

# The World of Materials

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

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## New Department Head for Materials Science and Engineering

David E. Clark will become the department head for Materials Science and Engineering starting January 2001. Dr. Clark joins Virginia Tech after a productive career at the University of Florida (UF) in Gainesville.

Dr. Clark earned three degrees at the University of Florida, beginning with his bachelor's degree in metallurgical engineering in 1969, a master's in MSE in 1970, and his doctorate in 1976, also in MSE. From 1976 to 1978 he served as a postdoctoral fellow in ceramics in the MSE department at UF.

In 1978, he was named a visiting assistant professor at UF, and in 1982 he was promoted to associate professor in ceramics. Four years later, he earned the rank of full professor.

Dr. Clark's research interests are in nuclear waste materials, environmental degradation of glass and ceramics, microwave processing, materials engineering, ceramics, sol-gel processing, coatings, glass, ceramic super-conductors, sol-gel fibers, and self-propagating high temperature synthesis.



*David E. Clark*

Among his awards and honors, he is a Fellow of the American Ceramic Society and the 2000 Friedberg Memorial Lecturer. He received UF's Research Achievement Award in 1990 and was named the Engineering Teacher-of-the-Year in 1989. He is a former president of the National Institute of Ceramic Engineers and the former chair of the Engineering Ceramics Division of the American Ceramic Society. Most recently, he chaired the Second World Congress on Microwave and RF Processing in April 2000. He was also elected to a second three-year term as a trustee of the American Ceramic Society.

Dr. Clark has authored or co-authored more than 230 technical publications, and he is a co-author or editor of 11 books or proceedings. He holds nine patents with two more pending.

The MSE Department at Virginia Tech looks forward to welcoming Dr. Clark in January.



## CIT and Advanced Materials in Virginia

### **CIT History and Mission**

Virginia's Center for Innovative Technology came about in 1984, when the General Assembly sought to create a non-profit organization that would facilitate relationships between Virginia's colleges and universities and Virginia industry. The original CIT mission focused on enhancing research and development at universities within the state, and this was accomplished by fostering business/university relationships that would encourage and promote innovation in technology. During its first ten years of operation, CIT co-funded more than 800 research and innovative technology projects, which brought Virginia universities together with nearly 800 companies, resulting in more than \$155 million in funding to those universities. CIT also established 13 technology development centers within Virginia universities, covering such areas as fiber-optics, composite materials, advanced computer technology, biotechnology, advanced ceramics, and wireless communications. And CIT played an important role in bringing Virginia up through the ranks of patent activity from eighteenth in the nation to sixth by 1993.

***More than 700 Virginia companies are involved at some level with materials***

Because Virginia is now dealing with greater competition both from other states and from other countries, CIT saw the need for a new mission that would address the challenges of accelerated technological advances. Thus, CIT's mission is now "to enhance Virginia competitiveness through technology innovation." Success in fulfilling this mission is measured in part by fiscal impact on client companies. By 1997, CIT added to their mission: "To advance the development of Virginia as a technology state."

### **Materials in Virginia**

Turning the focus to materials, George Mason University conducted a study for CIT in 1998 to assess the size and scope of the materials industry in Virginia. This study documented more than 700 companies that indicated involvement with materials at some level. In recognition of the important role of materials in industry, CIT appointed a Senior Industry Director to target advanced materials and electronics in Virginia. Nancy Vorona joined CIT in 1998 in this capacity.

Part of her role is to work with industry to identify concerns and solutions. To that end, the Advanced Materials Steering Committee was initiated a year and a half ago. Their first order of business was to identify materials activity in the state and discover major industry concerns, the overriding concern being how to reduce the time between concept of technology and commercialization. "CIT's role," said Ms. Vorona, "is as a catalyst to help industry come together and to provide momentum." The committee found that networking is a major need. Companies need to know who is available statewide for partnership, for supplies, and where to find customers. Local interaction is fairly diverse, according to Ms. Vorona, but statewide relationships need to be fostered. "We need an integrated industrial community."

### ***Virginia needs an integrated industrial community***

In order to tackle this need, CIT is initiating a virtual network, Innovation Avenue, which will be launched in the next few months. Its purpose will be to assist Virginia companies in locating partners, to aid in information exchange, and to improve statewide access to intellectual resources. Innovation Avenue will focus on Virginia industries dealing with advanced manufacturing, advanced materials, aerospace, biotechnology, electronics, information technology and telecommunications, and transportation technologies. A second way to address the need for connections is through bringing Virginia companies together face to face, and a statewide conference is in the planning stage for next fall.

### **Connecting Industry and Research**

"Another major industry concern is connection with research universities in the state," said Ms. Vorona. Companies are looking for access to students for employment, and they are interested in locating faculty expertise as well as facilities for joint research and problem solving. To help connect students with companies, CIT has established internships and a job bank. "CIT underwrites this program in terms of promoting positions in the materials industry to science and engineering undergraduates," Ms. Vorona explained. Through CIT's ten-week internship program a company must offer a student relevant work and a mentor. This allows students to work in a real-world environment where they are doing work that is pertinent to their major. Ms. Vorona commended Virginia Tech's long-time advocacy of co-operative

education and internships, and more specifically, she said, “Ron Kander has been a real advocate and support for this program through talking with his students and helping to place them.”

