



TECHSTRACKS

MATERIALS SCIENCE AND ENGINEERING

A newsletter for alumni and friends of the Department of Materials Science and Engineering

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Linking Together a New Department

Fall 2003 brings both a new name and a new chair for our department. Professor Aris Christou stepped down after 10 years as chair and Professor Robert M. Briber was selected as the new chair. The department was renamed Materials Science and Engineering to provide more of a focus on materials research and education activities in the A. James Clark School of Engineering.

Effective April 16, 2003, the former Department of Materials and Nuclear Engineering (MNE) has become the Department of Materials Science and Engineering (MSE). These changes enable a concerted focus on cutting edge research and education in materials and their impact on nanotechnology, biotechnology, and information technology.

The focus on materials at Maryland has grown substantially in recent years with the addition of new faculty and significant interest in materials research, nanotechnology, microelectronics processing, polymers, and biotechnology. The current size of the MSE department, at 15 faculty, is consistent with typical MSE departments across the country. The aspirations of the A. James Clark School of Engineering, which has been one of the fastest-

rising colleges of engineering in the country, hinge in part on the growth, leadership, and collaboration of the new Department of Materials Science and Engineering.

Professor Robert M. Briber was selected as chair of the materials science and engineering department effective July 1, 2003. He joined the university in 1992 and has an outstanding record of scholarly accomplishments in the areas of materials science and polymer physics. His research accomplishments in the areas of neutron and x-ray scattering of soft materials have brought national visibility to the University of Maryland.

Prof. Briber currently serves as an editor of the **Journal of Polymer Science-Polymer Physics Edition** and as president of the Neutron Scattering Society of America. He also is a Fellow of the American Physical Society.

Briber received his Ph.D. and M.S. in Polymer Science and Engineering from the University of Massachusetts, Amherst and his B.S. in Materials Science and Engineering from Cornell University.



Message From the Chair

This is an exciting time to be involved with materials science and engineering (MSE) both here at the Clark School of Engineering and in the scientific world. Materials science is at the heart of many fields of engineering but in particular, MSE forms the building blocks for nanotechnology and microelectronics.

The newly reorganized Department of Materials Science and Engineering at the University of Maryland is poised for great things. We have an excellent faculty who are immersed in their teaching and research programs in addition to a number of new and exciting scientific programs developed in the department

during past year. Some of these you will read about in this newsletter.

I want to share my enthusiasm in leading the department in the coming years and in leading a number of new ventures including renovation of our building, reviewing our educational programs, and initiating new research programs. My door is always open for discussions with students and alumni, so please do not hesitate to write, call or stop in.

R.M. Briber
Chair, Materials Science
and Engineering

A Flurry of New Construction

Construction on the new Jeong H. Kim Engineering Building has recently begun (December 2002). This major facility, with 140,000 sq. ft. of space and a pre-dominance of wet labs, should become available for occupancy by 2005.

It will house a host of research and teaching laboratories, including a major clean room facility (10,000 sq. ft.) and related research capabilities that are comparable to the best of university facilities nationwide, supporting silicon, compound semiconductor, MEMS, and biotechnology research.

A new materials characterization laboratory and materials teaching laboratory are

also included in the design for the Kim Engineering Building. The MSE department will play a major role in activities in the building, which is located next to the department's current home.

To watch the progress of the Kim Engineering Building construction, follow the web-cam links on <http://www.eng.umd.edu/kim/intro.html>.

Another project affecting the department is the renovation of the Chemical and Nuclear Engineering Building, beginning in Fall 2003 and scheduled to finish in Spring 2005. The electrical and HVAC systems will be replaced, and restrooms and elevators will be upgraded for better

compliance with disability standards. In addition, older labs will be renovated, and new labs will be built for polymer and soft materials research.



The new Jeong H. Kim Engineering Building will open in 2005.

Undergraduate Awards and Honors

Chairman's Outstanding Senior Award

Presented to a graduating senior for scholarship, leadership, and service to the department

Theresa Valentine

Outstanding Materials Student Service Award

Presented to a graduating senior for outstanding service to the department's recruiting efforts and the student society.

