratulations MatSE Graduates Fall 2004, Spring 2005

B.S. degrees

Jeffrey Bender
Paul Cha
Christopher Deeble
Sarah Dilts
Paul Hauge
Kyle Hoff
Ju Pyo Hong
Brian Julius
Brian Kim
Jessica Kohler
Lok Man Norman Li
Sarah Mansuetti
Craig McCann
Ioanna Mina
Joseph Moretz

Nathan Murphy
Joshua Panfile
Amish Shah
Jaclyn Shearer
Nevin Sherlock
Daniel Shir
Robert Smith
Seth Stewart
Amra Tabakovic
Thomas Taggart
Christopher Walton
Arwen Wilson
Andrew Woodruff
Kevin Yocca
Melissa Zimmerman

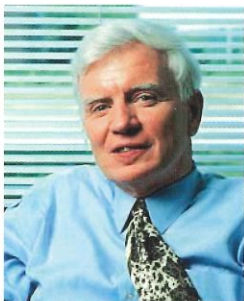
M.S. degrees

Leon Amelinckx
Chad Eichfeld
Morgan Smith
Maria Zapata

Ph.D. degrees

Lennart Berg
Elam Leed
Sean Sweeney
Mustafa Telli
Ahmed Touny
Hsiao-An Wang

Alumni News



Gary Weber Recipient of 2005 McFarland Award

Dr. Gary Weber, materials science and engineering alumnus and former

Associate Vice

President and Director of Technology Transfer at Penn State, was the recipient of the 2005 David Ford McFarland Award for Achievement in Materials Science at the 57th annual banquet on Saturday, April 23. Dr. Weber presented the McFarland lecture titled "From Submarines and National Labs to Industry and Academia – A Career in Materials Science."

Dr. Weber earned his B.S., M.S., and Ph.D. degrees in Ceramics Science at Penn State. He has held executive research positions at Oak Ridge National Lab, Carborundum/SOHIO, General Electric and PPG Industries. In 2000, Dr. Weber joined Penn State as Associate Vice President for research and the Director of Technology Transfer where he was responsible for intellectual property activities and commercialization.

Dr. Weber is currently involved in the technical community by serving on several boards of directors and

advising committees, including the Ben Franklin Center of Central and Northern PA, Austrian Research Centers of North America, High Peaks Venture Partners VC firm, and NASA SBIR small company program.

MatSE Faculty Honored at EMS Wilson Awards Banquet

MatSE was well represented at the College of Earth and Mineral Sciences annual Wilson Awards Banquet held on Sunday, April 17, 2005. MatSE faculty members were honored for excellence, service, and mentoring.



Venkatraman Gopalan, Associate Professor of Materials Science and Engineering, received the Wilson Award for Excellence in Research, the college's highest honor for sustained research achievement. Gopalan was

recognized for his exceptional accomplishments in the field of optoelectronics and ferroelectrics. The totality of his research accomplishments, as measured by the number of peer reviewed papers, citations, invited talks and peer comments, demonstrates that Gopalan has excelled and consequently brought international recognition to the Department of Materials Science and Engineering, the College and Penn State as the home for ground-breaking materials research.



Tarasankar DebRoy, Professor of Metals Science and Engineering, received a Special Appreciation Award as an outstanding faculty member who has served his profession and the University diligently at all levels.

Earle Ryba, Associate Professor of Metallurgy, and **John Hellmann**, Professor of Ceramic Science and Engineering, were honored for excellence in teaching with a Gladys Snyder Education Grant for "Collaborative learning using industrial problems in materials science and engineering."



Erwin Vogler, Associate Professor of Materials Science and Engineering and Bioengineering, received the Wilson Award for Excellence in teaching. Vogler has a very lucid teaching style with great

emphasis on motivating his students to think independently while relating his course materials to everyday situations where the relevance and application can be seen. His energy and willingness to share his knowledge and work individually with the students in his classes significantly contribute to shaping a future generation

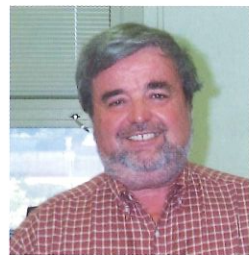


Tarasankar DebRoy, **Gary L. Messing**, Distinguished Professor of Ceramics, **Carlo Pantano**, Distinguished Professor of Materials Science and Engineering, and **James Runt**, Professor of Polymer Science, were recognized for 25 years of committed service.



Paul Painter, Professor of Materials Science and Engineering, received a Faculty Mentoring Award in Earth and Mineral Sciences. Painter was recognized for his leadership of the Polymer Science Club where his personable and caring way has endeared him to legions of polymer graduates.

