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University of Delaware

Mechanical Engineering News

April 25th 2008

Inside this issue: **Faculty Highlights, Student Profiles, Fourth Annual Alumni Business and Career Conference**
ME Alums to be honored

Cheers from the Chair

This issue of Mechanical Engineering News presents a potpourri of vignettes of life in the Department of Mechanical Engineering at the University of Delaware. The assortment here is especially appropriate because we have so many different irons in the fire, so many exciting happening our department, so many exciting people to talk about, that it would be a disservice to address just one topic.

Perhaps I could begin this column by noting the amazing growth in our department. Compared to five years ago, we have seen unprecedented increases both in the number and quality of our students. The number of freshmen taking our required statics course has gone from 99 to 164 in five years! At the same time, SAT scores for incoming freshmen have risen by over 75 points (when combining the verbal and the math score—which is our main measure).

Not only are our students good, but (and remember, these are engineers) they also have lives outside the classroom! You can read more about four of our undergraduate students in this issue. What do the phrases *Miss Liberia, jazz pianist,* and *mechanical engineer* have in common? Read on to find out.

Also during the last five years, our faculty research expenditures have doubled, which is impressive growth at a time when most researchers are complaining about the decrease in funding available. We are particularly excited about the number of interdisciplinary and multi-investigator studies being done at UD. Few professors work alone any more as research becomes increasingly interdisciplinary, requiring multiple people with different perspectives to tackle a problem. This is seen in the baby robot project, in which our Dr. Agrawal works with Dr. Galloway from Physical Therapy, or the V2G project, in which our Drs. Prasad and Advani work with Dr. Kempton in Marine Policy and Dr. Gardner, in Business Administration.

Our work in nanotechnology is receiving awards for Drs. Chou and Thostenson, not to mention Professor Emeritus Vinson who just never seems to stop. This is an exciting area for us and we have many faculty engaged in nano-research. And expect to be continuing to grow in this area in the future.

Finally, I would be remiss if I did not point out the incredible work of our alumni. We have made great efforts in the past few years to reach out to alums and hear their stories and are we ever glad we did. UD MEs are amazing people and we are pleased to honor five of our best and brightest this year at our alumni event this spring: Ray Feehery, Jim Gitney, David Meyers, Martha Meaney Murray and Oren Phillips. Their stories are in this issue. Please keep in touch with us and consider joining us this April if you can!

Thomas S. Buchanan

Chair of Mechanical Engineering

Inside This Issue

ME News

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Editor's Notes:

The front cover illustrates one example of the exciting research being carried out in the Mechanical Engineering Department that has the potential to positively impact the well-being of humanity and our planet. The example shows a baby "driving" a mobile robot, illustrating research that may improve the cognitive development of infants with special needs (story on p. 3). This work and other biomechanical research-including robotics research on the application of exoskeletons to help stroke patients gain mobility (ME News, Summer 2007) and a National Institutes of Health-sponsored study of osteoarthritis-will be discussed at the Fourth Alumni Careers and Technology Conference. All alumni will be invited to the event, which will takes place on the afternoon of April 25, 2008, at Clayton Hall on the University's North Campus (see stories, pp. 13-16). Please save the date and join other alums, faculty, and students for an afternoon of learning, networking, reunion, and celebrating alumni careers. The University's newly elected President, Patrick Harker will deliver the keynote address. Registration information will be available in the near future. —Nate Cloud '64

Faculty Highlights

Suresh Advani gave a presentation on fuel cells at the Solar Hydrogen Workshop, held at the University of Delaware on August 22, 2007.