Christopher Ziegler

ASM/TMS Materials Undergraduate Service Award

Presented to an undergraduate for service to the ASM/TMS chapter

Erin Dreyer

New Name, Improved and Enhanced Activities, More Awards: MatES

The Materials Engineering Society (MatES), newly renamed, has worked hard during the past academic year, leading to improved programming and increased awareness of the society.

New activities have been designed to give members an opportunity to learn about their field, career options, and their organization. During the 2002-2003 academic year, the society had over 55 events related to career development, technical issues, membership development, and promotion of the field of materials science and engineering.

Some of these events included guest speakers at every monthly general body meeting and social events such as mini golf and out-to-dinner nights. There was also a huge turnout of materials engineering majors and their dates at the Engineering Fall Ball. One of the most important events was the Materials Career Fair, heavily attended by materials engineering majors as well as other engineering and science majors. The U.S. Nuclear

Regulatory Commission, Naval Surface Warfare Center (Carderock), Naval Research Laboratory, and Materials Modification, Inc. all sent representatives.

Based in large part on these activities, MatES won three Chapters of Excellence awards from ASM/TMS in Fall 2003. These national awards were for Most Improved Chapter, Career Development, and Technical Programming.

Over the last three years, MatES has won every possible society award from the ASM/TMS societies (Promotion of the Field in Fall 2002, Chapter Management in Fall 2001, and Most Creative Recruitment in the ASM/TMS Membership Challenge for three years in a row). Because of their concerted effort, MatES is now nationally known for excellence.

University of Maryland Alumni Association Engineering Chapter Student Honor Award

Presented to one junior and one senior level student who have shown keen interest, development, and accomplishment in leadership, academics, teamwork, and active participation in student engineering organizations

Erin Dreyer (junior)
Theresa Valentine (senior)

A. James Clark School of Engineering Dean's Award

Presented to a senior for academic excellence, leadership, and service to the college

Theresa Valentine

The society encourages support from department alumni. Guest speakers are always welcome. Contact the society president, Erin Dreyer (edreyer@wam.umd.edu), if you would like to speak at a meeting or contribute in another way. See the MatES website at <http://www.mse.umd.edu/mates/> for upcoming events and more information.



At the 2003 TMS Annual Meeting (March 2003, San Diego), MatES students socialize with Prof. Ankem and other materials professors from around the country.

Faculty Develop New International Materials Institute

The National Science Foundation has awarded a five-year, \$3.5 million grant to Rensselaer Polytechnic Institute (RPI), the University of Maryland (UMD), and Florida International University (FIU) for an integrated program of research, education, and global outreach aimed at fundamental change in the practice of materials discovery and development. The **Combinatorial Sciences and Materials Informatics Collaboratory (CoSMIC)**, an NSF International Materials Institute (IMI) led by Krishna Rajan (RPI), will provide a globally connected environment of international collaborators to pursue systematic approaches based on combinatorial experimentation, materials databases, and modeling. Major research thrusts include: Informatics, Modeling, and Databases, led by Rajan (RPI); Combinatorial Experimentation, led by **Ichiro Takeuchi** (UMD); Education and Research Integration, led by **Gary W. Rubloff** (UMD); and IT Infrastructure and Collaboration, led by Surendra Saxena (FIU). CoSMIC is one of three Institutes established under NSF's new IMI program in its Division of Materials Research.

Ph.D. Student Wins Paper Award

Materials Science and Engineering Ph.D. student **Soon Cho** received a Student Paper Award for "Real-Time, In-Situ Metrology to Drive Real-Time Advanced Process Control" at Sematech's Advanced Equipment Control/Advanced Process Control Symposium. His advisor, Professor **Gary W. Rubloff** writes, "Soon's work has been pivotal in developing and demonstrating a viable option for the expansion of the semiconductor industry's cur-

rent emphasis in advanced process control (APC) into the domain of real-time APC, where real-time, in-situ sensors provide the metrology for virtually instant feedback to the equipment and process. This goal has been central in my group's research for the past several years."

