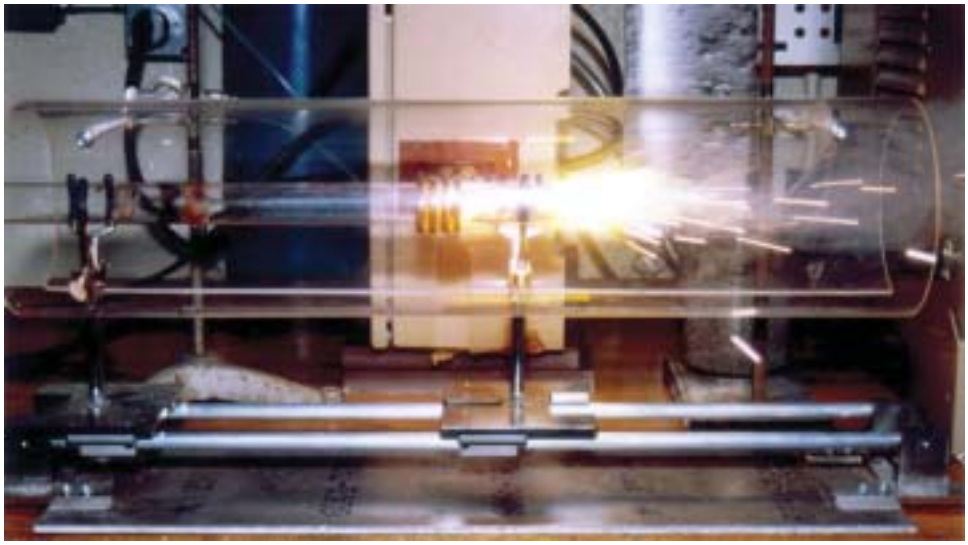
Exploring Materials

at Virginia Tech

Spring 2004, Volume 8, Number 1

News from the Department of Materials Science and Engineering
Virginia Polytechnic Institute and State University

Research Spotlight



Reaction synthesis of composites involves utilizing the thermodynamic heat-of-reaction to create in situ reinforcement. Here, elemental molybdenum, silicon, and carbon powder are blended and reacted to form a molybdenum disilicide—silicon carbide ($MoSi_2$ + SiC) composite.

In Situ Materials Synthesis and Processing

Steve Kampe

In situ processing refers to a synthesis strategy where certain essential microstructural features of a material are introduced "in place" or "on site" during processing. While the term "in situ" has often been applied to specific classes of materials (e.g., certain composites), it actually refers to a generalized approach where processing and microstructural evolution are concurrently addressed. Using this more generalized definition, one may recognize that there are many conventional processes which rely on in situ development of microstructure and thus properties; for example, the thermomechanical processing of metals often proceeds in a way such that both a material form (e.g., an extrusion, plate, or sheet) and a specialized microstructure (thus defining the property mix) simultaneously develop.

Many processes, however, have historically evolved in a notoriously ex situ fashion; for example, composites are most typically produced using processing methods that essentially force two independently-procured constituents together to produce the desired composite composition and/or architecture.

Consistent with the examples given above, in situ strategies obviously have the potential to offer certain benefits related to production efficiency when applied to materials processing. Devising, developing, and characterizing new methods that incorporate an in situ approach to processes that have historically evolved as conventionally ex situ processes has been a common theme of investigation since my arrival at Virginia Tech in 1992.

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Discover what we're made of...
www.mse.vt.edu

Virginia Tech

Research Continued

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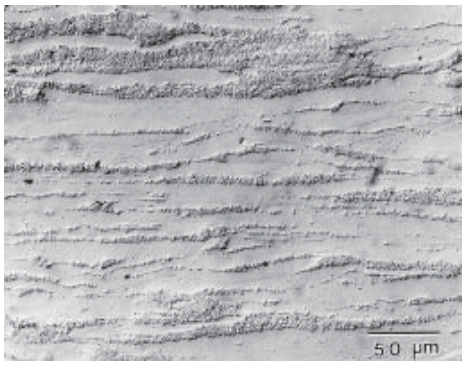
Reaction synthesis as a means to create in situ metal or intermetallic matrix composites represents one example of a strategy that has been studied and applied to several material systems at Virginia Tech. In one common variant of this process, ceramic reinforcement is synthesized directly within a metallic solvent from elemental precursors. If formulated and processed appropriately, the metallic solvent can ultimately serve as the metal matrix of the composite, and it will contain strengthening-capable reinforcements with interfaces free of the contamination that often arises from extrinsic handling. In this variant, the in situ processing approach serves to eliminate several problems that arise when one attempts to artificially introduce two dissimilar materials that have been previously and independently processed. The technique also enables one to economically and efficiently produce a large number of composite variations of widely varying compositions, relative component volume fractions, reinforcement size, and, in some instances, reinforcement shape (the border art of this newsletter was created from micrographs of reaction-synthesized titanium diboride particulate; note the variety of shapes represented). By the nature of the process, the composites also tend to be highly stable and resistant to both temperature and microstructural reactivity.

Another example of an in situ composite fabrication process is codeformation processing. In contrast to reaction synthesis where the phase constituency is established in situ, codeformation processing relies on deformation processing to effect an in situ-derived composite morphology or architecture. By establishing deformation conditions that lead to commensurate deformation among the phases present in an otherwise conventional multiphase microstructure, highly-aligned and efficient composite materials can thus be produced. In this example, an effective composite morphology is developed concurrently during thermomechanical processing and thus eliminates the need to devise more complex extrinsic methods to introduce the aligned reinforcing phase. The micrograph below shows an example of a deformation processed, in situ "multilithic" metal/intermetallic/ceramic composite produced by the high temperature extrusion of a formulated powder blend of Ti-6Al-4V + 40 v% (Al_3Ti + 40 v% TiB_2).



A deformation-processed, in situ multilithic metal matrix composite produced by extrusion. Micrograph courtesy of Judson Marte (Ph.D. MSE 2000)

Presently, graduate student Shawn Kelly is developing a model to predict and map the microstructure that develops during the deposition of Ti-6Al-4V via laser additive manufacturing (LAM). In this process, alloy powder is deposited in a layer-wise fashion to produce potentially-complex three-dimensional parts. While the process was originally envisioned as a means to rapidly prototype parts and dies, it is now under consideration as a primary processing method for large structures and components. As a consequence of the periodic deposition of molten material during the build process, the material experiences a complex thermal history that strongly influences the resulting microstructure. If one can successfully associate thermal history to both a position within the 3-D build and, further, to a description of the microstructure, one has created a unique opportunity to introduce position-customized property development within a component or piece. In this example, heat treatment occurs in situ as a consequence of the primary production process used to create the component. In fact, NASA is currently developing related processes to serve as in-place, in-space manufacturing techniques for the construction of large space structures.

Meet Steve Kampe

LeeAnn Ellis

Becoming an engineer "was the obvious thing to do in our family," says Steve Kampe. His father was an instructor of agricultural and mechanical engineering at Michigan State University. "He was always very proud of the profession," Steve said, "and it rubbed off at home."

Steve is the third of four children, all of whom grew up to become engineers of some variety. Theirs was a farm family. "We were part timers," Steve explained. The farm covered 150 acres in Lower Michigan, small by Midwestern standards, and they grew wheat, oats, and soy beans in rotation. Steve spent many after school and summer hours driving a tractor.

As a junior in high school, he rented 40 acres from a neighbor and planted soy beans, which became popular in the mid-1970s, when the price boomed at $12 per bushel. "I basically allowed soyburgers to pay for my college education."