Overall, Virginia Tech “has a superior reputation as being accessible to industry,” said Ms. Vorona. In the MSE Department, Ron Kander advocates collaboration with industry. Currently, he is working on a project with Directed Technologies Incorporated dealing with fuel cells that is being partially supported by CIT. Also, Ron “has offered to be a conduit for polymers or materials-related concerns in industry through the Polymeric Materials Resource Center (PMRC).” PMRC provides easier access to Virginia Tech’s outstanding faculty members and multidisciplinary research centers involved in polymeric materials. By providing access to the resources at Virginia Tech, PMRC will help Virginia companies maintain and improve their competitive advantage in polymer-related areas. PMRC will assist companies by solving their technical problems or by directing them to the appropriate academic resources throughout the university. More information on PMRC can be found on the web at [www.mse.vt.edu/pmrc](http://www.mse.vt.edu/pmrc).

Another area of interest has been teacher training, and Bob Hendricks, a joint faculty member in MSE and ECpE, is involved with a proposal for a summer institute for physics and chemistry advanced placement high school teachers. The focus of the institute would be training in semiconductor manufacturing.



*The CIT Tower in Herndon, Virginia, was designed to “embrace innovative developments in 20th century technology.”*

The point of all of this activity is that “there is interest and enthusiasm and willingness to work with a different chain and channel of educators,” Ms. Vorona explained. “I would envision that industry would be brought in to give consultation in the training.”

For more information about CIT and about Virginia’s advanced materials sector, visit CIT’s website: [www.cit.org](http://www.cit.org).



## Preparing to Hand Over the Reins



*Prof. Norman Dowling*

Our search for a new department head has reached a conclusion in that an offer has been made and accepted by David Clark from the MSE Department of the University of Florida. He will arrive and take over the reins in January. MSE owes a debt of gratitude to Steve Kampe and his search committee for their hard work and for this successful conclusion. We also have an offer out to fill one of our open faculty positions, but we will delay filling a second open position until after David Clark’s arrival.

MSE will be renting 6000 square feet in a new building adjacent to campus, and we will move some faculty offices

and labs to this space. The lease is not actually signed as of this writing, but the space appears to have been secured. This will allow us to partially relieve the crowding in Holden Hall and to have much improved graduate student office space. We expect to occupy this rental space in the spring.

After December, I will revert to my previous status as a professor jointly appointed between MSE and ESM (Engineering Science and Mechanics). As Interim Department Head for the last year and a half, it has been a pleasure to work in this capacity with the MSE students, faculty, staff, alumni, and Industry Advisory Board. Everyone has pulled together in a most remarkable fashion, and I think it is clear that the department has progressed during this time. I thank all of you for your help and support.

## Department News

The MSE Department is pleased to welcome **Diane Folz**, who will join the department in January as a senior research associate.

Diane received a B.S. in MSE from the University of Florida in 1987. Since that time, she has worked for UF in the MSE Department as an engineer. In 1994 she was appointed the executive director of the National Institute of Ceramic Engineering (NICE). Diane is a Fellow in both NICE and the American Ceramic Society, and she is a member of several organizations, including the Society of Women Engineers, the Order of the Engineer, Epsilon Lambda Chi (Engineering Leadership Circle), and the Ceramic Education Council.

Diane has co-authored two books and several papers, and she holds two patents with three more pending. ❖

### An Exemplary Employee

Congratulations to **David M. Berry**, who is one of two recipients of the 2000 Exemplary Employee Award. Sponsored by the College Association for Staff in Engineering, this award is given in recognition of outstanding contributions and service within the College of Engineering.

David joined the MSE Department in 1997 as a laboratory instrument maker, and he currently serves as the technical contact for maintaining MSE laboratory facilities in Holden and Hancock Halls. "David holds the difficult position of being the only technician in a highly interdisciplinary department," according to the MSE facilities manager, Carlos Suchicital. David handles everything from plumbing and carpentry to electrical work. "David does them all promptly, correctly, and with a good nature. He consistently goes beyond his duties and invests his own time" to find and implement solutions.

MSE Department Head, Norm Dowling, said of David, "He is quite versatile, capable, and innovative in his mechanical and electrical abilities, and he has very good common sense and judgment in his work."

In addition to meeting so many departmental needs, David is working toward a B.S. in engineering with plans to major in MSE. ❖



*Diane Folz*

On June 1, **Jesse J. Brown, Jr.** became the Director of Research and Product Development for Kyanite Mining Corporation in Dillwyn, Virginia. Dr. Brown, who retired from the MSE Department last December after serving for over 30 years on the Virginia Tech faculty, has been a consultant for the company for many years. In his current position, he is involved in testing, quality control, sales and advertising, customer relations, and new product development. He is also responsible for preparing papers for presentation at national and international meetings.

The company recently installed a new testing laboratory to replace one set up by Dr. Brown 25 years ago. Now, instead of using atomic absorption to conduct the testing, they use X-ray diffraction and X-ray fluorescence to do the chemical and mineral analyses. Kyanite is a mineral that is widely used in refractories. The refractories, in turn, are widely used in the steel, ceramics, cement, petrochemical, and other basic industries. Kyanite is also used as a critical ingredient in the manufacturing of brake linings, welding rods, investment casting shells, dinnerware, sanitary ware, glass, dental caps, and art ceramics. Kyanite Mining Corporation is the major supplier of commercial grade kyanite in the world. ❖

**Bill Reynolds** and **Hervé Marand** were promoted to full professor. ❖

**Diana Farkas** was named ASM Fellow this fall. ASM International is a materials-oriented professional society encompassing all classes of materials. ❖

**Al Loos**, who held appointments in MSE and ESM, returned full time to ESM in July. ❖

**Yuri Mishin** left Blacksburg in August to accept a tenure-track appointment at George Mason

University. Dr. Mishin is now an associate professor at the School of Computational Sciences (SCS) at GMU. "SCS," said Dr. Mishin, "is a new and rapidly growing interdisciplinary program which includes several groups working on computer applications for space sciences, fluid dynamics, bio-informatics," as well as computer design of materials, the group in which Dr. Mishin is working. He plans to continue his research on atomistic modeling and computer simulation of materials. MSE wishes him well in this new endeavor. ❖