Rubloff continues, "Soon's research was initially devoted to applications in sputter technology, specifically using tungsten chemical vapor deposition as a demonstration vehicle, and in close collaboration with Inficon Inc., a major supplier of chemical sensors to the semiconductor industry. For the past two years, he has been applying related methodology to the optimization and control of gallium nitride based device layers in a joint program involving Professors Rubloff and Raymond Adomaitis at Northrop Grumman, where real-time, in-situ chemical sensing is delivering value for process understanding, process control, model validation and refinement, and equipment design."

Department Teaches Local Kids about Materials at Maryland Day

Over 58,000 people attended the fifth annual Maryland Day festivities held April 26, 2003. Despite the rain, the Engineering activities were well-attended



Prof. Briber and Ohrlein pose for the camera while helping out at the Maryland Day outreach booth.

inside Glenn L. Martin Hall.

The undergraduates developed a "Materials Battleship" game for the Engineering Student Council's major-versus-major design competition. The game taught kids about the strength and buoyancy of materials as they attempted to sink plastic, wooden, and metal boats by throwing balls. Trivia questions about the MSE field made the game even more competitive and educational. The game did not win any awards, but the students did receive an offer to buy the entire setup!

Meanwhile, faculty and students staffed a table of demonstrations (such as the ever-popular superconductor levitation experiment) and information about the major. Overall, Maryland Day was an excellent way to bring information about materials science and engineering to the community as a whole.

MSE-NIST Neutron Outreach

The NIST Center for Neutron Research (NCNR) is part of the Materials Science and Engineering Laboratory at the National Institute of Standards and Technology (NIST) in Gaithersburg, Maryland. The activities of the NCNR are focused on provision of neutron measurement capabilities to researchers in the U.S.A. The NCNR is a national center for research using thermal and cold neutrons, offering advanced measurement capabilities for use by all qualified applicants. Many instruments rely on intense beams of cold neutrons emanating from a recently upgraded liquid hydrogen moderator.

There is a wide range of neutron scattering techniques that are uniquely suited to solve many problems of current scientific and technological interest. One of the goals of the NCNR is to provide scientists from across the nation the opportunity to utilize the neutron instrumentation and

capabilities at NIST to solve these problems. However, this can represent a significant barrier for scientists who are not already well versed in neutron scattering, in that they don't have the experience, knowledge, or familiarity to successfully use the facilities. To encourage new users and provide them with this essential educational opportunity, the University of Maryland has developed an outreach program to assist first-time users to come to the neutron facility and carry out an experiment, in close cooperation with NIST scientific staff. Funds of up to \$400 will be paid to new users to offset travel and subsistence expenses.

For more information on the UMCP/NIST Outreach Program please visit: <http://www.ncnr.nist.gov/outreach.html>. For a program application, email Professor **Robert Briber**, University of Maryland, at neutron_outreach@eng.umd.edu. An application will be sent to you electronically.

Faculty Involved in New Bioengineering Graduate Program

Five MSE faculty members (Profs. **Mohamad Al-Sheikhly**, **Luz Martinez-Miranda**, **Gary Rubloff**, **Isabel Lloyd** and **Otto Wilson**) are actively involved in the new Graduate Program in Bioengineering. The program offers research and education opportunities leading to the Master of Science and Doctor of Philosophy degrees. Its objective is to integrate engineering with the sciences of biology, medicine, and health. Students will gain the knowledge base and skill sets to quantitatively measure, and rationally manipulate cells, tissues, and integrated systems. The program is truly multi-disciplinary, housed in chemical engineering and involving ten departments (including MSE) in total.

New Director of Administrative Services

Patricia C. Holmes, former Director of Administrative Services for the Department of Chemical Engineering, has been appointed Director of Administrative Services for MSE. Ms. Holmes received an M.B.A. from Johns Hopkins University and brings 20 years of experience to the job.