Steve entered Michigan Technological University intending to major in civil engineering. However, a required course in materials science, an area unfamiliar to him, sparked his interest. "It seemed to suit me a lot better than the civil curriculum." Steve earned three degrees at Michigan Tech, all in metallurgical engineering.

After completing his doctorate, Steve accepted a position as a research scientist at Martin Marietta's corporate laboratory in Baltimore. "I was able to work with an exciting group of individuals in alloy and composite development." At that time, there was a push to create an aerospace plane that took off like a conventional plane, went into orbit, then landed on a runway like a conventional aircraft. Advanced materials, particularly intermetallics and composites, were a key focus area for this project. "The work was fast-paced and very exciting. There was a lot of development going on, and I

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The Engineering Communications Program: Taking the Next Step

Marie Paretti

If there's one thing we've learned from talking to our alumni, it's the importance of strong communication skills. And the strongest skills are those that are flexible—as communication technology changes constantly, business becomes increasingly global, and the types of documents and presentations required of engineers continuously expand, our students need both a core set of writing and speaking skills and the ability to adapt those skills to a wide array of audiences and situations. As I look to the future, I want to build on the success of the current Engineering Communications Program to strengthen both the students' proficiency in the core skills and their ability to apply those skills to ever-changing scenarios.

Flexibility is key in developing and using communication skills

The first step in this process involves working closely with our alumni to stay current with types of communication required in today's workplace. On page 13 of this newsletter, you will find a brief survey about your current experiences writing and speaking on the job. Your help on this project is invaluable because the more we learn about the kinds of experiences you face regularly, the better we can prepare our graduates for those experiences. Conducting such surveys every three to five years will help ensure that the projects we assign students in class consistently provide a solid foundation for the demands placed on them in the workplace.

At the same time, because workplace demands do change over time, the program will also help students develop the processes and strategies needed to adapt their skills to different situations—so that, for example, they are equally at ease describing a project to colleagues, managers, and clients by shifting both what they say and how they say it to match the situation. Learning how to communicate in different contexts will also increase students' analytical abilities and critical thinking skills as they evaluate situations to determine both what they want to achieve (winning a bid contract, getting a raise, changing a process) and what their audiences need and want (solving a problem as cost-effectively as possible, developing a strong market presence, developing technologies that make the company an industry leader).

Finally, particularly at the senior level, we'll focus on helping students see project documentation—proposals, reports, presentations—as tools that can serve their engineering design work. My goal is to help students learn to use this documentation to help define and plan projects and analyze results. By increasingly integrating communication and design skills, I believe we can strengthen students' ability in both areas.

Moving forward in the ways I've described requires change at a number of different levels—adapting assignments in specific courses, updating teaching and grading practices, revising the two professional development courses, expanding the programmatic assessment process, networking with faculty across the university and across the nation who are grappling with similar challenges, and, importantly, talking regularly with our graduates to find out what's working and what needs to change. By developing innovative strategies and attending closely to the needs of the workplace, the Engineering Communications Program can expand its role as a leader in disciplinary communications programs both within the university and across the country. As the need for these skills continues to grow, Virginia Tech's MSE Department is poised to serve as a model for excellence.

Meet Marie Paretti

Marie Paretti joined the MSE faculty last fall as the new director of the MSE/ESM Engineering Communications Program. Marie brings a wealth of experience and knowledge in technical communications, editing, and teaching, with the added bonus of an engineering background.

Although originally from Westchester County, New York, Marie attended junior high and high school in York, Pennsylvania, "where they make barbells, Peppermint Patties, and Harley Davidsons," she said. Since she excelled in math and science, engineering seemed a natural choice when she started researching colleges.

She chose Virginia Tech after visiting several top 20 schools. "I really fell in love with the campus," Marie said, despite declaring, "I am *not* going to a school with Fighting Gobblers for a mascot!" on first seeing Lane Stadium. However, the beautiful campus and the people she met while visiting convinced her that Virginia Tech was the right school for her.

After completing undergraduate work in chemical engineering with a minor in English, Marie went to work for Tennessee Eastman for two years, then returned to Virginia Tech for her master's, this time in English. "I knew by the time I graduated that I probably wanted to do graduate work in English," Marie explained. "I love ChemE, but it's a hobby rather than a career." She knew that she wanted to teach and conduct research, but not in engineering. "I like the dynamics of writing and literature classrooms, and the research questions are ones I see myself drawn to for the long haul." Over the next few years, Marie concentrated on graduate work at Tech and later at the University of Wisconsin - Madison, where she completed a doctorate in 20th century American literature with a minor in composition theory. In between these degrees, she worked for Litton Polyscientific as a technical writer, and later for Recognition Research Incorporated as Manager of Technical Communications. Her experiences on the job, combined with her work as a writing teacher and her study of rhetoric and composition, have shaped her teaching philosophy.

"In technical communication," Marie explained, "you can teach students

Paretti continued page 11

Department News

Materials Science and Engineering Receives Second Exemplary Department Award

LeeAnn Ellis

The Departments of Materials Science and Engineering, Electrical and Computer Engineering, and Physics were selected to receive a 2003 University Exemplary Department Award. The theme for the award was "working collaboratively across departmental boundaries to fulfill common or complementary goals."

The Exemplary Department Awards program was established in 1994 by the Office of the Provost. The award recognizes outstanding teaching and learning environments in departments and programs across the university.

"Interdisciplinary education and research are essential to the health and growth of a major university like Virginia Tech," said David Clark, department head for MSE. "Through such collaborative efforts emerge new ideas and knowledge that shape the future of our nation. All three departments plan to maintain joint activities among themselves and foster new activities with other departments."

From Left: Prof. Bob Hendricks, Virginia Tech President Charles Steger, University Provost Mark McNamee, and MSE Head David Clark

The ECE, MSE, and Physics departments were recognized for their cooperative efforts in developing an academic and research program now called MicrON (Center for Microelectronics, Optoelectronics, and Nanotechnology). According to David Gray, a Ph.D. candidate in MSE, these three departments "came together to share time, funding, even laboratory space with the end result being a rich program that allows for a robust undergraduate education as well as enormous research potential for graduate students."

John Ficenec, interim chair in Physics, stated, "Forging strong collaborative research and education efforts among the sciences and engineering disciplines strengthens the individual disciplines and broadens the range of investigations that can be addressed in order to enhance our understanding and convert that understanding into technological advances." Futhermore, he said, "These interdisciplinary activities are essential to the intellectual vitality of a major research university such as Virginia Tech."

Faculty members from all three departments laid the groundwork for MicrON starting about five years ago. This core group, according to Professor Robert Hendricks (ECE), recognized the need for Virginia Tech to move forward in the "burgeoning fields of microelectronics, optoelectronics, and nanotechology."

In support of the nomination for this award, James Heflin (Physics) wrote, "These departments have been working closely to develop an integrated, cross-disciplinary curriculum and to establish central facilities that advance the research activities of faculty throughout the university and foster interdisciplinary collaborations."

A major part of this effort involved creating courses in nanotechnology, accomplished by Heflin and Stephane Evoy (former ECE faculty member). In addition, along with other departments, the faculty in ECE, MSE, and Physics established MicrON, with emphasis on the creation of materials and device development and characterization facilities, including a cleanroom, semiconductor packaging lab, materials device and characterization lab, and a pulsed laser deposition (PLD) system. Late in 1999, Virginia Tech received a three-year grant from the National Science Foundation to continue developing a microelectronics curriculum. Robert Hendricks served as the principal investigator (PI), with co-PIs from ECE, MSE, and Physics.