Other MatSE Faculty Notables



Digby Macdonald, Distinguished Professor of Materials Science and Engineering, was elected a Fellow of the World Innovation Foundation. The World Innovation Foundation comprises leading scientists and scholars, many of whom are Nobel Laureates, with the mission of directing scientific inquiry toward the benefit of humankind.

directing scientific inquiry toward the benefit of humankind.



Ralph Colby, Professor of Materials Science and Engineering and **Digby Macdonald**, gave invited lectures at AMN-2: Second International Conference on Advanced Materials and Nanotechnology in Queenstown, New Zealand, February, 2005.

Colby's lecture was titled, "Electrical and Mechanical Properties of Poly (ethylene oxide)-based Ionomers as Single Ion Conductors." **Macdonald** gave two lectures, "On the Nature of Our Tenuous, Metals Based Civilization," and "Chemistry in Really Hot Water."



Susan Trolier-McKinstry, Professor of Materials Science and Engineering, attended the Polecer "Winter Course on Piezoelectrics" in Chateau d'Oex Switzerland where she gave an invited lecture titled, "Fatigue Anisotropy in Relaxor Ferroelectrics." While in

Chateau d'Oex, she taught a short course on Crystal Chemistry to over 35 students from Universities across Europe. Trolier-McKinstry also delivered an invited lecture, "Templated Grain Growth for Enhanced Piezoelectric Properties in Reduced Pb Systems," at the POLECER meeting on "Electroactive Materials and Sustainable Growth" at the Abbaye Les Vaux de Cernay, May 2005.

Long-Qing Chen, received the Outstanding Young Scientist Award from the National Science Foundation of China from which he will receive research funding to support his collaborative research with Beijing University

of Science and Technology on Phase-Field Simulation of Ferromagnetic Shape Memory Alloys.

Chen also edited, "Continuum Scale Simulation of Engineering Materials Fundamentals - Microstructures - Process Applications," Raabe, Dierk/Roters, Franz/Barlat, Frédéric/Chen, Long-Qing (eds.) 2004. Wiley-VCH, Weinheim. The book presents in detail the concepts behind computational methods for microstructure simulation of engineering materials above the atomic scale.



Darrell Schlom, Professor of Materials Science and Engineering, was elected to The Materials Research Society's Board of Directors for the 2005-2007 term.



Robert E. Newnham, Alcoa Professor Emeritus, Solid State Science, was elected as a Fellow of the Institute of Electrical and Electronic Engineers (IEEE). Newnham gave a plenary address at the fiftieth anniversary of the UFFC Division of the IEEE on "Fifty Years of Ferroelectrics" which summarized the many advances in ferroelectric materials and ultrasonic applications made at Penn State.

Newnham's new book on crystal physics and structure-property relationships, "Properties of Materials: Anisotropy, Symmetry, Structure," was published in January 2005. It covers a very wide range of physical properties and engineering applications, and is suitable for teaching a one- or two-semester course. Published by Oxford University Press, his book is available in both paperback and hardcover editions.

107th Meeting of The American Ceramic Society

The American Ceramic Society held its 107th Annual Meeting in Baltimore, Maryland, April 10-13, 2005. A number of MatSE faculty, students and alumni were honored with awards at the Awards Banquet on April 12.



Clive A. Randall, Professor of Materials Science and Engineering and Director, Center for Dielectric Studies, was named a **2005 Society Fellow**.

David J. Green, Professor of Ceramic Science and Engineering presented the **Sosman Memorial Lecture**, "Mechanical behavior of porous ceramics: A critical science for optimizing processing and performance."



Gary L. Messing, Distinguished Professor and Department Head, received the **Ceramic Educational Council Outstanding Educator Award**.

Kevin Fox, graduate student, was awarded the **Sapphire GEMS** (Graduate Excellence in Materials Science) Award by the Basic Science Division for his presentation: "Microstructural Characterization and Impression Creep Testing of SiAlON Ceramics." Kevin's advisors are John R. Hellmann, David J. Green, and Elizabeth C. Dickey. His project is funded by Kennametal Inc. and the US Department of Energy.

Niall J. Donnelly, a Postdoctoral Scholar working in Clive Randall's Laboratory at the Materials Research Institute, received the **Best Student Presentation Award-Oral Category, Electronics Division**.



David W. Johnson, Jr. (B.S. 64, Ph.D. 68), retired from Agere Systems, Incorporated, received the **Distinguished Life Membership**, the Society's most prestigious grade of membership.



Saint-Gobain Ceramics and Plastics, Incorporated received the Corporate Technical Achievement Award for development of CerastatTM Electrostatic-Discharge Dissipative Ceramics zinc oxide,

zirconia. **Oh-Hun Kwon** (Ph.D. 86) accepted the award. Kwon, a research manager for Saint-Gobain Ceramics and Plastics, is one of the inventors of Cerastat, a high-density ceramic that dissipates static electricity. The patented ceramic has wide-ranging applications, including on tools used in the manufacturing of magnetic heads, on wafer handling containers and fixtures, and during assembly of hard disk drives.