Student Wins ARCS Foundation Fellowship

Jason Hatrick-Simpers was one of three A. James Clark School of Engineering graduate students awarded the ARCS (Achievement Rewards for College Scientists) Foundation 2003-2004 Fellowship. Candidates for the fellowship had to be full time students in science or engineering with a 3.5 or higher GPA and proven financial need. Hatrick-Simpers is a Ph.D. student in Prof. **Takeuchi's** group and received B.S. degrees in Physics and Mathematics from Rowan University in 2002.

Department Honors for Prof. Aris Christou

In honor of Prof. **Aris Christou's** service to the department during his 10-year tenure as department chair, a celebration was held at the UMCP golf course on July 25, 2003. Prof. Christou was presented with a University of Maryland chair. In attendance were Clark School Dean Nariman Farvardin, associate deans, former deans (Profs. Dieter and Rabin) other department chairs, and the faculty and staff of the MSE department.

High School Girls Explore MSE

As part of the Women in Engineering 2003 summer program "Exploring

Engineering," 2 groups of 30 high school juniors and seniors spent a Friday afternoon learning about materials science and engineering. Led by Prof. **Isabel Lloyd**, **Theresa Valentine**, and **Kathleen Hart**, the girls saw demonstrations of "fried marbles" (to show how stress gradients cause tempering of glass), shape-memory alloys, and superconductor levitation. They also learned about crystal structures by building four different models with jelly beans and toothpicks. These activities, combined with "be-an-engineer" brainstorming and lab tours, got the students excited about MSE. We hope to see some of them in the department in the future. (See picture in the photo gallery.)

Graduate Students Win MRS Award

Haimei Zheng and **Junling Wang** were selected as Graduate Student Award finalists at the 2003 Fall MRS meeting. They will present their research at a graduate student competition at the MRS meeting in Boston. Winners will receive a gold or silver award. Ms. **Zheng's** research is "Epitaxial Growth and Characterization of Ferroelectric/Ferromagnetic BaTiO₃-CoFe₂O₄ Thin Films". Mr. **Wang's** research is "Strain Effect in BiFeO₃ Thin Films". Wang is advised by Prof. **Ramamoorthy Ramesh**. **Zheng** is advised by Profs. **Lourdes Salamanca-Riba** and **Ramesh**.



Prof. Briber presents the University of Maryland chair to Prof. Christou at the party held in his honor.

Christou to Lead FMS

Professor **Aris Christou**, past chair of the materials science and engineering department, has been selected President-Elect of the **Federation of Materials Societies** (FMS) in 2004. The FMS brings together the research policy and strategic efforts of a broad range of materials-related professional societies. Dr. Christou chaired the FMS Education Committee during 2003.

Faculty Publish in Nature Materials

“Identification of Novel Compositions of Ferromagnetic Shape-Memory Alloys Using Composition Spreads,” by Profs.



Ichiro Takeuchi and **Manfred Wuttig** and collaborators, was published in the prestigious new journal *Nature Materials* in March 2003. This paper

describes new materials development and characterization currently being undertaken in Takeuchi's laboratory.

Bringing Nanotechnology to the Mouth

Prof. **Isabel Lloyd**, recent Ph.D. recipient **Yan Dang**, and Dr. Brian Lawn of the National Institute of Standards and Technology (NIST) are currently examining polymer and ceramic nanocomposites as a means to join layers in laminar dental composites. Prof. Lloyd writes, “Our focus is on tailoring toughness and elastic modulus to optimize mechanical perfor-

mance while achieving appropriate aesthetics.” The group is also exploring solid freeform fabrication techniques to rapidly prototype dental composites from a CAD drawing.

Japanese Scientists Visit

Last fall, a group of technicians and engineers who oversee the management of the technical infrastructure at Tokai University in Japan visited the A. James Clark School of Engineering and the MSE department. Led by Prof. Matsushita of the Materials Science and Engineering Department, they were in the United States to learn more about technical support for education and information technology, as well as the general operation of universities. The University of Maryland was one of five universities they chose to visit.