"This award," said Warren Stutzman, Interim Head in ECE, "recognizes that many disciplines are required to perform high-level research in nanotechnology and that faculty from different departments and colleges are working together toward the goal of making Virginia Tech a leader in the area."

All three departments are previous recipients of Exemplary Department Awards. The Department of Electrical and Computer Engineering was one of the first recipients back in 1994, honored for "undergraduate programs that effectively link research and teaching." This is the second time that the Materials Science and Engineering department has been recognized for collaboration across departmental boundaries, the first being in 1998. The Physics department was honored in 1999 for "effectively linking research and teaching with emphasis on innovative undergraduate programs."

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On the Cover:
The cover design features a micrograph of single-crystal TiB_2 reinforcement in a deep-etched Ti-47Al + 50 v% TiB_2 as-reaction-synthesized composite. Courtesy Steve Kampe and Raphael Martin (M.S. MSE 1994).

We always enjoy hearing from alumni and friends. Please send us a note at the address above, or email us: mse@vt.edu

MSE Advisory Board Update

Warren White

The MSE Advisory Board met last September. With Dr. Clark's help, we are now comprised of fourteen active members representing industry, academia, national laboratories, and professional societies. All the members are actively associated with one or more areas of materials manufacture, testing, development, and research. Five members are Virginia Tech alumni. Alfred Knobler, one of the original board members, is a member emeritus.

During the preceding twelve months, the board has been actively consulting and meeting with Dr. Clark, MSE faculty, staff, and students in order to determine how the board can support the department's goals of growth in faculty and infrastructure coupled with continued improvement in courses, teaching, and research. At the September meeting, we decided to form two committees. One committee is studying how the department can improve its recognition and visibility within Virginia Tech, within the Commonwealth, nationally, and internationally. The other committee will place its attention on how to financially support the department. They will coordinate with University Development to identify potential sources for contributions supporting four specific needs: to build a first class materials characterization facility (the ICTAS proposal), to complete the foundry teaching facility (Virginia Tech Fire), to endow up to four graduate fellowships, and establish at least one endowed professorship for the department.

A regular feature of the board meeting is a round table discussion with MSE undergraduate and graduate students (refreshments are included, but faculty are not). This gives us the opportunity to judge the performance of the department from the students' perspective. We capture the comments and concerns and incorporate them into the meeting minutes, which are issued to Dr. Clark. In this way, we help to provide confidential feedback to the department which they might otherwise not receive. The board places great value in the opportunity to meet with the students.

During the final hour of our meeting, we were honored by a visit from the new dean of the College of Engineering, Dr. Aref Hassan. Dr. Hassan expressed his support for a strong materials science program within the college. He also described how he plans to provide additional faculty to the College of Engineering during this period of fiscal restraint within the commonwealth. The dean then answered questions from the board. The visit was concluded by a presentation by the chairman outlining the goals and plans developed by the two board committees.

Warren White (CERE '75) serves as the chairman of the MSE Advisory Board. He is the Technical Sales Manager for Dominion Metallurgical in Roanoke, Virginia.

An Alumni Award for Excellence in Research was presented to **Professor Diana Farkas** at the Fourth Annual Faculty/Staff Awards Ceremony, held September 19. Dr. Farkas is the director of the Center for Modeling and Simulation in Materials Science, and she is recognized internationally as a leader in the area of computational materials science. Her research areas include atomistic computer simulation, interfaces and diffusion, and defect structures. Dr. Farkas is actively involved in improving the merger of research and curriculum. She served as co-principal investigator with Ron Kris (ESM) on an NSF grant to study the combined research and curriculum development of the mechanical behavior of materials. More than 25 educational modules on mechanical behavior resulted. ❖

The College of Engineering will honor **Dr. Norm Dowling** (MSE/ESM) this spring with a Dean's Award for Service. Dowling has served as interim department head twice in the last six years. First, from 1999 to 2001, he stepped in as Interim Head for MSE following Ron Gordon's departure. Then, in 2002, he agreed to chair the ESM department after Ed Henneke moved into an associate dean's position. In praise of Dowling's work, Dean Hassan Aref describes him as "a man of considerable academic and administrative abilities. He is also someone who commands the respect and cooperation of his colleagues." Dowling will step down as ESM interim head this August. He plans to take a sabbatical to revise and update his textbook, *Mechanical Behavior of Materials*, which is used in graduate and upper level undergraduate courses in over 60 engineering programs across the United States. ❖

John Kroehling (CERE '48) will be inducted into the College of Engineering Academy of Engineering Excellence in April. The academy recognizes alumni who are outstanding contributors to the profession of engineering and to the college. Mr. Kroehling attended Virginia Tech from 1942 to 1948, taking time out to serve in World War II from 1943 to 1945. John has been a faithful supporter of the MSE department and the university, establishing scholarships in MSE and Statistics in 1998, as well as serving on the MSE Advisory Board. He is also a member of the College of Engineering Committee of 100. *Read more about John Kroehling at www.mse.vt.edu/people/AwardPages/KroehlingScholarship.html* ❖

Department News continued page 11

Student and Alumni News

New Scholarship Programs Introduced in 2003

Alfred Knobler Provides $600,000 to Materials Science and Engineering and English

In November, Alfred Knobler (CERE '38) made a generous gift of $600,000 to the university that will be shared equally between the Departments of Materials Science and Engineering and English. The purpose of this gift is to support graduate education through the establishment of Knobler Fellowships.

Knobler Scholars will mesh across the two departments to exchange ideas and skills. An Alfred E. Knobler Summit is in the planning stages and will be a university-wide event to showcase accomplishments, talent, and creativity of students and faculty who have benefited from Mr. Knobler's generosity.

The MSE Department expresses deep appreciation to Mr. Knobler for his continued interest in and support of materials science and engineering at Virginia Tech. The department also thanks Lucinda Roy (Chair, English), Evan Bohnen (Director of Development, College of Liberal Arts and Sciences), Lori Lewis (Director of Development for Engineering), Hassan Aref (Dean, Engineering), Jerry Niles (Dean, Liberal Arts and Human Sciences), and Karen DePauw (Vice Provost, Graduate Studies and Dean, Graduate School) for their efforts toward making this award a reality for the two departments.

Knobler is the founder and CEO of Pilgrim Glass Corporation and Knobler International Ltd. He has been socially active throughout his life and has always been concerned about his fellow man. He has two children and three grandchildren. All reside in New York City. *Read more about Alfred Knobler on our website: www.mse.vt.edu/people/AwardPages/KnoblerScholarship.html*

Ronald S. Gordon Scholarship

Dr. and Mrs. Ron Gordon have established a scholarship in the MSE department. Dr. Gordon served as the Materials Science and Engineering department head from 1989 to 1999. The Gordons paid a visit to the department last fall, and the first scholarship was presented during a morning reception to David Berry. David, a senior facilities technician in the department, is working toward a bachelor's degree in MSE.

After leaving Virginia Tech, Dr. Gordon served as dean at the School of Ceramic Engineering and Materials Science at the New York State College of Ceramics at Alfred University in New York. Since retiring from Alfred in December, he and J.C. are dividing their time between Maine, Florida, and Utah.

Dr. Gordon hopes to continue affiliations with both of his primary universities, the University of Utah and Virginia Tech. He plans to collaborate on research, teach part-time, work with graduate students, and do some writing and consulting. He has recently been given professor emeritus status at the University of Utah.

The Gordons have five grown children scattered about the country: a son and daughter in Oregon, a daughter in Utah, and two daughters in Maine.