Tsu-Wei Chou continued to be active in his research on carbon nanotubes and their composites. He delivered the following lectures during June-December 2007 on these subjects:

- 3rd China-Europe Symposium on Processing and Properties of Reinforced Polymers, Budapest, Hungary
- 16th International Conference on Composite Materials, Kyoto, Japan (keynote)
  Rensselaer Polytechnic Institute, Troy, NY
- International Conference on Intelligent Textiles 2007, Seoul, Korea (keynote)
- Institute of Applied Mechanics, National Taiwan University, Taipei, Taiwan 31st Congress of Theoretical and Applied Mechanics, Kaohsiung, Taiwan (keynote)

Mike Greenberg and his wife, Yisraela, spent October and November in Haifa, Israel.

Ajay Prasad was the featured lunchtime speaker at the 2007 Transportation Education, Research and Security Forum on November 14, 2007, in Clayton Hall. He spoke about the UD Fuel Cell Bus Program.

Erik Thostenson was the recipient of the 2007 Elsevier Young Composites Researcher Award from the American Society for Composites (see article on page 5). The award recognizes a member of the composites community who early in their career has made a substantial impact on the science and technology of composite materials through a sustained research effort.

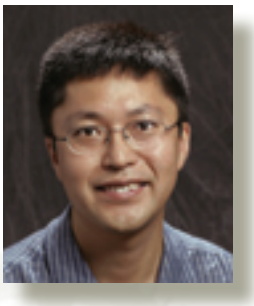
Thostenson was an invited speaker at the TTCP MAT TP7 workshop held at the U.S. Naval Academy on September 26 and 27, 2007. The workshop reviewed the current status of research in the field of nanocomposites within the TTCP nations. He was also a featured speaker at the Institute for Defense and Government Advancement (IDGA) Next Generation Materials for Defense 2007 Nanomaterials Focus Day. Thostenson led a two-hour seminar entitled "Nanostructured Composite Materials: Bridging the Micro and Nano Scales," addressing his recent advances in processing, characterization, and modeling of nanomaterials.

Jack Vinson, is the recipient of the 2007 American Society for Composites Outstanding Research Award, which is given annually to "a distinguished member of the composites community who has made a significant impact on the science and technology of composite materials through a sustained research effort over a number of years." (See full article on p. 6)

Lian-Ping Wang was a Visiting Scientist at the National Center for Atmospheric Research (NCAR) and spent one month in Boulder, Colorado, during the summer of 2007. His postdoc, Dr. Bogdan Rosa, and graduate student Grace Shi also worked at NCAR in the summer, and together they visited the Computational and Information Systems Laboratory there. Dr. Wang continues to expand his research collaboration with NCAR scientists on warm rain microphysics. On July 6 2007, Dr. Lian-Ping Wang presented a seminar, "The Role of Turbulence in Warm Rain Initiation," at the Institute of Atmospheric Sciences and Climate, Italian National Research Council, in Rome, Italy. On July 16, 2007, he delivered a second seminar at the Institute of Geophysics, Warsaw University, in Warsaw, Poland. As a joint initiative led by Dr. David Legates (Department of Geography), Dr. Denny Kirwan (College of Marine and Earth Studies), and Dr. Lian-Ping Wang, the University of Delaware is now a member university of UCAR (University Corporation for Atmospheric Research). This signifies UD's strength in and commitment to research in atmospheric sciences and related fields.

Prof. **Liyun (Leann) Wang** and her research group have received a Zeiss Laser Scanning Microscope LSM510 to establish a biomechanics imaging core facility. Funding for this major piece of equipment was provided by the department's $11M COBRE grant. In addition, the biomechanics group has been awarded two new NIH R01 grants, one to Dr. Wang and the other to Department Chair Tom Buchanan, to conduct musculoskeletal research.

Prof. **Bingqing Wei** gave an invited talk at "Symposium K: Nanostructured and Bulk Materials for Electrochemical Power Sources" during the *International Conference on Materials for Advanced Technologies*, from July 1 to 6, 2007 in Singapore. His talk was highlighted in the meeting postscript.



Department News

Babies Driving Robots?