Patent recipients for 1999 were honored last spring at a reception held at the German Club. MSE patents awarded were: **Guo-Quan Lu** and **Jaechol Bang**: "Process for providing a glass dielectric layer on an electrically conductive



*David M. Berry*

substrate and electrostatic chunks made by the process" Patent No. 8,864,459, issued January 26; **Guo-Quan Lu** and **Jesus N. Calata**: "Tube lining Apparatus" Patent No. 5,855,676, issued January 5; **Carlos Suchicial** was co-inventor on "Flash evaporator" Patent No. 5,887,117, issued March 23, a device and method for evaporating reagents of different compositions. This technique has been licensed by Sharp Kabushiki Kaisha of Osaka, Japan. ❖

**Jessamyn Franks Brown**, the associate director of the MSE/ESM Advanced Engineering Writing and Communications Program, will leave her position this December to move to Northern Virginia to be with her family. Jessamyn served as a graduate teaching assistant in the program for two and one-half years and as an instructor for the past 18 months. Finding a replacement has been a difficult task, since Jessamyn has been extremely popular with students and faculty and has offered invaluable assistance in the development of the program.

On December 25, Ms. Judy Robinson, a 1988 graduate of Virginia Tech, will assume duties as associate director. Judy has been living in Philadelphia for the past decade and is pleased to be returning to the Blacksburg area. Judy has an undergraduate degree in architecture and a master's degree in education. ❖

**New Industry Advisory Board Member:** The MSE Department is pleased to welcome Dr. H el ene Aguilar to the Industry Advisory Board. Dr. Aguilar received her bachelor's degree in mechanical engineering in 1993 from the Universit e de Technologie de Compi egne (UTC) in Compi egne, France, with emphasis on materials engineering

and quality control. She also has a two-year degree in mathematics and physics from the Universit e de Lille I in Dunkirk, France, which she received in 1989. Dr. Aguilar participated in the student exchange program between the UTC and Virginia Tech, joining the MSE department at Tech in August 1991. She completed her Ph.D. in materials engineering science (MESc) in May 1995. During her post-doc year at Tech, Dr. Aguilar conducted processing and conductivity experiments on polyelectrolyte composites, directed materials selection and testing experiments for a laptop computer casing, and performed various elastomeric materials analyses for Acadia Polymers. In July 1996, Dr. Aguilar joined Acadia Polymers as Staff Materials Engineer in Clifton Forge, Virginia, where her work has encompassed projects involving adhesives development, surface analysis work, elastomers compatibility studies with automatic transmission fluids, and rubber compounding. Dr. Aguilar joined the new Acadia R&D team in the Corporate Research Center in Blacksburg in February 1999, where she was responsible for setting up the new R&D mixing and testing laboratory. She is now the Manager of Materials Research and Development. She joined the MSE Industry Advisory Board last fall. ❖

#### Donations to the Department

The MSE Department greatly appreciates the recent generous donation made by **Mr. and Mrs. John H. Kroehling**. Their donation went toward the purchase of items needed for MSE undergraduate laboratories, such as materials sample preparation equipment, including a sample polishing unit, a pressure mounting system, and a belt grinder system. Mr. Kroehling, a 1948 ceramic engineering alumnus, serves on the MSE Industry Advisory Board and the College of Engineering Committee of 100. ❖

## American Foundry Society Gives MSE Laboratories a Boost

*Bill Reynolds*

What do Virginia Tech's football team and the MSE Department have in common? Well, not much, aside from the fact they are both trying to upgrade their facilities. The Hokies' stadium is growing, and MSE is in the process of building a new foundry lab in 130 Holden Hall. The lab will provide new opportunities for teaching and research.

The plan to remodel the space in Holden resulted from the convergence of several influences. One prime mover of the plan was the Piedmont Chapter of the American Foundry Society. This regional chapter of the metalcasting industry's national organization has supported Virginia Tech over the years with scholarship funds, supplies, and co-op opportunities for students. Several years ago, Paul Huffman, Educational Chair of the Chapter and alumnus of the MSE Department, saw an opportunity for a more active alliance between Virginia Tech and the industry. At that time, Georgia Tech's activities in metalcasting had ended, leaving Virginia



*AFS and FEF scholarships were presented during the Piedmont Chap. meeting held at Tech this fall. L to R: Don Gaertner, Pres. AFS; Mark Zaun, FEF Scholarship; Norm Dowling, MSE Dept. Head; Jacqueline Gerken, AFS Piedmont Chap. Scholarship; Bill Reynolds, MSE faculty; Paul Huffman, AFS Piedmont Chap. Educ. Chair (not pictured: Stacey Sharp, AFS Piedmont Chap. Scholarship, and Chris Kessler, FEF Scholarship)*

*Foundry continued page 14*

## Student and Alumni News

In June 2000, the Procter & Gamble Company (Cincinnati, Ohio) appointed **Dr. Andrew J. Wnuk** to the position of Research Fellow, Victor Mills Society. Dr. Wnuk is currently a member of P&G's Corporate Prototyping and Packaging Development Division.

Dr. Wnuk joined P&G in 1979, soon after receiving a Ph.D. in materials engineering science (MESc) from Virginia Tech. Prior to the Ph.D., he earned a master's in ceramic engineering from Tech in 1977, and a B.S. in chemistry from Rider University, in Lawrenceville, New Jersey, in 1973.