Micron Technology Foundation Establishes Microelectronics Scholarships

The Micron Technology Foundation, Inc. has initiated a Micron Scholars program in the College of Engineering that will fund five undergraduate students each year. This non-profit organization was established by Micron Technologies, a microelectronic company headquartered in Boise, Idaho, with facilities in Virginia, Taiwan, and Singapore. The company produces memory chips and electronic components and devices. The foundation was set up to promote higher education in the area of microelectronics, and eleven universities were chosen to partner with the Foundation in promoting microelectronics education. Virginia Tech is the most recent institution named a Partner University. Scholarships are awarded by invitation through these universities.

Virginia Tech is the only partner school located in the eastern United States. "This is in recognition of Tech's establishment of an interdepartmental microelectronics program and a great way for Micron to assist the program and establish a connection with Tech," said Stewart Ocheltree, who is a process engineering manager in Micron's Manassas facility.

The program has been set up to encourage outstanding Tech students to consider careers in microelectronics. Scholars are selected based on high academic achievement. The main criteria for selection include a GPA of 3.25 or higher; a major in electrical engineering (EE), computer engineering (CPE), materials science and engineering (MSE), or chemical engineering (ChemE); and participation in the new microelectronics engineering minor. This minor was initiated this spring and is and offered by the Bradley Department of Electrical and Computer Engineering, the Department of Materials Science and Engineering, and the Department of Physics.

Students are selected in the spring of their sophomore year and will receive $2500 per semester over the next two years. Also, because the minor requires extra hours, students may be entitled to one or two additional semesters of funding.

Micron continued page 11

MSE Students Participate in Fall Field Trips

Pouring molten stainless steel (Conbraco Industries)

Roanoke Electric Steel Corporation
In October, 19 students from the *Metals and Alloys* and *Transport Processes* classes and Instructor Kathy Rohr participated in a plant tour at Roanoke Electric Steel. The Main Plant, characterized as a mini-mill, uses electric arc melting, ladle refining, continuous casting, and hot rolling to produce a variety of finished and semi-finished steel products from automotive and industrial scrap.

After a welcome, introduction, and safety briefing by Assistant Quality Manager Wendy Munro (MATE '84), the group donned hard hats and safety goggles to follow Ms. Munro through the production process, from the scrap heaps that feed the furnaces to the bundling of finished merchant stock for shipment to customers. From a safe distance, they observed the fiery furnace while workers injected oxygen into the molten metal. They watched as multiple strands of white hot billets emerged from the continuous casting machine, saw cast and cooled billets move through the pre-heat furnaces, and tracked the steel through the rolling process and on to sectioning and packaging for shipping. Along the way, they visited the labs where chemical analysis, microscopic examination, and mechanical testing of the steel are conducted; and they stopped by several control rooms from which computer-controlled manufacturing operations are directed.

For many of the students, the field trip was their first plant tour. They, and all of the MSE visitors, found the sights and sounds of Roanoke Electric Steel fascinating as well as highly educational.

Conbraco Industries
The big trip for the foundry students this fall was to Conway, South Carolina, to tour and work at Conbraco Industries. Conbraco manufactures valves of all sizes through investment casting. The lead for the Conbraco foundry was Mr. James Sturgeon. Students were able to see first hand the stage by stage process of ceramic shell casting and bonded sand casting. The plant is completely automated, using computers to operate robots that perform the different operations.

Continuous-cast billets move down the line (Roanoke Electric Steel)

Students brought works that they had created at Virginia Tech to be cast by the company. The highlight and most generous contribution from Conbraco was the creation of several works that were created from computer models and then cast (a type of rapid prototyping), technologies that are not available at Tech but necessary in the real world. The assistance from our regional AFS chapter, particularly MSE Advisory Board Member, Paul Huffman, has made it possible for students over the past several years to experience the casting process. Other members in the AFS chapter that have assisted the students are the Intermet Foundry in Radford, NOMAR Casting in Salem, Thistle Foundry in Bluefield, TICO casting in Bristol, and Dominion Metallurgical in Roanoke. Steve Bickley, a professor in Art and Art History, teaches this hands-on metals casting course.

Westinghouse Savannah River Company
In November, the Materials Engineering Professional Societies (MEPS) sponsored an adventure to Westinghouse Savannah River Company in Aiken, South Carolina. Twenty-three MSE students toured the facilities, along with Diane Folz and David Clark. The tour included a special glimpse into the Defense Waste Processing Facility that handles remediation of high-level nuclear waste products by incorporating them in a stable glass matrix cast into stainless steel canisters. These canisters are a hot topic in national headlines as they are proposed for permanent storage in the Yucca Mountain burial site.

The group also toured robotics facilities where they met the Westinghouse team that placed among the top competitors in the 2003 Battle Bots competitions; the environmental impacts study facility where scientists evaluate the effects of large-scale nuclear materials production facilities on the immediate ecosystems; the weather center that constantly monitors local and state conditions and works with site scientists and engineers to predict/evaluate the effects of weather conditions on hazards migration; and the radioactive materials testing facility where all operational procedures are developed and monitored. This rare view of one of the most secure materials facilities in the country was made possible by Dr. George Wicks, a Senior Advisory Scientist at Westinghouse, who also serves on the MSE Advisory Board. ❖ *Thanks to Kathy Rohr, Steve Bickley, Bill Reynolds, and Diane Folz for contributing these stories.*

Robotics at Westinghouse

Student News continued next page

Ashley White Named to 2004 All-USA College Academic Team

MSE undergraduate Ashley White has had a busy year filled with honors and international adventures.

Most recently, Ashley is one of 60 students nationwide to be named to *USA Today's* 2004 All-USA College Academic Team. Selections are made based on academics and leadership skills. She was nominated for this honor by the MSE, Music, and University Honors departments.

Ashley is in the Honors Program at Virginia Tech and, in addition to working toward a bachelor's degree in materials science and engineering, she is also pursuing a degree in music performance.

Last summer, this accomplished violinist spent eleven weeks touring Paraguay and Mexico, working with youth orchestras. Her selection to the All-USA Team was based in part on an essay she wrote recounting her experiences on this trip, which was funded by a University Honors Program Scholarship.

Ashley has been performing with the New River Valley Symphony since 2000 as a student concert master. In 2001, she became first violinist with the Virginia Tech Spring Quartet. She gives violin lessons through the Performing Arts Institute of Virginia, and she also coaches young violinists for the Blacksburg Youth Orchestra.

In MSE, Ashley has been involved in several research projects, and last December she co-authored a paper on aerogel materials, which was published in the *Journal of Non-Crystalline Solids*.

She has participated in several engineering internship programs during her years at Tech, including internships at Lawrence Berkeley National Lab, NASA Langley, Cornell University, and the Thomas Jefferson National Accelerator Facility.

Last spring, Ashley received a Barry M. Goldwater Scholarship, a prestigious national award. She is also the recipient of several other awards, including the Hokie Scholar Award, the American Ceramic Society Hoffman Scholarship, the Pulley-Louden Scholarship, the Alfred E. Knobler Scholarship, a Pamplin Leader Award, and a Music Department Scholarship. She was inducted into Phi Beta Kappa, an honor society, in 2002.

This spring, Ashley is in Italy, studying engineering and music at the University of Rome. She is pictured above, standing outside the Coliseum in Rome.

Ashley is the fourth Virginia Tech student to be named to an All-USA Team, and she is the second MSE student to receive a Goldwater Scholarship, the first being Erik Herz in 2002.