Researchers collaborate to improve cognitive development

ME Professor Sunil Agrawal is collaborating with James C. (Cole) Galloway, Associate Professor of Physical Therapy, on innovative research that could have significant repercussions for the cognitive development of infants with special needs. The two have outfitted kid-size robots to provide mobility to children who are unable to fully explore the world on their own.

The idea sprang from a parking lot conversation in which Agrawal approached Galloway, who he knew worked with babies with special needs, and said he might have developed something of interest. Agrawal is a robotics expert who had been developing a fleet of small, rounded robots that could work as a unit through a wireless network.

The work is important because much of infant development, both of the brain and behavior, emerges from the thousands of experiences each day that arise as babies independently move and explore their world. Infants with Down Syndrome, cerebral palsy, autism and other disorders can have mobility limitations that disconnect them from the ongoing exploration that their peers enjoy.

Galloway said no one had ever tried using robots with babies, but early experiments show that seven-month-olds can learn to operate the simple joystick controls. But he is passionate about the possible benefits to children with special needs of even younger ages.

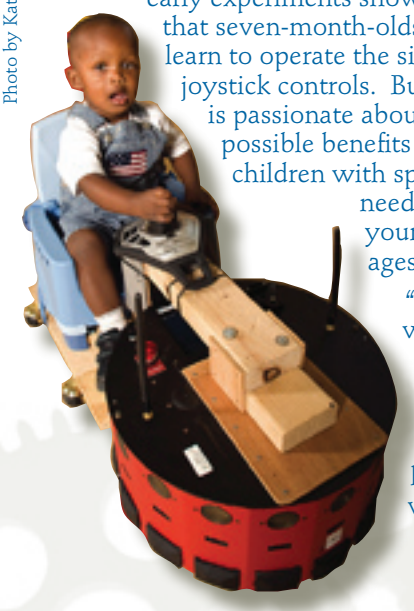


Photo by Kathy Atkinson

"Infants with limited mobility play in one location while their peers or siblings go off on distant adventures all over the room or playground," Galloway said. "With the robot, they become the center of attention because their classmates want to try it. We predict that this increased social interaction alone will provide an important boost in their cognitive development."

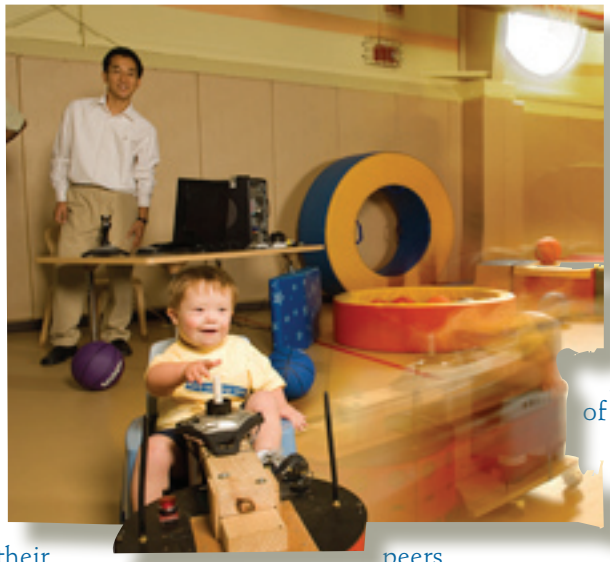


Photo by Kathy Atkinson

The researchers took their first robot, known as UD1, to the UD Early Learning Center, which has a gymnasium for initial training on the robot and a varied outdoor landscape to use as a test track. The tiny robot is ringed with sensors that can determine the obstacle-free roaming space and will either allow infants to bump obstacles or will take control from the infant and drive around the obstacle itself.

"It was a relief when we saw that the children quickly grasped the use of the joystick," Agrawal said. "If they had just sat there or cried, it would have been back to the drawing board. But over time we have seen them gradually increase their time with the robot and the amount of distance they cover."