Procter and Gamble formed The Victor Mills Society in 1990 to honor technologists in the company who, through their technology innovations, have made sustaining and important business-building contributions throughout their careers. It is named for Mr. Victor Mills, generally regarded as P&G's most prolific inventor and technologist, who worked for the company between 1927 and 1962.

Over the past 21 years, Dr. Wnuk has worked in process and materials development for a wide range of company initiatives. He has been named an inventor or co-inventor on 17 patents and has 8 additional patents pending.

Dr. Wnuk has also been recognized for his efforts in building organizational capabilities at P&G. Since 1984, he has been heavily involved with the recruiting and training of new engineers and scientists. This has included roles as a campus interviewer at Virginia Tech and other universities, and a trainer of P&G new hires. ❖

**Angelo J. Ingrassia** (METE '40) retired as chief administrative judge for the ninth judicial district in New York. He plans to return to practicing law. ❖

**Robert M. McMarlin** (CERE '60) retired as director of technical services and systems development from Pittsburgh Corning Corp. after 30 years of service. ❖

**Robert W. Ellis, Jr.** (METE '62) recently retired from Lawrence Technological University, where he served as dean of engineering and provost. ❖

**Ronald M. Haeberle, Jr.** (METE '67) was promoted to vice president for specialty businesses and director of strategic planning with Special Metals in West Virginia. ❖

**Roderique R. Rohas** (METE '72) completed upgrade training as a captain flying the new fly-by-wire Airbus 319/320 series of advanced commercial jets with U.S. Airways. ❖

**John R. Christman** (CERE '75), survey manager at Anderson and Associates in Blacksburg, was installed as the first vice president of the Virginia Association of Surveyors for 2000. ❖

**John C. Fanning II** (MATE '86) is the manager of metallurgy at the Titanium Metals Corp. (TIMET) Henderson Technical Laboratory in Nevada. ❖

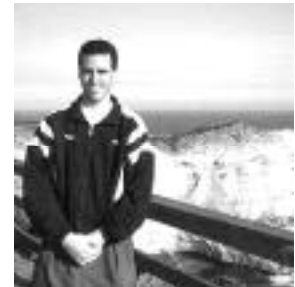
**Deborah K. Fourney** (MATE '87) was promoted to project manager of the materials group for Law Engineering and Environmental Services, Inc. She also earned her P.E. license in metallurgical engineering in the state of Florida. ❖

**Mark C. Munson** (MATE '87) was named director of market analysis for ProcureNet, Inc. ❖

### More Global Hokies...

**Mark Northrop** (MSE '89) is working in Brussels, Belgium for the next three years with C-E Minerals as their European Sales Manager.

**Marty Swan** (MSE '96) is the International Technology Transfer Engineer for Corning. He has traveled to England, Germany, and Australia so far. ❖



*Marty Swan along Great Ocean Road in Victoria, Australia*

### New MRS Student Chapter

A new student chapter of the Materials Research Society (MRS) was started at Virginia Tech this fall. MRS is a well-respected international society dedicated to the advancement of interdisciplinary materials research. This past year the society's journal was the second most cited by materials scientists and the most cited journal by applied physicists. There were also two nobel prizewinners from the society. At the fall meeting held in Boston in late November, Sean Corcoran and Martha McCann accepted a University Charter presented to Virginia Tech's MSE Department. Being a University Chapter entitles us to many benefits including travel support for student members to attend MRS fall and spring meetings, chapter rebates, distinguished speaker support, special project grants, as well as promotional support. Martha also attended the annual meeting of University Chapters, where she learned from other chapters ways to contribute to the local materials community, raise money, and increase membership. The new MRS chapter will become part of the umbrella organization Materials Engineering Professional Societies (MEPS). This organization enables the individual chapters to add resources

to accomplish more activities. In the coming year there are plans for invited speakers, outreach programs, a field trip and, of course, a social activity or two. The MRS should be a valuable addition to MEPS. With the help of the other societies we will be able to enhance appreciation of materials locally and add visibility to Virginia Tech nationally. ❖

### **Best Wishes**

**Shawn Kelly** (MSE '99) and Nancy Chandale Hart (BMGT '99) were married on July 8. Shawn is a graduate student in MSE and Chandale is studying speech/language pathology at Radford University.

**Daniel P. Kailey** (MATE '87) married Kathleen R. LaRock on January 15.

**John Stuecker** (MSE '97) married Regan Abel (MSCI '97) May 30, 1999 in the Virginia Tech botanical gardens. After completing his master's degree in materials engineering in May 1999 at New Mexico Tech, John went to work in the ceramic materials department at Sandia National Labs in Albuquerque. He is working on a freeform fabrication/rapid prototyping process for ceramics, termed robocasting.

**Dylan V. Pugh** and Christina E. Mister were married June 10. Dylan completed three years of his undergraduate degree in physics at the University of Granada in Spain. He transferred to Virginia Tech and graduated with a bachelor's degree in physics in May 1999. Currently, he is pursuing a doctorate in MSE. Christina is a '99 graduate of Virginia Tech with a bachelor's degree in communications. She is a master's student in wood science. ❖



*Dylan & Christina Pugh*

**Keith Knipling** (MSE '98) and **Ben Lepene** (MSE '01) participated in the Virginia State Championship Series Bike races this summer. This is a series of 6 races held between April 30 and October 8 in which riders accumulate points for each race.

Ben finished first in the Men's Sport race held Sept. 10 in the Jefferson National Forest near Pandapas pond. There

were 140 participants in the race, which covered a distance of 17 miles spanning Gap and Brush Mountains. Keith finished first in the XXCross Country race, a ride of 36 miles in the same area. Championships were awarded in October, and Keith finished third in the series.