2003-2004 MSE Undergraduate Scholarship Recipients

Alfred E. Knobler
Josh Beck
Nick Bell
Lisa Copley
Amy Ducut
Megan Enzinna
Diane Fields
Gregory Fritz
Sarah Galyon
Elizabeth Hubbard
Michael Hunt
Elizabeth Jeffers
Michelle Kennedy
Christina Lee
Adam Maisano
Jemmel Pursoo
Allison Smith
Ashley White
Michael Willemann

John H. Kroehling
Daniel Etter
Steven Kyriakides
Ethan Lavery
Andrew Miller
Patrick Muffo
A. Ramsey Persing
Chris Storey
Mark Taczak
Ryan Turner
Graham Wasilition

Thomas G. Stroyan
Douglas Banerjee
Bradley Cline
Matthew Hubbard
Chris Kessler
Matthew Lynch
Robert Mitchell
Michael Wooddell

Ronald S. Gordon
David Berry

MSE Faculty
Andrew Miller

Micron Scholar
Robert Mitchell

Eleanor Davenport
Steven Kyriakides

Ellen C. Wheeler
Matthew Lynch

Ray D. & Violet T. Frith
Andrew Miller

Gilbert & Lucille Seay
Douglas Banerjee
Bradley Cline
Diane Fields
Matthew Hubbard
Elizabeth Jeffers
Steven Kyriakides
Patrick Muffo
Chris Storey

William C. McAllister
Mark Taczak

Pulley-Louden
Ashley White

Ted & Drusilla Kirby
Michael Willeman

Stuart & Mary Shumate
Adam Maisano

W. Thomas & Barbara Robertson
Lisa Copley

Fred E. Durham
Chris Kessler

John B. Greiner
Elizabeth Hubbard

Erik Herz Wins Fulbright

In spring 2003, Erik Herz was awarded a Fulbright grant for doctoral research at the University of Dortmund in Germany. Erik graduated from Virginia Tech last May with undergraduate degrees in MSE, economics, and international studies. Over the summer, he successfully defended his master's thesis in MSE.

His research in Germany will advance research begun at Tech in the area of semiconductor nano particles.

Herz participated in the University Honors Program at Tech, and he was the recipient of several scholarships during his time here. Among these were the Barry M. Goldwater Scholarship, the Paul E. Torgersen Leadership Scholarship, the Alfred E. Knobler Scholarship, and the Gilbert and Lucille Seay Scholarship. In addition to these honors, Erik was named the Outstanding Senior for 2002-2003 by the College of Engineering in recognition of his many academic accomplishments.

After completing his studies in Germany, Erik will relocate to Ithaca, New York, where he will attend Cornell University. ❖

Human-Powered Submarine Team Update

Adam Maisano

The Human-Powered Submarine (HPS) Team returned from the 7th International Submarine Races (ISR) in Carderock, Maryland, with two new world records, bringing the total to three world records currently held by the team. The team has shown that innovation and testing prior to competition are keys to success. This year, the HPS team took two submarines to the 7th ISR: Phantom 4 and Specter.

Competition rules call for a wet submarine, meaning the submarine is flooded with water and the pilot breathes from a SCUBA tank. Submarines fall into one of four categories: propeller-driven or non-propeller-driven, and one- or two-person boats.

With a design philosophy of simplicity in mind, the submarine Specter was born. Specter has no drive train or control surfaces. It operates much like a dolphin as the pilot's head, arms, and SCUBA tank are inside a pointed rigid fairing, while the pilot's torso and legs fit inside a flexible fairing, allowing him or her to kick a large monofin. The monofin both propels and controls the sub.

Simplicity was rewarded as the team's president, Adam Maisano (MSE), broke the previous world record (3.477 knots) with a speed of 3.52 knots. The team's female pilot, Amy Linklater (AE), also set a world record with a speed of 3.397 knots.

Virginia Tech's team continues to do well in the one-person, propeller-driven category. In 2003, Phantom 4 placed third with a speed of 4.516 knots, piloted by Justin Stepanchick (OE).

The HPS team is partially supported by the College of Engineering, the Departments of Aerospace/Ocean, Materials Science and Engineering, and Mechanical Engineering, in addition to many corporate sponsorships. This year the team will travel to San Diego to compete in the HPS 2004 races in July. To find out more about the team or sponsorship opportunities, visit our website: *www.hps.vt.edu.* ❖

2004 Clevinger Scholarship Winner Announced

Brian Okerberg (B.S. '00) has been awarded the Gary S. Clevinger Scholarship for 2004. This scholarship was established in honor of Gary Clevinger, who earned three materials engineering degrees from Virginia Tech in the 1970s.

Brian grew up in a military family, so he calls Blacksburg home because that's where he's lived the longest: eight years. His family is scattered around the country, and his parents currently reside in Ann Arbor, where his father works as a veterinary pathologist with Pfizer.

As an undergraduate, Brian participated in the University Honors Program, and he was active in academic and community projects. Since his freshman year, he has been a YMCA volunteer, where he has worked in the Juvenile Detention Home program and the Project Home Repair program.

Brian served as the president of the Virginia Tech chapter of the Society for the Advancement of Material and Process Engineering (SAMPE) and the vice president of the Materials Engineering Professional Societies (MEPS). He is currently a Ph.D. candidate in MSE, studying thin-film crystallization of polymer blends. Down the road, he plans to do post-doctoral work, then he would like to teach or work in a research lab.

Brian married Laura Pollard in August 2003. She earned a bachelor's in psychology from Virginia Tech in 2000 and is currently pursuing a master's in social work at Radford University. ❖

Other Student and Alumni News

Shawn Kelly (B.S. '99, M.S. '01) has spent the last nine months at Oak Ridge National Laboratory gathering data for his dissertation entitled "Coupled Thermal and Microstructural Modeling with Application to Laser Metal Deposited Ti-6Al-4V." Work is complete on the first of four research goals, and he presented the results at the TMS Annual meeting in Charlotte, and he also plans to present at the American Welding Society (AWS) meeting in Chicago.

*S*hawn plans to return to Tech to defend his dissertation in the fall. Virginia Tech is part of a U.S. DOE-selected team serving as the Management and Oper-

Student & Alumni News Cont'd page 15

People in Materials

The Rest of the Story
(Further Virginia Tech/Kyanite Connections)

LeeAnn Ellis

After reading "Kyanite and Virginia Tech: Jesse J. Brown Carries on a Tradition" in last spring's issue of *Exploring Materials*, Virginia Tech graduate, Ron Lester (CERE '53 and '54), offered more Kyanite/Virginia Tech connections.

In Piney River, Virginia, Kyanite operated Dominion Materials, where Vic Kelsey hired Mr. W.R. Lester as Technical Director. The rock sold at Dominion Minerals was called "Aplite" and was a source of alumina for glass manufacturing. While working with Dominion, Mr. Lester lectured at Virginia Tech's Ceramic Engineering Department (CERE). He also worked with Dean Whittemore and with Paul Dear, the head of CERE, on research and marketing of Virginia Kyanite to the glass industry. Based on these connections, Mr. Lester's son, Ron, decided to attend Virginia Tech, earning bachelor's and master's degrees in ceramic engineering in 1953 and 1954.

Ron worked in the area of electrical porcelain as the Vice President of Lapp Insulator, and later as Operations Manager for Eljer Plumbingware's three plants, R&D and International Distribution Center in Ford City, Pennsylvania. He also held positions with Locke Insulator and Ohio Brass. Ron finally retired as a Professor of Management at the School of Business at Indiana University of Pennsylvania. He has written many technical articles and contributed to books on ceramics technology, quality assurance, and management, and he is the author of *Quality Control for Profit: Gaining the Competitive Edge, 3rd Edition*.