Prof. **Ichiro Takeuchi** hosted the group as they met with the staffs of the Office of Technology Liaison, M-Tech and the Office of Information Technology of the Clark School. The group received in depth information on topics ranging from maintenance of physical infrastructure to software used for teaching in engineering classes.

Plasma Possibilities

Prof. **Gottlieb Oehrlein** is studying plasma, the fourth state of matter. Plasma is a partially or fully ionized gas and provides unique possibilities for advanced materials processing since it enables a greater level of control than the other states of matter. For certain high technology industries, plasmas have become indispensable for processing or modifications of advanced materials.

For example, the microelectronics industry employs plasma-based etching to produce device features in thin films with precisely controlled dimensions (down to 100 nm at this time). Plasma enhanced chemical vapor deposition methods are used to synthesize insulators, conductors, diamond thin films, and high temperature superconductors. Plasmas are also used to modify surfaces of medical implants, sterilize medical tools, or chemically functionalize substrate surfaces.

Even the simplest plasma processing reactor is scientifically extremely complex, and the characterization and understanding of plasma-surface interactions is one of the least understood parts of the overall problem. The major scientific theme of Prof. Oehrlein's program is the development of novel materials plasma processing technologies based on the thorough characterization and understanding of the gas phase species and the gas solid interactions in low pressure plasma environments. His group utilizes a broad array of gas phase and surface measurement techniques for this purpose on a set of representative plasma processing reactors, and leverages these insights for novel applications in the microelectronics, nano- and biotechnology fields. More information can be found at: <http://www.ipr.umd.edu/ppm/>.

Faculty Honors

Prof. **Robert M. Briber** was promoted to the rank of professor of materials science and engineering. Prof. Briber also became president of the Neutron Scattering Society of America for 2004-2006.

BioMEMS: Collaboration, Integration, Application

Prof. Ramamoorthy Ramesh, Professor of Materials Science and Engineering and Physics, was awarded the rank of Distinguished University Professor. Professor Ramesh's accomplishments as a teacher and scholar are well known. He has made significant and fundamental contributions in the area of functional materials, which have brought recognition to his department, the College and the University. Only a small percentage of faculty achieve this high recognition.



Prof. Raymond J. Phaneuf was promoted to the rank of Associate Professor of Materials Science and Engineering.

Prof. Isabel K. Lloyd was nominated by materials science and engineering students as Advisor of the Year. The A. James Clark School of Engineering selected her as their nominee to the campus-wide competition for University Advisor of the Year.

Prof. Lourdes Salamanca-Riba was named Graduate Director of Materials Science and Engineering effective Fall 2003.

Prof. Raymond J. Phaneuf was named Undergraduate Program Director of Materials Science and Engineering effective Fall 2003.

Where materials, electrical, mechanical, and bio-engineering meet lies a new research field, now explored by faculty and students in the department. BioMEMS -- biological microelectromechanical systems -- essentially means making tiny biological factories, complete with fluid and electrical controls.

Profs. **Gary Rubloff** (MSE/ISR), Reza Ghodssi (ECE/ISR), Bill Bentley (ChE/UMBI), and Greg Payne (UMBI) oversee an enthusiastic group of researchers developing bioMEMS technology. Based on this work, three major articles have appeared in the journal *Langmuir* in the past year alone, in addition to multiple conference papers and posters. The group's work has encompassed three major areas:

Device and packaging development deals with designing the microfluidic devices that will become the miniature biological "factory." A simple and robust fabrication process and new materials, such as reusable electrodes and a device packaging technique (to avoid making painstaking connections directly to the device), are being developed.

Materials fabrication and characterization makes up the bulk of the published work from the group. The polysaccharide *chitosan* can be deposited using a voltage-controllable, pH-dependent process. Chitosan can be used as an interface layer between non-biological (e.g., gold) and biological materials (e.g., DNA). The material is selectively deposited and characterized; other species can then be anchored to it.