The next prototype, UD2, will build on the current technology to provide additional control to a parent, teacher, or other supervising adult. The goal of the next phase of the project is to place multiple mobile robots with special needs infants in communities throughout Delaware and to gather data to analyze how they are used and what the children learn so that the research team can continue to make modifications.

Both Agrawal and Galloway note that Delaware, with its mix of urban, rural, and suburban communities, is a model state for a clinical project such as this. They also believe the training, robot design and new technology derived from the project will provide the foundation for the first generation of safe, smart vehicles for infants born with mobility impairments. "For a real-world mobility device to emerge, we have to build it for exploring the real world experienced by infants and their families and then rigorously study its performance in that world," Galloway said.

This interdisciplinary project is bringing together students and researchers from fields that have had little or no interaction: engineering, early childhood education, and pediatric therapy. "This project is allowing us to bind technology and human need together to remove barriers for movement in the environment," Agrawal said.

"The research, educational, and health care impact is hard to overestimate, given the critical nature of early development, the relatively short time to prepare special needs infants to enter mainstream education, and the complete lack of power mobility early in life," Galloway said. "This project has so many positives and is of interest to so many in the community. We are encouraging everyone interested in special-needs infants—from parents to policymakers—to get involved. We are thinking locally and globally at the same time."

Editor's Note: This article was adapted from a story written by Neil Thomas and published in UDaily *on Nov. 9, 2007. Since the original article was published, the research has garnered a fair amount of media attention, including coverage by Channel 6, Comcast Channel 8, Discovery Canada, and the Associated Press.*

CCM and ME Team with Korean Researchers on Nanotechnology Program

Nine-year funding comes from Korean government agency

A team that includes two ME faculty members affiliated with UD's Center for Composite Materials (CCM) and researchers from the Korea Institute of Materials (KIMS) has been selected to receive a $5M grant from the Korea Ministry of Science and Technology (MOST) for work in the area of nanotechnology. Tsu-Wei Chou, Pierre S. du Pont Chair of Engineering, and Erik Thostenson, Research Assistant Professor of Mechanical Engineering, will lead the UD effort in the nine-year program.

MOST provides central direction, planning, coordination, and evaluation of all science and technology activities in Korea. The funding comes through the Global Research Laboratory (GRL) program, which is aimed at developing fundamental and original technologies through international collaborative research between Korean and foreign laboratories. In addition to nanotechnology, the GRL program supports collaborative research in biotechnology and information technology.

The UD-KIMS team is one of only two teams awarded GRLs in the nanotechnology area, out of 39 proposals submitted to the competitive program. The Korean PI at KIMS is Dr. Joon-Hyung Byun, who received his Ph.D. at UD in mechanical engineering in 1993 under Chou's supervision.

"The program, which will establish a global collaborative network between KIMS and UD-CCM, will enable us to advance the research in hybrid micro- and nano-composites for structural and functional applications," Chou said. "I am very excited about this opportunity for international collaboration and really pleased to be working with Dr. Byun and Dr. Thostenson on this program."

"International collaborations are highly valued here at UD as we strengthen our global presence," said Interim Dean Michael Chajes, "and this program is an excellent example of the knowledge-based partnerships that President Harker is encouraging faculty to develop."

"Tsu-Wei has established some very high-impact international collaborations over the past three decades, and this latest program further expands his global visibility," said CCM Director Jack Gillespie. "This grant has added significance in that all of the funds are coming from MOST."

ME Faculty Win Prestigious Composites Awards

ASC recognizes Vinson and Thostenson

Two ME faculty have won major awards from the American Society for Composites (ASC). Jack R. Vinson, Professor Emeritus, is the recipient of the 2007 ASC Outstanding Research Award, and Erik T. Thostenson, Assistant Professor of Mechanical Engineering, is the winner of the Elsevier Young Composites Researcher Award. The awards were conferred at ASC's 22nd Annual Technical Conference, held from September 17–19, 2007, at the University of Washington in Seattle.