Ron's father, W.R. Lester, was a fellow of the American Ceramic Society and published many papers and articles on glass technology. He wrote monthly articles about glass technology for Ceramic Industry Magazine. He titled these articles "C.A.R. Says." (C.A.R. refers to Ron's mother's maiden name, Catherine Albert Reid.) During his career, W.R. Lester participated in the first fall meeting of the glass division of Cove Point in 1930 and was the first to provide quantitative seed count of glasses and to recognize the source of surface cord material that plagues many glass-making operations. He served with distinction on the C-14 Committee on Glass and Glass Products. At the time of his death, W.R. Lester was technical director of Emhart Glass Technology Labs in Hartford, Connecticut, as well as a glass consultant for companies worldwide.

Ron Lester (B.S. '53, M.S. '54)

W.R. Lester (courtesy The Bugle 1953)

"Between the two of us," Ron writes, "we worked in the major fields of ceramics, refractories, electrical porcelain, whiteware (plumbing ware), and glass." And it all started with Kyanite Mining Corporation.

Kampe continued from page 2

worked with a great bunch of people. We were very productive, so it was great fun.

"I never intended to go into academia," Steve said. "In fact, if someone had told me in 1987 that I might someday be in academia, I'd have said no way. I was ready to leave when I finished." However, following the major defense cutbacks of the late 1980s, Steve decided that a university atmosphere would offer an opportunity to continue the advanced materials research he had begun at Martin Marietta.

He joined the MSE faculty at Virginia Tech in 1992, bringing industrial and research experience to this academic endeavor. His technical marketing and proposal writing experiences transferred nicely to the research component of a university environment. And in the classroom, Steve explains, "I always envision homework assignments as the kind of experience that a supervisor might request of his team on the job." He refers to his homework assignments as mini projects. "I think the MSE students see my assignments as comprehensive and a fair bit of work. They're a complete package." He allows his students some latitude in how they approach these assignments, acknowledging that there are different ways to get the job done. In this way, the students get a sense of what it will be like in an industrial setting, where they are required to analyze or bring to life an idea and then present the results coherently so that a busy supervisor can make a quick assessment.

Aside from research and teaching, there is also the area of service to round out an academic career. Steve is currently the chairman of the MSE curriculum committee. A fair amount of work goes into keeping the curriculum up to date and relevant. Curriculum check sheets must be developed, and college- and university-mandated changes must be implemented.

In addition, Steve oversees MSE's ABET 2000 accreditation efforts, which require ongoing assessment and continuous program improvements. "For some reason, I seem to have an interest in generating statistics that can be used to measure the department's success as well as to identify any needs or changes that might be needed."

Steve also chairs the scholarship committee. "I essentially paid for most of my own college education, so I remember money was always an issue." Thus, he is interested in helping students find ways to fund their education. "Our scholarship budget has increased considerably over the last few years," thanks to several very generous alumni benefactors and to the efforts of Ron Gordon, former MSE department head.

Away from campus, Steve enjoys hiking, canoeing, and camping with his sons, Alex, 13, and Frank, 11. Steve and his wife, Jean, also on the Virginia Tech faculty, live in Floyd County with their sons. ❖

Department News continued from page 5

Diane Folz has been appointed to the Board of Governors for the American Association of Engineering Societies (AAES). Her duties will take her to Washington, DC, for board meetings at the National Academy of Engineering. Governors provide input concerning engineering issues ranging from benefits, jobs, and national recognition of engineers, to suggested levels of funding from federal agencies as well as technical areas of critical interest to the United States. The AAES also develops new methods for outreach to the general public and to the future workforce as well as developing strategies for strengthening international alliances relating to engineering. Diane's service on the board began in January and will run for three years. ❖

MSE initiated its ***Frontiers of Materials Science and Engineering*** lecture series last fall. Larry Hench (Professor of Ceramic Materials and Co-Director of the Tissue Engineering and Regenerative Medicine Center, Imperial College, London) delivered the inaugural lecture on "A Role for Ceramics in an Age of Biology." The lecture was preceded by a reception in Holden Hall for Virginia Tech faculty and students to meet and share ideas with Professor Hench. During the day, he met with MSE faculty to discuss potential interactions and also delivered a lecture to the *Physical Ceramics* class. Our next ***Frontiers*** lecture will be in fall 2004; we would welcome any help that you could provide in identifying an appropriate speaker. ❖

Department News continued page 12

Micron continued from page 6

"The microelectronics faculty at Virginia Tech are delighted that this excellent and long-standing relationship is now being formalized by naming Tech as a Micron Partner University," said Robert Hendricks, who chairs the Micron Scholars Selection Committee. "As a result, even greater interaction between Tech faculty and students, researchers and production personnel within Micron should evolve and provide more opportunities for our students." ❖

MSE major, Robert Mitchell, (right) is among the Micron Scholars chosen for 2003/2004. Other Scholars are: Heath Conyers (CPE), Ka Ming Lai (EE), David Mo (CPE), and Julie Morris (EE).

Paretti continued from page 3

basic skills for writing concise, direct sentences, but those skills aren't enough." Information design is key. "By the time students leave the program, I want them to be able to think critically about their own objectives, their audience's needs, and the constraints of the situation to produce a document or presentation that succeeds in meeting the goals of both audience and writer.

"As circumstances, technologies, and needs change, the way we communicate has to change. I want students to be able to analyze a situation and design information that makes sense for that specific context."

In the classroom, Marie encourages students to study a variety of documents and understand why they're constructed in particular ways. "I want students to understand the basic expectations for different document types (like proposals or journal articles), but I also want them to be able to use those types flexibly and adapt them as needed." When it comes to grading, Marie often relies on portfolios, where students revise repeatedly to continually improve their work. "I spend a lot of one-on-one time with my students, because I think that's one of the ways you learn.

"A lot of teaching communication is tutoring. You become a better writer or speaker by working with people who can talk to you about what you're trying to accomplish, then look at your document or presentation and help you figure out how to accomplish it more effectively."

Besides teaching, Marie is interested in environmental issues, including the Green Engineering Program in the College of Engineering. She has done writing and editing work for a consulting forestry firm, and part of her research examines how technical information is used and disseminated within environmental organizations.

"Writing is the thing that makes me happiest professionally," Marie said. "I love to write, and I love to work with writers." She sees presentations and speaking as extensions of writing because they require many of the same design skills, but then add a layer of complexity in terms of the ability to connect to a live audience.

Home for Marie is a log house on 20 acres in Craig County with her husband, Duane Means (Forestry, Virginia Tech). At home, Marie spends most of her waking hours reading about, planning, and planting gardens of all sorts and is a master gardener. She has also combined work and play by writing about gardening, and she edited the New River Valley Master Gardener Association newsletter for a year. Her three godchildren, who all live in Blacksburg, teach her the rules of soccer and force her to listen to K92 for the latest music trends. In her spare time, she fishes, canoes, hikes, runs, bikes, and when all else fails, splits wood for therapy (and to keep her house warm all winter). ❖

Department News continued from page 11

Graduate Program Update

Bill Reynolds

The most significant boost for the MSE graduate program has been the recent gifts from Alfred Knobler (CERE '38), who has provided funds to help in recruiting efforts. Through Mr. Knobler's generosity, the department is able to offer attractive fellowships to outstanding graduate candidates. The first recipient of a Knobler Fellowship is master's candidate Dara Fleming. Faculty will have the opportunity to apply for fellowship support in the form of extended assistantship funds for existing projects. A Knobler Committee has been formed to review faculty requests for assistance. Serving on this committee are: Steve Kampe, Sean Corcoran, Brian Love, Dwight Viehland, and Bill Reynolds.