Process control and sensing, a focus of research in Prof. Rubloff's group, looks at the process as it happens. Whether cells are alive; which products are evolved during the chitosan reaction; how a reaction is progressing -- these questions can be answered *in situ* using novel techniques and the group's expertise in mass spectrometry and other sensing techniques.

Integrating these three areas of research results in a powerful bioMEMS program with future applications for lab-on-a-chip techniques, chemical and biological sensing, and drug discovery. Once again, materials science and engineering is at the forefront of a revolution in technology.



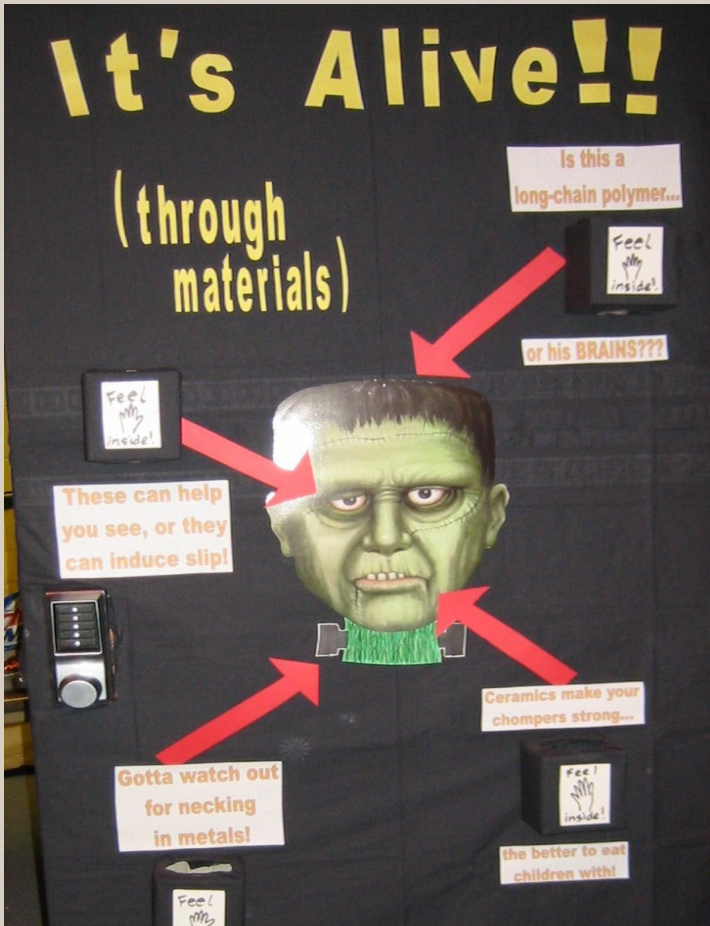
At the Materials Engineering Society's annual Halloween party, faculty, staff, and students enjoy the festivities. From left to right: Erin Dreyer (society secretary), Dr. Kathleen Hart (Program Coordinator), and Dr. Gary Rubloff (Professor).



Stacy Cabrera discusses the Fall 2002 senior capstone design project with the materials faculty. The team of six students designed a latching shape memory alloy microactuator.



Shawna Dean weighs out materials in one of the department's ceramics laboratories for her research in Dr. Manfred Wuttig's group. Shawna synthesized ceramic magnetic materials as part of the SURF summer research program.



The Materials Engineering Society won the Engineering Student Council's Halloween door decorating contest with this door. Frankenstein had metal neck bolts, ceramic dental implants, and polymer brains!



Prof. Aris Christou accepts a University of Maryland chair at a luncheon held in his honor on July 25, 2003. Presenting the gift is incoming Department Chair Prof. Robert M. Briber.



The University of Maryland display at the 2003 TMS Annual Meeting (March, San Diego), showing the ENMA490 senior design project, student resumes, and UMD memorabilia.



As part of Johns Hopkins University's Center for Talented Youth program, Dr. Isabel Lloyd shows local children how materials look "Through the Microscope."



High school juniors and seniors participating in the Summer 2003 Exploring Engineering program learn about crystal structures and other materials topics.