The Outstanding Research Award is given annually to "a distinguished member of the composites community who has made a significant impact on the science and technology of composite materials through a sustained research effort over a number of years." The Elsevier Award, given for the first time in 2007, recognizes "members of the composites community who early in their career have made a significant impact on the science and technology of composite materials through a sustained research effort."

Vinson, who joined the University of Delaware faculty in 1964, is credited with teaching one of the first composites courses in the nation in 1969. In 1974, he became the founding director of the UD Center for Composite Materials.

Tsu-Wei Chou, Pierre S. du Pont Chair of Engineering and long-time colleague of Vinson said, "For half a century, Dr. Vinson has made remarkable contributions to advancements in fiber composites, owing to his unique expertise in the mechanics of structures composed of anisotropic materials."

Chou also noted Vinson's contributions in educating generations of engineering students with advanced degrees who are now engaged in cutting-edge R&D in composites.

Vinson spent 10 years in industry before beginning his academic career, doing R&D work at the Aeronautical Research Laboratory of the Wright-Patterson Air Force Base, the Missile and Space Vehicle Department of General Electric, and other companies. At Delaware, his work has focused on structural mechanics of plates and shells, thin-walled structures, and sandwich structures.

In addition to reporting his research results in more than 220 archival journals and conference papers, Vinson has authored or co-authored seven graduate-level textbooks on structural mechanics and mechanics of composites, which have been extremely well received by students and researchers all over the world. One of his books, *The Behavior of Structures Composed of Composite Materials,* recently went into a third printing.

An active member of several professional societies, Vinson has also encouraged and facilitated the participation of his students in these organizations.

"Besides his innovative ideas in fundamental research," Chou said, "I have been most impressed by Jack's energy, dedication, and tireless effort in promoting the application of composites technology."

Thostenson, who completed his master's degree in mechanical engineering in 1999 and his doctorate in materials science and engineering in 2004, both at the University of Delaware, also earned a bachelor's degree in composite materials engineering from Winona State University in Minnesota. The program is the only undergraduate program in the country focusing on composites.

According to Chou, Thostenson's advisor and mentor, the young researcher's experience in the field of composites is very diverse, encompassing synthesis and processing of materials, advanced characterization techniques, and development of models to predict material behavior.

Thostenson and Chou were recently cited for their discovery of a means to detect and identify damage within advanced composite materials by using a network of tiny carbon nanotubes, which act in much the same manner as human nerves. That work is an outgrowth of research that the pair have been conducting in carbon nanotubes for the past several years.

Given his relative youth in the world of scientific research, Thostenson's publications have been cited widely—nearly 750 times as of July 2007. His original work in modeling the elastic properties of carbon nanotube-based composites, published in 2003, has been cited by others 56 times.

"That manuscript marked an important step in understanding the mechanical behavior of nanomaterials," Chou said. "Unlike prior modeling efforts in nanotube-based composites, where atomistic simulations on highly idealized systems had been employed, Erik's approach adopted mechanics-based models for realistic nanocomposite systems and supported the calculations with careful experimental measurements."

Thostenson has been the recipient of several other prestigious awards, including the 2004 Allan P. Colburn Award for outstanding dissertation in the engineering and mathematical sciences. In addition, he received the inaugural Hayashi Memorial International Award from the Japanese Society of Composite Materials, recognizing outstanding young international researchers in the field of composites, as well as the Society for the Advancement of Material and Process Engineering (SAMPE) Outstanding Ph.D. Student Award.

"These awards are particularly significant since they are based on technical merit as judged by others in the field of advanced materials," Chou said.

Thostenson Receives Gift from Northrop Grumman

Collaboration facillitated by ME alum

Erik Thostenson, Research Assistant Professor of Mechanical Engineering, has received an unrestricted gift from Northrop Grumman to support his research in nanomaterials for aerospace applications. He plans to use the gift, which was made through the company's Industrial Affiliates Program, to add equipment that will expand the current capabilities of his lab.