**Kathy Rohr** and **Jeff Schultz**, also cyclists, worked as course marshals for the race, marking the course, making sure racers stayed on course, and handing out water. ❖

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*Shawn & Chandale Kelly*

### **Materials Engineering Professional Societies Fall Activities**

The Materials Engineering Professional Societies (MEPS) is in full swing this fall sponsoring department activities, starting with a pig roast held September 16 following the VT/Rutgers football game. The pig was roasted Hawaiian pit style, courtesy of Ben Hailer (MSE '98) and Keith Knipling (MSE '98). About 100 students, alumni, faculty, and friends attended the pig roast, which was held at the Knipling family Doe Mountain Lodge near Mountain Lake.

They feasted on roasted pig, potatoes, and corn on the cob and later roasted marshmallows around a bonfire. Other activities included a make-shift golf driving range (i.e., "Can you hit that Hertz truck parked up in the meadow?") and piling as many people as possible into David Berry's pickup truck for a ride over to a cave excavated by Jeff Schultz and Keith Knipling. About 20 hearty souls rounded out the evening by spending a cold night camping out.

The MSE Industry/Academic Symposium and second annual Golf Tournament took place Friday, October 6, prior to Virginia Tech's homecoming game. The symposium was held Friday morning and had a good turnout of students, alumni, and faculty. The morning began with a tour of MSE facilities given by Carlos Suchicital, followed by the symposium, which was held in Squires Student Center. Speakers included alumni Mitch Jackson (MESC '00) from Tycom Ltd. and Eric Wuchina (MATE '88, MESC '96) from the Naval Surface Warfare Center. Brian Love talked about photopolymerizable bone cement, Sean Corcoran gave a talk on scanning electron microscopy, Ron Kander discussed materials-related challenges in fuel cell research and development, and Steve Kampe finished off the morning with a discussion of alloy design of golf clubs.

The golf tournament took place at Fountain Springs Golf Course in Glen Lyn, West Virginia. Twenty-four alumni, students, and faculty participated, playing in a scramble

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format. The weather, though overcast, proved no deterrent for the golfers, while the open but hilly course presented some interesting challenges. Trophies were awarded at a dinner held at the Foxridge Clubhouse in Blacksburg. The winning team for the day included Wes Shaw (MSE '01), Alison Suggs (grad. student), Craig Todd (MSE '01), and Mark Fields (MATE '81). Other trophies went to Marybeth Miceli (grad. student), Todd Heil (MSE '01), and Bill Reynolds for closest to the pin; Doug Crowson (grad. student) for the longest drive; and Wes Shaw for the longest putt.

MEPS is planning a spring trip to visit Howmet and Jefferson Labs near Hampton, Virginia, and a spring cookout is also being planned. And, of course, another symposium and golf tournament will be scheduled next fall. ❖

MEPS FAI

Ben Hailer, Shawn Kelly, and a VT pig



Ben Hailer, Mighty Hunter



Ben Davi

F to B, L to R: Craig Todd, Jeff Schultz, Ron Kander, Alison Suggs, Mitch Jackson, Bill Reynolds, Matt McMurtry, Wes Shaw, Brian Love, and Shawn Kelly



Mitch Jackson, Jeff Schultz, Shawn Kelly, Matt McMurtry



"Fore!"

Mitch Jackson



RAPBOOK

*Marand & Brian Love*



*Shawn Kelly*



*Steve Kampe*



*Tommy Partridge, Leslie Howard, Herve Marand, & Brian Love*

*The Winning Team: Wes Shaw, Alison Suggs, Craig Todd, and (not pictured) Mark Fields*



*Matt McMurtry & Shawn Kelly*



*Anders DiBiccari & Marybeth Miceli*

## Cycling into the Millennium



*Kathy Rohr*

When Kathy Rohr isn't teaching in the MSE Department at Virginia Tech, she might be out cycling across the countryside. Kathy admits, a bit sheepishly, that she never owned a bicycle as a child, that she bought her first bike at age 35 as a reward for giving

up cigarettes. For a while, she rode only occasionally, but during 1990 she worked up to riding seven days a week and thought she was doing admirably riding twelve miles a day. When she began joining in some long distance rides like the Wilderness Road Ride, her miles increased considerably. By 1998 she was ready for Bike Virginia's five-day, 300-mile tour of Northern Virginia. From that point, Kathy says, "I was launched!"

This past June, Kathy joined a group of about 200 cyclists for Bike South 2000, a bicycle tour through five southern states. She saw the ride as a unique way to celebrate the millennium.

Five organizations took part in planning and implementing this 2000-mile ride from Florida to Virginia: Bike Florida, BAMA (Bicycle Across Magnificent Alabama), BRAG (Bike Ride Across Georgia), Cycle South Carolina, and Bike Virginia. Each organization sponsors an annual state ride, and for this event, the state rides were linked. In most states, the core of 200 riders was joined by cyclists opting to ride through just one state. The tour started in Tallahassee on June 2 and finished 35 days later in Charlottesville on July 7.

Highlights on the tour included following Martin Luther King, Jr.'s historic civil rights marching route from Selma to Montgomery and being joined by 2100 riders for the Georgia leg of the journey. In Virginia, Kathy was impressed with Bike Virginia's hard work in getting local people involved. "Virginia always had something going on." There were street parties, museum tours, a wine tasting, and a talent show. Local volunteers and vendors were ready with food, information, and services when the riders pulled into town.