Interest in the five-year master's program is increasing among MSE students. Virginia Tech permits students to double count course credits toward a bachelor's and a master's degree, thereby decreasing time spent in the master's program by one semester. Erik Herz completed this program last year, graduating in May with three bachelor's degrees (MSE, Economics, International Studies), and completing a master's in MSE over the summer. Students currently in the program are Adam Maisano and Liz Jeffers, and some sophomores are considering the five-year option.

Recent awards and recognition to our graduate students include a Fulbright awarded to Erik Herz, and an Aerospace Graduate Research Fellowship awarded to Todd Heil. Brian Okerberg is the latest recipient of the Clevinger Scholarship. Shawn Kelly is in Knoxville, Tennessee, continuing his research and using the lab facilities at Oak Ridge National Laboratories.

Distance learning is becoming more prevalent in the graduate program. These courses are taught via satellite with two-way feedback possible. Distance learning allows the university to bring in outside instructors with a wealth of knowledge and experience to teach specific courses, as well as permitting Virginia Tech faculty to offer courses to students away from campus. For example, Bill Reynolds has taught *Math Methods for Materials Research*, which is broadcast to NASA Langley in Hampton, Virginia. Guo-Quan Lu just completed a course in thermodynamics, also delivered to NASA Langley. Increased student participation in such courses is expected with the launch of the National Institute of Aerospace (NIA), "a world-class research and educational institute created to do cutting edge aerospace and atmospheric research, develop new technologies for the nation and help inspire the next generation of scientists and engineers."* This institute is comprised of the NASA Langley Research Center, the AIAA Foundation, Virginia Tech and five other research universities (UVA, NC State, Georgia Tech, University of Maryland, NC A&T), and three affiliate universities (Hampton, ODU, W&M).

Courses broadcast to MSE graduate students have included *Introduction to Materials Characterization*, and *Chemistry and Physics of Surfaces*, taught by Michael Kelly of The College of William and Mary and Jefferson National Labs. The first company-delivered distance course was taught by Neil Kilpatrick of Siemens Westinghouse in Orlando. The course dealt with failure analysis.

Enrollment in the graduate program is expected to rise with the upcoming hire of two new faculty plus the possibility of two joint appointments. Recently completed graduate degrees in MSE are listed in the table below. ❖

**National Institute of Aerospace website: www.nianet.org*

Recent Graduate Defenses

Graduate	Degree		Advisor	Thesis Title
Hamad Abdullah Ababutain	MEng	2003	Carlos Suchicital	*Plasma Spray Coating Introduction to Theory and Application*
Anders Dibiccari	MS	2003	G-Q Lu	*Sol-Gel Processing of R Y Al Fe O Magneto-Optical Films*
Jennifer Suzanne Franklin	MS	2003	Steve Kampe	*Synthesis of Piezoelectric-Reinforced Metal Matrix Composites*
Charles Stephan French	MEng	2003	Robert Hendricks	*Process Development and Planning for an Advanced Semiconductor Device Fabrication Laboratory*
Adam Goff	MS	2003	Steve Kampe	*The Mechanical Damping Capability of a Piezoelectric Ceramic-Reinforced Metal Matrix Composite*
Erik Herz	MS	2003	Rick Claus	*Colloidal Semiconductor Nanocrystals: A Study of the Syntheses of and Capping Structures for CDSE*
Michelle Lynn Horch	MEng	2003	Bill Reynolds	*Polymeric Coatings as Barriers to Diffusion of Carboxylic Acids*
Michael R. Horne	PhD	2003	Jack Duke	*Rayleigh Wave Acoustic Emission During Crack Propagation in Steel*
Elizabeth M. Neyman	MS	2003	David Dillard	*Improvement in Adhesion for Epoxy-SiC System via Plasma and Silane Surface Modification Techniques*
Dylan Vicente Pugh	PhD	2003	Sean Corcoran	*Nanoporous Platinum*
Benjamin T. Ruette	MS	2003	Dwight Viehland	*Induced Phase Transition Studies in Magnetoelectric $BiFeO_3$ Crystals, Ceramics and Thin-layers*
Jeffrey P. Schultz	PhD	2003	Ron Kander	*Viscoelastic Contact Growth in Laser Sintering*
Sumitra Subrahmanyan	PhD	2003	Brian Love	*An Investigation of Pore Collapse in Asymmetric Polysulfone Membranes*

Dear Colleague,

On the reverse side of this page, you'll find a brief survey concerning your workplace communications practices. As the new director of the MSE/ESM Engineering Communications Program, I am in the process of updating our curriculum to make sure that we continue to provide students with the skills they most need to succeed in their careers.

As you may know, the Engineering Communications Program is now 10 years old. With a decade of experience behind us, it's time to take stock and make sure that we are keeping pace with the ever-changing demands of today's workplace.

Your help is critical in this process. By taking a few minutes to fill out the survey and mail it back, you'll help us develop a clear picture of the kinds of communications practices students will face once they leave our department.

Whether you are an MSE alum or a friend of the department in another field, we need your input to succeed. Our undergraduates take jobs in industry, higher education, and government, so no matter where you are, you have something important to share with us. You are the voice of experience, the ones who can best tell us what's actually happening in the "real" world where our students will spend the rest of their lives. Please take a few minutes to fill out this survey so that we can shape our curriculum to best meet our students' needs.

Thank you for your time and consideration. If you have any questions about the program or would like more information, please feel free to give me a call or send me an email.

Sincerely,

Marie

Marie C. Paretti
mparetti@vt.edu

Fold

Virginia Tech

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Blacksburg, Virginia 24061

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Virginia Tech
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Blacksburg, VA 24061

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Tape, do no staple

Workplace Communications Survey

1. Year of graduation:*_____

2. Current job title:* _____

_____

3. Undergraduate major:*_____

4. Please indicate how often you develop the following documents or presentations

a. Email correspondence

Daily Weekly Monthly Rarely Never

b. Short written reports (e.g. progress/status reports, memos, research briefs, etc.)

Daily Weekly Monthly Rarely Never

c. Long written reports on your work

Daily Weekly Monthly Rarely Never

d. Written proposals to clients/funding agencies

Daily Weekly Monthly Rarely Never

e. Web pages for public use

Daily Weekly Monthly Rarely Never

f. Web pages for company intranets

Daily Weekly Monthly Rarely Never

g. Instructions or manuals

Daily Weekly Monthly Rarely Never

h. Informal presentations

Daily Weekly Monthly Rarely Never

i. Formal presentations

Daily Weekly Monthly Rarely Never

Fold

j. Poster sessions at conferences

Daily Weekly Monthly Rarely Never

5. Please indicate how often you communicate with the following audiences

a. Managers with technical backgrounds

Daily Weekly Monthly Rarely Never

b. Managers with non-technical backgrounds

Daily Weekly Monthly Rarely Never

c. Co-workers who share your expertise

Daily Weekly Monthly Rarely Never

d. Co-workers who do not share your expertise

Daily Weekly Monthly Rarely Never

e. Technicians or operators who work for you

Daily Weekly Monthly Rarely Never

f. Clients

Daily Weekly Monthly Rarely Never

g. Funding agencies

Daily Weekly Monthly Rarely Never

h. The general public

Daily Weekly Monthly Rarely Never

6. Please list any other documents, presentations, or specific audiences you work with that we should consider incorporating into our curriculum:

Fold

7. What strategies or processes do you use when composing documents and presentations (please check all that apply):

___ Analyzing audience to determine content and organization
___ Planning, outlining, and revising
___ Editing documents to make them concise
___ Proofreading
___ Having a colleague review your draft
___ Using Word's Spell Check
___ Using Word's Grammar Check
___ Writing collaboratively
___ Researching information in print or on the web
___ Researching information by contacting individuals or organizations directly
___ Applying headings, lists, and illustrations to make documents easier to read
___ Rehearsing presentations, either alone or with an audience

8. Please provide any other comments that you think would be helpful as we revise the writing and speaking assignments in our Engineering Communications Program.