Rick Bohner (BME1984) of Northrop Grumman presents a check to Erik Thostenson (right) to support his research in nanomaterials.

"Erik's work in nano-composites fits a niche we've been looking at ourselves," says Rick Bohner (BME1984) Manager of Advanced Materials and Processes Development for the company's Integrated Systems sector Western Region (ISWR). "His ability to identify unique material properties and to tailor materials for our applications is what is of interest to us, as it complements some of our own IRAD work."

According to Bohner, the Industrial Affiliates Program is a recognized process that companies use to promote collaboration and gain access to valuable academic resources. "The funds are unencumbered as a show of good faith and interest," he says. "For us, it's a way to get the 'ears' of academia, and for the University, it's a way to bring in real-life requirements."

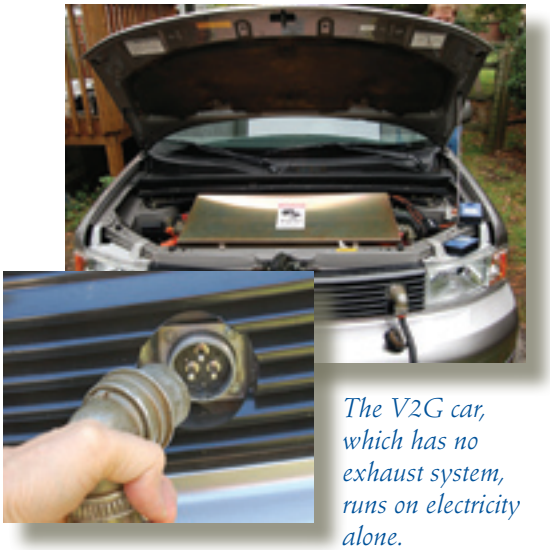
Both Bohner and Thostenson see a near-term opportunity for further joint work. "We identify the application requirements and then augment that with academic capabilities, such as Erik's expertise in the nanomaterials area," Bohner explains, "These capabilities may be leveraged directly on our existing programs or pulled together into a proposal for further development funding by our customer, which may be the Air Force or DARPA or the Navy."

"There are a lot of untapped applications emerging in the aerospace field," Thostenson says, "but there has to be value added." The "sensing" system that he and Tsu-Wei Chou, Pierre S. du Pont Chair of Engineering, are developing using carbon nanotubes to detect defects in composites fits that criterion.

"This gift demonstrates Northrop Grumman's confidence in our work and sets the stage for future collaborations," Thostenson says.

V2G Car Generates Electricity—and Cash:

Team develops car that stores electricity for utilities



The V2G car, which has no exhaust system, runs on electricity alone.

The price of oil nearly reached $100 a barrel earlier this month, but a new University of Delaware prototype vehicle demonstrates how the cost of the black stuff could become a concern of the past.

A team of UD faculty has created a system that enables vehicles to not only run on electricity alone, but also to generate revenue by storing and providing electricity for utilities. The technology—known as V2G, for vehicle-to-grid—lets electricity flow from the car's battery to power lines and back.

The team includes ME professors Ajay Prasad and Suresh Advani, as well as Willett Kempton, associate professor of marine policy and Meryl Gardner, associate professor of business administration. Kempton began developing the technology more than a decade ago and is now testing the new prototype vehicle.

When the car is in the V2G setting, the battery's charge goes up or down depending on the needs of the grid operator, which sometimes must store surplus power and other times requires extra power to respond to surges in usage. The ability of the V2G car's battery to act like a sponge provides a solution for utilities, which pay millions to generating stations that help balance the grid. Kempton estimates the value for utilities could be up to $4,000 a year for the service, part of which could be paid to drivers.

The technology will work on a large scale, he said, because on average 95 percent of all cars are parked at any given time. One hour a day of car usage is the average in America.