Kathy met several heroes along the way, speaking most appreciatively of the law enforcement officers who were particularly evident in Virginia. Throughout the state, bike riders passed state police, county sheriffs, local police, and, along the Blue Ridge Parkway, U.S. Park Police, who handled traffic and made sure the cyclists had a safe ride. Another hero

was James Chapman, a 57-year-old paraplegic, who rode the entire 2000 miles on a bike equipped with hand pedals and a full set of gears. She also met Jim Boykan, the oldest rider at 72, and 65-year-old Louise Taylor, a former triathlete, who got started in the sport at age 47 and won 5 of 11 ironman triathlon events in her age group.

Kathy met up with a few creatures she dubbed "celebrities." This category included several (unfortunately) dead armadillos that appeared along the roadside, propped up and sporting beer cans or other odds and ends. Another celebrity (a live one this time) was Matthew Blankets, a baby goat, hauled in a baby cart by his owner, Nancy Flowers, for the entire ride. Matthew garnered lots of attention, and there was even some competition among the younger riders as to who would be allowed to pull the goat cart each day.

Before actually starting the trek from Florida to Virginia, Kathy thought of the ride as "the biker's version of hiking the Appalachian Trail. I very quickly realized this is nothing like hiking the Appalachian Trail, which is all about solitude and getting in touch with your soul. This is just a big bike ride!"



*Kathy, Matthew Blankets, & Nancy Flowers*

"I did learn who I am," Kathy said. "I am the Energizer Bunny! I can just keep going and going and going." She has developed her own code of conduct for these extended bike rides. She never takes short cuts, and she rides up every hill. No walking allowed, and absolutely no riding over the hill in the "SAG wagon," a support vehicle provided for riders with medical or mechanical problems. "That's satisfaction for me. I'm not fast, I'll never be fast. But I can keep going."

Kathy received a B.S. in chemistry from the University of Pittsburgh and a master's in chemistry from the University of Chicago prior to moving to Virginia with her husband, John Rohr, and two sons. John is a professor in the Center for Public Administration and Policy at Virginia Tech. Her sons, Paul, 27, and Mark, 24, team drive an eighteen-wheeler. Kathy earned a master's degree in materials engineering from Virginia Tech in 1986. She worked as a

Research Associate and Instructor for MSE in the late 80's and early 90's. She returned to Tech last winter after several years working in industry. For six years she served as plant metallurgist and chemist for the John C. Nordt Company in Roanoke, a precious metals fabricator for the jewelry industry. Currently, she is an Instructor in the MSE Department, teaching Elements of Materials Engineering and Physical Metallurgy Laboratory.



*James Chapman*



*Louise Taylor*

### *Bike South 2000 Heroes*



*Jim Boykan*



*Updates continued from page 7*

**Benjamin Liptak** (MSE '99) is a process engineer with Techneglas, Inc., in Columbus, Ohio. Techneglas is a wholly owned subsidiary of Nippon Glass. Ben is making glass for television sets and gaining excellent manufacturing experience. ❖

**Pete Widas** (MSE '00) is a manufacturing engineer with Howmet in Hampton, Virginia. ❖

Congratulations to **Bob Fielder** (MSE '00), who successfully defended his master's thesis in MSE at Virginia Tech on December 4. Bob will be working as an R&D materials engineer for Luna Innovations in Blacksburg. This company specializes in fiber optics and related components and sensors. ❖

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LeeAnn Ellis, Editor

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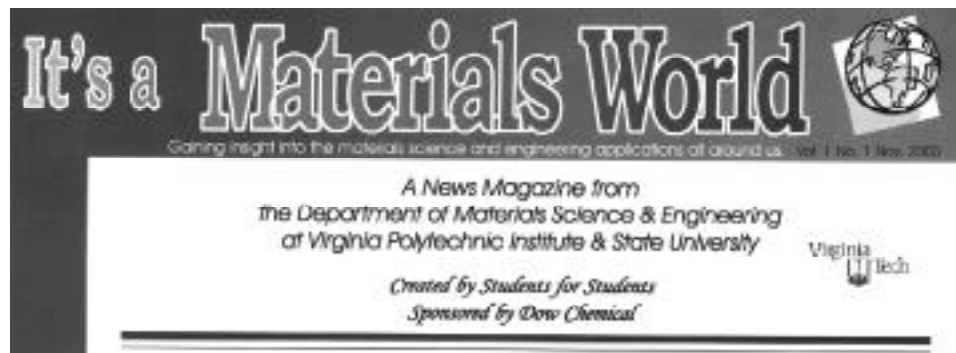
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## New Student Publication Showcases the Materials World

Students in the MSE Department have gotten together this fall to create a newsletter designed specifically for students. *It's a Materials World* is sponsored by Dow Chemical, and its main purpose is to encourage awareness of "how the field of materials science and engineering enhances our everyday lives," as Julie Martin writes in the editorial. Three students comprise the editorial staff: Julie Martin, a graduate student, Todd Heil, a senior, and April Williams, a junior. Contributors are all MSE students, who offer insights into various aspects of materials science and engineering, such as the need for

advanced materials in the 21st century, smart materials and ski technology, women in engineering, and investigating tire rubber.

If you would like more information about this new MSE publication, you can contact Julie, Todd, or April at the following email addresses: [jpmartin@vt.edu](mailto:jpmartin@vt.edu), [theil@vt.edu](mailto:theil@vt.edu), or [apwillia@vt.edu](mailto:apwillia@vt.edu). Following are some excerpts from *It's a Materials World*.