Guiding Our Nation's Policy

Marta Vornbrock, a December 2002



MARTA VORNBROCK

Materials Science and Engineering graduate, is currently a research assistant for the National Materials Advisory Board (NMAB) and the

Board on Manufacturing and Engineering Design (BEMD) at The National Academies. The National Academies, located in Washington, D.C., is a non-profit organization that provides independent advice on matters of science, technology, and medicine.

The various boards at The National Academies perform studies at the request of Congress and government agencies to advise them on scientific issues that frequently impact public policy decisions. The staff members for the boards help form committees consisting of the nation's top scientists, engineers, and other experts, all of whom volunteer their time to study the issues in question. At the end of a study, the committees often publish reports to publicize their findings. The staff is responsible for seeing that a study is carried out from its initiation to its conclusion.

As a research assistant for both the NMAB and BMED, Ms. Vornbrock's duties include obtaining data and background information about assigned projects, identifying and contacting potential committee members, preparing reports and summarizing technical information, and working with other staff members to conduct meetings. She enjoys her job because it gives her the opportunity to work with the various members of the materials and engineering community on a professional level. Ms. Vornbrock must also keep up-to-date on the latest issues in materials and manu-

facturing.

Ms. Vornbrock, formerly Materials Science and Engineering Student Group (MatES) President, feels her materials education and experience with the student chapter of ASM/TMS helped her prepare for this job. For more information about The National Academies, visit www.nationalacademies.org.

Berkeley, Here He Comes

Alvin Henry was a member of the first graduating class of Materials Science and Engineering students at the University of Maryland in 1999. After graduation, he became an engineering consultant at MPR Associates (Old Town Alexandria, Virginia), engaged in various projects ranging from structural mechanics, failure analysis (including SEM, FTIR, and fracture mechanics), materials corrosion and selection, and his favorite--the unknown problem.

As a consultant, Mr. Henry solved problems in disparate fields: biotechnology, pharmaceuticals, nanotechnology, power plants, submarines, and even materials analysis for the U.S. Treasury. He also designed two entire power plants by himself, including cost analyses for the lifetimes of the plants. A modified version of his design is being constructed.

About 18 months after graduation, the U.S. Nuclear Regulatory Commission in Rockville, Maryland, (where he had had an internship) offered him a position working on the material processes of nuclear waste. Within a year, he was promoted to project manager of nuclear power plant re-licensing. In this managerial position, Mr. Henry coordinated the engineering analyses of about 50 engineers and scientists as well as problem solving as technical issues arose. In this position, he also began recruiting and hiring stu-

dents at Maryland and developed engineering research programs at Berkeley and Brooklyn Polytech.

After one year in this position, Mr. Henry became a License Renewal Expert -- one of only two in the country. When he left this position in July 2003 to return to graduate school, he had just been nominated for the senior management track of the U.S. government at age 25.

Mr. Henry will begin studying for his Ph.D. at the University of California, Berkeley, on a five-year fellowship in Fall 2003.

Keeping the Country Safe

Dori Votolato received her Materials Science and Engineering degree from the University of Maryland in 2001. Ms. Votolato gained extensive research experience in radiation effects as an undergraduate student. She is currently a Nuclear Safety Intern for the Nuclear Regulatory Commission. This program is a two year program for new full-time employees. During the first two years of employment, Nuclear Safety interns receive training and rotate through various departments to learn about the agency.

Ms. Votolato is currently qualifying to become a Material Control and Accounting (MC&A) Inspector at uranium



DORI VOTOLATO

fuel cycle facilities in the United States. MC&A is a system of protection and accountability for all the uranium-235 that a facility processes. She has one year left in the qualification process. While MC&A is not directly related to materials engineering, the fuel cycle involves the ceramic processing of uranium dioxide into pellets that are used to fuel the nuclear reactor. Understanding the process allows Ms. Votolato to understand

some of the accounting aspects of the MC&A program.

Ms. Votolato rotated into a position in the Regional Office in Arlington, Texas, for two months, where she accompanied inspections of Nuclear Power Plants in the fields of emergency preparedness and health physics.