Kempton has a 240-volt plug at home that gives the battery a full charge—or a range up to 150 highway miles—in just two hours. A smaller, standard 110-volt plug works but provides a full charge in about 12 hours. The smaller plug also moves less power for the grid operator when the car is in V2G mode.

"The bigger the plug, the more power you can move, the more revenue," he said, explaining that it cost about $600 to have the larger plug installed.

But even though Kempton is supplying power to the grid with the prototype car, he's not getting paid for it—yet.

PJM, the grid operator for 14 states, including Delaware, is keen on the technology and even hosted the second-ever public demonstration of the V2G car in action last week. (The first was at the Federal Energy Regulatory Commission, two weeks earlier.) But PJM requires at least 300 megawatts to purchase power. That means the UD team and its collaborators must get 300 cars up and running.

A large plug allows electricity to move from the car to the power lines and back.

The prototype car is a stepping-stone to that goal. Prasad and Advani plan to add V2G to the University's fuel cell bus. Next, the team, including the company that created the car, California-based AC Propulsion, will test the prototypes and fix any potential problems they bring to light. Then they'll begin creating a user interface that will let drivers, for example, tell the car to never go below 50 percent charge while in V2G mode.

Helping him to learn what types of features potential buyers would want on the car and to identify potential buyers are business administration faculty member Gardner and her students. They've done a pilot survey of nearly 100 drivers that's shown there's a lot of interest in the technology, she said.

"We also want to provide information on how to market the car," she said, so her team is asking people questions like how much they would be willing to pay for it and how they feel about driving a car that's better for the environment than a gasoline-powered vehicle.

That last question gets Kempton, who also is involved in College of Marine and Earth Studies research on offshore wind farms, the most excited. He explained that even if the electricity used to charge the car is produced by a coal-fired power plant, the car itself produces no carbon dioxide emissions. If a wind farm fuels the electricity from the power plant, he explained, the car and its power source would be emissions free.

And even though the green aspect of the car is key for Kempton, he knows consumers might have some other, more practical, questions about the vehicle, such as, "What's it like to drive?"

Zippy yet quiet, being behind its wheel is a thrill, he said. "I hate getting back in my gas car. It feels sluggish."

For more information about V2G technology at UD, visit www.udel.edu/V2G. To learn more about the College of Marine and Earth Studies, visit www.ocean.udel.edu.

Editor's Note: This article was adapted from an article by Elizabeth Boyle that appeared in the Nov. 28, 2007, issue of UDaily.

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Rick Hall:

Composites engineer and "farmer"

Rick Hall has spent most of his academic career working on advanced materials. An expert in metal-matrix composites, he uses high-tech methods to characterize the microstructure of these materials for applications ranging from auto parts to armor.

But many of Hall's personal passions lie at the other end of the technological spectrum. Ten years ago, he and his wife, Lysette, bought a farmhouse in France. The date "1664" is inscribed in stone over the door, but Hall says parts of the original house date back even farther than that.

Hall calls the property a "farmhouse without the farm." Sitting on a relatively small plot of land, the compound includes an L-shaped house, two barns, a small house for drying chestnuts, and a stone bread oven.

It is a house with almost 350 years of history. "Back in the days before there was central heat," Hall says, "the ground floor was for the animals, and the top floor was for storage of hay and straw. The people were sandwiched in between, on the middle level, to keep warm."

Every summer, Hall and his wife spend at least two months on the property, working on renovations. While the work on the house itself and one of the barns is now complete, Hall recalls going over during the winter ten years ago to supervise the initial work. "The contractors had just taken the roof off," he says, "so I spent the first night in a sleeping bag, with a roaring fire in the fireplace, literally 'sleeping under the stars.'"

The house is now fully furnished and is currently rented to a Canadian family. "The wife posts a blog about the house, which I read once in a while," Hall says. "It's very weird because she's living and writing about our life." That life includes friendships with the neighbors in the tiny village, eating local foods, and hiking in the nearby mountains.