### It Really is A Materials World

*Julie Martin, Graduate Student  
Editor*

From the time we get up in the morning until the time we go to bed at night, our lives are affected by materials science and engineering. We constantly use polymers, metals, semiconductors and ceramics that were carefully developed and tested for their specific application by materials engineers, whether we realize it or not. That's what *It's a Materials World* is all about. Its purpose is to illustrate how the field of materials science and engineering enhances our everyday lives by bringing your attention to the materials aspects of current events and issues. Our purpose is also to let you know about some of the exciting things that are happening in the field, and specifically in the Materials Science and Engineering (MSE) Department.

MSE students benefit from the warmth of a small, friendly, and tight-knit department. We experience personal interaction with professors, small class sizes, exciting research opportunities,

and ultimately, fruitful job prospects. We invite you to learn more about the MSE Department. Feel free to contact any of the authors or editorial staff with your questions and comments, and look for the next edition of *It's a Materials World* early next semester.

### Mountain Biking: No More Heavy Metal

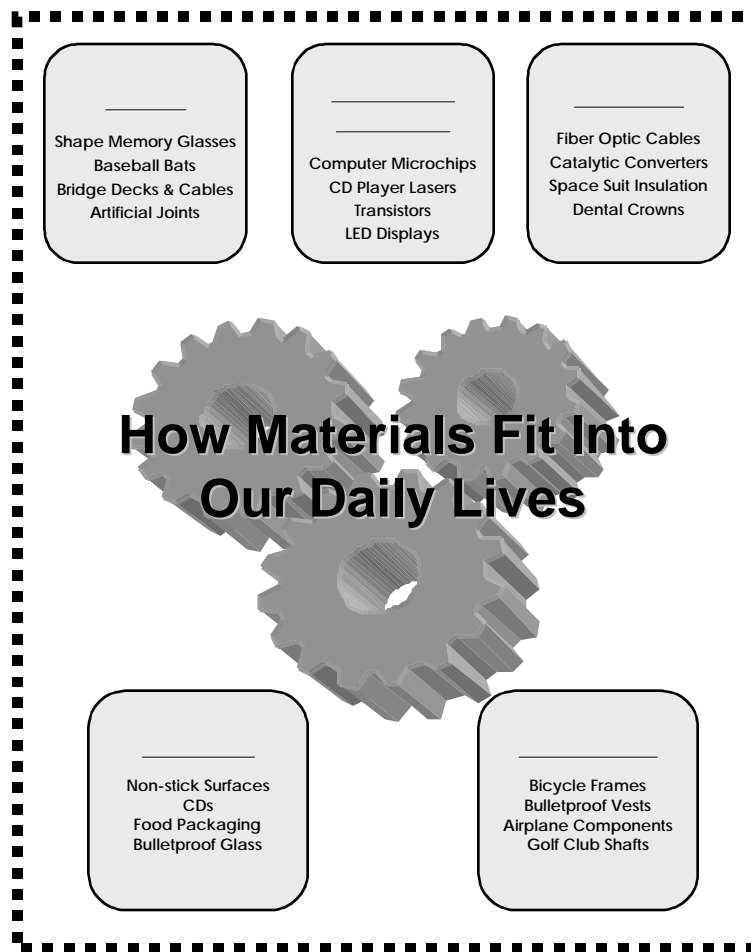
*Adam Maisano  
Sophomore*

Mountain biking has come a long way in the past twenty years. Originally, it was considered an extreme weekend adventure for those who could stomach it. Now, the sport is in the Olympic games. Mountain bike sales account for about half of the \$1.5 billion in total U.S. bike sales every year. So much has changed on these bikes, and new technology continues to evolve as components are refined and the materials used in them are made stronger and lighter.

Titanium alloy bicycle frames are considered to be top-of-the-line by many riders due to the material's high strength and light weight. The advantages of having a titanium frame are numerous. First of all, it is incredibly durable. The standard type of titanium used in industry is called a 3Al/2.5 V alloy that, besides titanium, contains 3% aluminum and 2.5% vanadium. This alloy, developed for airplanes, is twice as strong as commercially pure titanium. Titanium is naturally flexible which means that special tube shapes or large-diameter tubing is needed to reach a stiffness equal to steel. At about 57% the density of steel, oversized tubes bump up the stiffness without adding much weight. Titanium has a "springier" feel to the rider than a steel tube of

the same diameter because of its flexibility, which provides more ride compliance. Lateral and torsional rigidity can be improved by manipulating the tube shape. The resonance of titanium is moderate, which means it transfers less vibration to the rider than aluminum but more than that of steel.

The materials used in bicycle frames are constantly being improved to fit the needs of both road racers and mountain bikers. As we learn more about the stress and torque on a frame during the pedaling cycle, small changes can be made to the shape, thickness, and composition of the material. Better performance with less mass is the ultimate design goal.



Todd Heil

*Foundry continued*

Tech and the University of Alabama as the only schools in the region with an interest in metalcasting education. This situation was cause for some concern to an industry that needs skilled engineers to remain competitive. While the metalcasting industry was red hot like the rest of the economy (no pun intended), it was not likely to remain so if it could not continue to attract engineers to the field.

At the same time the industry was doing well, the gradual deterioration of the MSE Department's lab space and equipment over a period of many years had reduced its ability to expose students to metalcasting. Discussions among industry representatives and MSE faculty were started and evolved into a plan to build a state-of-the-art casting facility in the MSE Department. The intent was to create a facility for teaching modern casting processes on modern equipment while addressing the needs of the industry. These discussions culminated during the Piedmont Chapter's September meeting at Virginia Tech with the formation of a fundraising committee and a planning committee to help design the lab. Members of the planning committee have visited Internet Corporation's research lab and foundry in Lynchburg, and the American Foundry Society's teaching facility in Des Plaines, Illinois. To date, Mike Selz of Metalcasting Equipment, Inc., has arranged the donation of a shell molding machine to the new MSE foundry lab, Combraco Industries has donated an emission spectrometer for chemical analysis, and Electro-Nite Company has offered to donate thermal analysis equipment. The Piedmont Chapter of AFS has also committed to help raise funds for the lab and has established an annual scholarship for MSE students.