Ramakrishna T. Bhatt (Ph.D. 75), a Senior Materials Research Engineer in U.S. Army Vehicle Technology Directorate, NASA-Glenn Campus was named a **2005 Society Fellow**.

Christine Langton (Ph.D. 80), currently at the Savannah River Site, South Carolina, was named a **2005 Society Fellow**.

John Hellmann, Professor of Ceramic Science and Engineering, completed a successful term as President of NICE.

Upcoming Events

2005 Nelson W. Taylor Memorial Lecture

The **2005 Taylor Lecture in Materials** will be held Friday, September 16, 2005 in 117 Auditorium, Hetzel Union Building, with **Professor Marvin L. Cohen** presenting the Taylor Lecture entitled "*Quantum Alchemy and Reflections on the WYP 2005 and Einstein,*" at 11:00 a.m. Cohen is a University Professor in the Department of Physics at the University of California at Berkeley, and Senior Scientist at the Lawrence Berkeley Laboratory. He is a member

of the National Academy of Sciences, the American Academy of Arts and Sciences, and a Fellow of the American Association for the Advancement of Science. In 2002, Cohen received the National Medal of Science.

The theme of the Taylor Lecture this year is computational materials science. The lecture series will begin at 9:00 a.m. with Lectures from Penn State speakers, **Long-Qing Chen,**

Professor of Materials Science and Engineering, **Vincent Crespi,** Professor of Physics and Materials Science and Engineering, and **Kristen Fichthorn,** Professor of Chemical Engineering and Physics.

Student Scoop

First class of Undergraduate Research Fellows in MatSE

The Undergraduate Research Fellows (URF) Program in the Department of Materials Science and Engineering was launched in the spring semester. The goal of the URF is to encourage undergraduate students to pursue research experiences with MatSE faculty. The program is limited to Freshman-Junior level students. The Fellows presented the results of their research at the departmental poster competition on April 27, 2005.



The 2004-2005 URFs and their advisors are:

Front row: Trevor Buehl (Suzanne Mohney); Zana Cranmer (Joan Redwing); and Krystle Dzienis (Qing Wang).
Back row: Mark Burton (John Hellmann); Matt Scates (Chris Muhlstein); and Alejandro Levander (Gary Messing).
Not pictured: Kurtis Chiang (Ron Hedden).

Students Honored at EMS Wilson Awards

Several MatSE undergraduate students were honored for their achievements at the College of Earth and Mineral Sciences annual Wilson Awards Banquet on Sunday, April 17, 2005.

Mark Burton, an undergraduate in the metals science and engineering option, received the George W. Brindley award in Nonmetallic Crystal

Chemistry. The award honors the memory of Dr. George Brindley who was head of the Department of Ceramic technology from 1955 to 1962. This award recognizes materials science students who do outstanding work in crystal chemistry.

Craig McCann and **Arwen Wilson**, graduates of the metals science and engineering option in Spring 2005,

each received the Robert W. Lindsay Award in Metallurgy. This award honors the memory of Dr. Lindsay who served 27 years on the faculty and was head of the Department of Metallurgy from 1960 to 1969. The award recognizes students who do outstanding work in physical metallurgy.

PENNSTATE



MatSE News

Department of Materials Science and Engineering
The Pennsylvania State University
121 Steidle Building
University Park, PA 16802
Phone: (814) 865-0497

NON-PROFIT
ORGANIZATION
U.S. POSTAGE
PAID
STATE COLLEGE PA
PERMIT #1

Address Service Requested

FOR ALL MATSE NEWS PLEASE

VISIT US ONLINE AT

www.matse.psu.edu

MatSE News is a publication of the Department of Materials Science and Engineering. For a free subscription, send your name and address to *MatSE News*, 121 Steidle Building, The Pennsylvania State University, University Park, PA 16802.

This publication is available in alternative media on request.

The Pennsylvania State University is committed to the policy that all persons shall have equal access to programs, facilities, admission, and employment without regard to personal characteristics not related to ability, performance, or qualifications as determined by University policy or by state or federal authorities. It is the policy of the University to maintain an academic and work environment free of discrimination, including harassment. The Pennsylvania State University prohibits discrimination and harassment against any person because of age, ancestry, color, disability or handicap, national origin, race, religious creed, sex, sexual orientation, or veteran status. Discrimination or harassment against faculty, staff, or students will not be tolerated at The Pennsylvania State University. Direct all inquiries regarding the nondiscrimination policy to the Affirmative Action Director, The Pennsylvania State University, 201 Willard Building, University Park, PA 16802-2801; Tel 814-865-4700/V, U.Ed. EMS05-28.