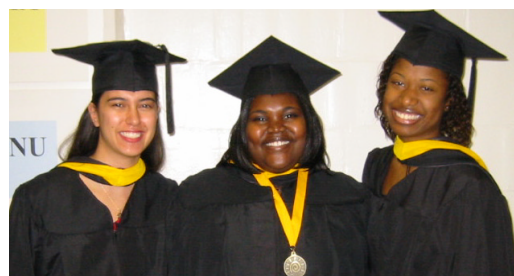
Recent Graduates

Enrique Cobas (Fall '02) is working in the University's Physics department with Dr. Michael Fuhrer while continuing his education.

Julian Timmermann (Spring '02) is working in California at HITCO Carbon Composites.

Theresa Valentine (Spring '03) is pursuing a M.S. in Materials Science and Engineering as part of the department's new 5-year bachelor's/master's program. Her research is in bio-microfluidics under Dr. Gary Rubloff.

Chris Ziegler (Spring '03) is working at the Army Research Lab in Aberdeen Maryland in the polymer characterization lab.



New Materials Graduates!

Class of Spring 2003 (at left: top, left to right): David Lunking, Rebecca Tang, Theresa Valentine, Stacy Cabrera, and Chris Ziegler
 Class of Fall 2002 (at left: bottom, left to right): Marta Vornbrock, Keisha Sylvester, and Takeisa Rowlett

2002-2003 B.S. Graduates

Stacy Cabrera - *Engineering Honors*
 Enrique Cobas
 David Lunking
 Takeisa Rowlett
 Keisha Sylvester
 Rebecca Tang
 Theresa Valentine - *Engineering Honors, summa cum laude*
 Marta Vornbrock
 Christopher Ziegler

2002-2003 M.S. Graduates

Yuhong Cai
 Sambasiva Chandu
 Liyang Dai
 Hongxia Feng
 Chih Kai Liang
 Ladan Mohaddes Ardabili
 Jun Ouyang
 Paraskevi Pampri
 Xiang Wang

2002-2003 Ph.D. Graduates

Sufi R. Ahmed, "Magnetic Properties of Mixed Metal Oxide Block Copolymer Nanocomposites" Advisor: Kofinas

Steven Bullock, "Polymeric Nanoscale Block Copolymer Batteries" Advisor: Kofinas

Yan Deng, "Failure Modes and Materials Design for Biomechanical Layer Structures" Advisor: Lloyd

Yufei Hu, "Study of the Interfacial Structures of Smectic Liquid Crystals Using Synchrotron Light Source" Advisor: Martinez-Miranda

Martin K. McDermott, "Mechanical Properties of Polyurethane Film Exposed to Solutions of Monoxynol-9 Surfactant and Polyethylene Glycol" Advisor: Briber

Gengfu Xu, "Unique High Temperature Sintering of AlN Based Ceramics with High Thermal Conductivity" Advisor: Lloyd

Seok-II Yun, "Characterization of Arborescent Graft Poly(styrene)-Poly(2vinylpyrrolidone)" Advisor: Briber

Chichang Zang, "Design Simulation and Fabrication of Nanostructured IR Vertical Cavity Surface Emitting Lasers with Graded Bragg Interfaces" Advisor: Christou

endNOTES

All Maryland alumni can now use the **Terp Alumni Network** (available through <http://www.alumni.umd.edu>). After establishing a user-id and password, you can search for the contact information of fellow alums, create a permanent *@terpalum.umd.edu* forwarding email, look at e-notes about classmates' activities, and check out the alumni events calendar. Access is free and simple. Register today and look up a friend from the Materials Department!

TECHTRACKS is published annually for alumni and friends of the Department of Materials Science and Engineering at the A. James Clark School of Engineering.

Your alumni news and comments are welcome. Please send them to: Editor, Department of Materials Science and Engineering, 2135 Chemical and Nuclear Engineering Building, College Park, MD, 20742-2115.

Visit our Web site at www.mse.umd.edu

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