*Mark Zaun's lost foam creation at 2 stages of completion (cast iron)*

The potential a well-equipped lab brings for attracting research support was a second factor in the decision to build a new foundry facility. Good equipment is essential to compete for federal grants in metalcasting research. Other organizations have acknowledged this fact and are using their facilities to attract funding. The University of Alabama at Tuscaloosa, Penn State, and Case Western Reserve are examples of schools that have recently built modern foundry labs with research opportunities in mind. Virginia Tech is



*Finished castings in aluminum and brass*

well-suited to take advantage of the trend, too. Several complementary research thrusts are already in place at Tech that can interact synergistically with the metalcasting lab when it is completed. For example, there are faculty working on rapid prototyping, computer simulation and modeling, expertise in polymer binders, refractories, and in alloy development. In addition, the Foundry Education Foundation (FEF), a national organization established by the metalcasting industry to support education, recently designated Virginia Tech as one of its key research universities. Virginia Tech is one of 31 North American member schools the Foundry Education Foundation supports, and its recognition of Tech's research emphasis is expected to provide useful leverage in seeking federal funds for casting-related programs.

Finally, the need for a new lab became painfully obvious last summer when the department's metalcasting course had to be taught using facilities entirely outside MSE. Steve Bickley, a professor in the Art and Art History Department, taught this course in which students designed and made patterns in his studio, then traveled to various companies in the area to make the molds and pour the castings. The class visited Hub Pattern, Roanoke, Virginia; Graham White Foundry, Salem, Virginia; QGC Castings, Surgoinsville, Tennessee; Thistle Foundry, Bluefield, Virginia; and Nomar Castings, Salem, Virginia. These companies provided the students with a lot of help and encouragement, and the students had a good opportunity to see how green sand, shell molding, and investment casting are done in industry. However, making a good casting on the first attempt is a challenge, and the limited time the students had during each road trip did not allow them to correct the inevitable problems that arose. Although the students did manage to make some nice castings, they were also discouraged by the low success rate. When completed, the new foundry lab in Holden should go a long way toward correcting this problem.

Would you like to help? Contact Paul Huffman, at Dominion Metallurgical, Inc. ([phuffman@dom-met.com](mailto:phuffman@dom-met.com)) or Bill Reynolds ([reynolds@vt.edu](mailto:reynolds@vt.edu)) for details.

### ***The MSE Baby Boom Continues!***

*Alex Longhenry*

*Alexander Patrick Longhenry was born May 17, 2000, to Joy and Randy Longhenry. He weighed 7 lbs. 1 oz. and was 20.5 inches long. Joy received her master's degree in MSE in 1995. She and her husband now live near Rochester, New York, where Joy is an engineer with Xerox Corp., and Randy is a computer systems engineer with Cisco Systems.*



*Stanley Jacob Stawovy was born April 3, 2000 to Mike and Becky Stawovy (both MSE '91). He weighed 8 lbs. and was 21 inches long. Mike, who received his M.S. in 1994 and his Ph.D. in 1999, both from Virginia Tech, is currently a senior project engineer at Aerojet Specialty Metals in Jonesborough, Tennessee. Becky received a master's from Tech in 1997, and until the birth of her son, she also worked at Aerojet as a project engineer, a process engineer, and a manager for the metallurgical laboratory.*



*Julie, Micah, and Rick Clark*

*Rick and Julie Clark are the proud parents of Micah Richard Clark, born August 30, 2000, 8 lbs. 4 oz., 21 inches long. Rick holds 3 degrees from Virginia Tech's MSE department and is currently teaching at the College of the Canyons in southern California. Julie (Bhatt) graduated from Tech in 1994 with a degree in communication studies.*



*Micah Clark*



*Stanley Stawovy*

*Oscar Thomas Aguilar was born August 6, 2000, to Hélène and Oscar Aguilar. He weighed 6 lbs. 3 oz. and was 19.5 inches long. Hélène completed her Ph.D. in MESC under Ron Kander in 1995. Currently, she is the Manager of Materials Research and Development for Acadia Polymers in Blacksburg.*



*Oscar Aguilar*

Dear Norm,  
The Materials Science and Engineering Department wishes to thank you for serving as our Interim Department Head for the last 18 months. We greatly appreciate your hard work and dedication. We'll miss you!

Norman:  
Great job.  
Thanks  
Dick Hasselman

Fantastic job  
Thanks  
Herve

It has been great  
working with you!  
LeAnn

Norman  
We all appreciate  
how kindly you did  
this job.  
Mawson

Myrt  
Gordon

Stuart Sowers

Tracey Reister

Jan A. Cocom

Mark R. Kern

Bill Reynolds

THANKS FOR  
POTTING UP  
WITH US!

Brian Lore

THANKS, YOU DID  
A GREAT JOB!  
Jill Libby

Great Job! Susan Kay  
Thanks for pulling us together!

Alex King

Thanks for a  
great year. your  
effort is greatly  
appreciated

Great Job!!

John V. Hoff

Julie  
Mastin

Ron Kah

Stewart Turcott

Steve Hauge

I think we got  
spoiled having you  
as our head.

Super Job  
Jan

Donny Hill

Bob  
Bachert

David B...

Steve Hauge

Wally  
Proff

Diane Forbes

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