* Please note: Personal information is optional; we will use this information to help determine the types of communication most appropriate to various career paths. When you complete the survey, please fold it in thirds, with the address on the outside, tape it (no staples), and drop in the mail. Thank you very much for your help.

Student News continued from page 9

ating Contractor for ORNL. This relationship benefits students like Shawn through enhanced research collaborations and sponsorships. ❖

Todd Heil (MSE '01) received an Aerospace Graduate Research Fellowship for 2003/2004. This fellowship is offered by the Virginia Space Grant Consortium (VSGC), an umbrella organization that coordinates and develops educational and research efforts that are aerospace related. Todd is pursuing a Ph.D. in MSE, and his research concerns "how metals can be developed that can sense strain and change shape within a magnetic field." Todd will present his research at a Student Research Conference in April at the VSGC headquarters in Hampton. ❖

Following graduation, **April Williams** (MSE '02) spent six weeks traveling through Spain as part of a Virginia Tech study abroad program that involved intensive Spanish language classes. Currently, she is studying Ergonomics and Human Factors at San Jose State University. She is also working as an intern at Applied Materials, where she is an ergonomics evaluator. ❖

Stephan Stücklin (MSE '99) completed Civil Service duty in Switzerland last fall and is now working at Nanosurf AG in Liestal. This nanotech company makes small, portable scanning electron microscopes. Stephan hired on as an area sales manager with responsibilities for roadshows, sales meetings, and distributor support. ❖

2003 Materials Science & Engineering Bachelor of Science Degrees

Samuel R. F. Allin
Lauren E. Bumgarner
Stephanie M. Coffey
Julie B. Cope
Christopher D. Creasy
Grace Gamboa
Erik Herz
Andrea J. Hill
Jason R. Knechel
Corey T. Love
Eric J. Payton
Eric D. Perez
Brendan C. Wells
Bryce M. Whited

2004 Materials Science & Engineering Bachelor of Science Degrees (Expected)

Edward J. Barry
Josh Beck
Lisa A. Copley
Paul Deal
Luis Folgar
Sarah Galyon
Elizabeth D. Hubbard
Elizabeth A. Jeffers
Michelle B. Kennedy
Christopher S. Kessler
Mark R. Kroner
Adam J. Maisano
Andrew R. Miller
Somadatta Mohanty
Patrick T. Muffo
Jemmel A. Pursoo
Allison J. Smith
Mark D. Taczak
Alexander P. Taloma

Jeff Schultz (MSE B.S. '99, Ph.D. '03) has accepted a post-doctoral position with Steve Kampe working the area of metal matrix composites. ❖

Cynthia Arnold-McKenna (MESc '90) has been appointed vice president of technology, responsible for coatings, adhesives, specialty polymers, and inks, at Eastman Chemical Company in Kingsport, Tennessee. ❖

W. Barry Lisagor (METE '61) is a senior scientist with Analytical Services and Materials in Hampton, Virginia. He recently received the Francis L. Laque Memorial Award, presented by the ASTM International Committee G01. ❖

Charles P. Blankenship, Jr. (MATE '88) has been named general manager of Small Commercial Engine Operation for GE Aircraft Engines in Cincinnati, Ohio. ❖

Julie Martin (MSE Ph.D. '01) is back at Virginia Tech as a visiting assistant professor in the Engineering Fundamentals department. ❖

Head's Up continued from page 16

and Nanotechnology at a reception held November 6. MSE is one of only five departments at Virginia Tech that has received the Exemplary Department Award twice.

Our undergraduate program continues to be strong, especially with the addition of Dr. Marie Paretti as Director of our Communications Program. In addition to having strong ties with the English department (our partner in the newly established Knobler Scholars), she has an excellent vision of what our program should become to make sure our students maintain their competitive edge.

Our major focus over the next few years will be on building our graduate program. The goal is to have 90-100 graduate students by 2010 with 75% working toward doctorates. Professor Bill Reynolds is doing an excellent job in his role as chair of the graduate program. He is assisted by Ms. Susette Sowers, who handles the day-to-day activities of the program. We expect to become more proactive in the recruitment of the very best graduate students from top-ranked MSE programs.

There have been many changes in the MSE department over the last three years. You always have an open invitation to catch up with MSE by joining us at the regular tailgate parties outside Holden Hall before the home football games in the fall. In addition to meeting old friends and perhaps seeing some interesting nanotechnology and superconductor experiments, you can enjoy some of the finest cuisine in Blacksburg. Diane Folz prepares an excellent bratwurst! Check our website before each game for details.

Head's Up!

David Clark

The department's spirit has remained high in spite of a weakened national economy and severe budget reductions by the state that began in 2001. We are particularly grateful for the strong support provided by our alumni through donations, scholarships, and service on our advisory board during these difficult times. Your support has made a significant difference to the health of the department. I believe that the worst is behind us and that we will experience more stability and even growth over the next few years. The future looks very promising for MSE at Virginia Tech.

Under the leadership of Professor Brian Love, we have completed a successful faculty search and expect to have two new faculty members on board this fall. We have the potential to add more faculty through the College of Engineering cluster hire searches now underway in the college-defined strategic areas of Advanced Materials, Computational Science and Engineering, and Biomedical Engineering. There is also a college search in progress for a NASA Langley Professor who will coordinate research and education activities between Virginia Tech and the newly formed National Institute of Aerospace (NIA) located in Hampton, Virginia. This professor's home department could possibly be MSE. These new hires are in line with our goal of increasing the number of full-time equivalent (FTE) faculty positions to 19 by 2010.

MSE has an opportunity to play a major role in the newly formed Institute for Critical Technology Applied Science (ITCAS). This university initiative, in the works for several years, is now a reality and is being led by the College of Engineering. The Institute will provide infrastructure and space to foster synergistic research between engineering and the sciences. When fully operational, ICTAS will occupy two new buildings to be located behind Holden Hall. Advanced Materials is one focus area for the new Institute. Two MSE faculty, Professors Lou Guido and Rick Claus, wrote successful proposals for the first round of ICTAS solicitations. Their research programs will receive funds and space to conduct research in advanced materials and in nanotechnology. MSE also proposed the establishment of a Materials Characterization Facility (MCF) to be part of ICTAS. This facility, still under consideration, will provide world-class capability in advanced materials analysis, including characterization at the nano scale. As envisioned, a central component of the facility will be a state-of-the-art transmission electron microscope with both imaging and compositional analysis capabilities and, when combined with Virginia Tech's new terascale super computer, 3-D simulation of atomic and nanostructures can be compared to similar structures from real materials. This facility will be a valuable resource for the entire university. In addition to pulling together the diverse materials community, it will assist in attracting top notch faculty and graduate students to Tech.

We are proud to be a recipient of the University's Exemplary Department Award. This award was presented jointly to MSE, ECE, and Physics by President Steger and Provost McNamee for collaborative efforts in developing an academic and research program in Microelectronics, Optoelectronics,

Head's Up continued on page 15

Virginia Tech

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