The house is in the Aveyron, which is in the southwest of France about 85 miles from Toulouse. "The area has traditionally depended on subsistence farming," Hall explains, "and the population plummeted several years ago, when a disease wiped out the local grape crop. Many of the people who own bistros in Paris now are from this area."

The Halls celebrated completion of the first phase of the renovation by hosting a big party in the larger of their two barns. "We invited local dignitaries including the mayor, neighbors, and everyone who had worked on the house," he recalls. "We had about 60 people, and after we were finished eating, we moved the tables out and did folk dances to music from a 'squeezebox' played by a local. It was absolutely magnificent."

Rick and Lysette met in the 1970s and spent the first three years of their married life in Denmark, where their son, Philip, was born. They then lived in Israel for two years, and their daughter, Joanna, was born there. The family came to the United States in 1980, intending to stay for just a year. They never left. Lysette, who earned a degree in nutrition at UD, has taught French in the Department of Languages and Literature for the past 20 years. But with a look toward their eventual retirement, the Halls chose France as the place they both wanted to be.

"The Aveyron is just a beautiful area," Rick says. "I've always liked hiking and camping, and this place is wonderful for someone who enjoys the outdoors." Also fascinated with history, he plans to become involved with local historical and nature societies after he and Lysette retire.

Life will certainly be different for the Halls when that happens. After spending most of their adult lives in a bustling university town of some 30,000 people, they will be living in a village with a population of about 30, in a house that sees just two or three cars a day pass by. But they have had plenty of time to hike the hills around the house, meet the neighbors, and learn the local customs. There will be nothing high-tech about life in the Aveyron, but the Halls will be ready for the change when it comes.

Student Highlights

Daniel Gempesaw

Mathematician, Engineer, and Musician

Dan Gempesaw (BME2008) couldn't decide between majoring in engineering or math, so he chose both. Gempesaw will graduate in May with a double degree in ME and math and plans to head to graduate school in applied math. Ultimately, he may choose academia as a career path. "I've had some great teachers," he says, "and it would be nice to pass that along."

Gempesaw's only regret about the double major is that it left him little room in the curriculum for technical electives that would have allowed him to pursue an area of specialization, but he did find time to do undergraduate research in both departments. During the summer between his freshman and sophomore years, he worked with Prof. David Luke in the math department; the summer after his junior year, he conducted research in fluid dynamics with ME Prof. Kausik Sarkar.

The challenging double major didn't prevent Gempesaw from pursuing outside interests either. He has a passion for music and jazz music in particular. "I've been playing piano ever since I was a child, when my mother gave me informal lessons," he says. "I started playing jazz piano during high school, and I really enjoyed it. I've been squeezing in lessons around my ME and math curriculum wherever I could fit them in over the past few years, and I really enjoy playing and listening to all sorts of jazz."

"I also taught myself how to play the bass guitar," he continues, "and I'm currently the bassist in an oldies cover band. I've been playing bass and singing as part of the Music Ministry group for six years at the church on campus, St. Thomas More Oratory."

With a group of friends on campus, Gempesaw played an integral role in the founding of a new student organization, the East and Southeast Asian Union. He is webmaster for the organization, which focuses on bringing various aspects of the culture of these regions to the University community.

Gempesaw's engineering senior design project was one of the most memorable activities of his undergraduate career. He is a member of the team charged with designing a shock-absorbing seat system for a Rigid Hull Inflatable Boat (RHIB) used in special operations missions.

To gain a realistic perspective on the needs of the project, Gempesaw and his senior design teammates were treated to a ride on a RHIB that left a lasting impression. Despite the rough ride, all four members of the group are ready to go again. "It would be especially meaningful if we got to the stage where we could try out the system we designed," Gempesaw says.

UD is a family affair for the Gempesaws: Dan is the son of Conrado M. (Bobby) Gempesaw, Dean of the Lerner College of Business & Economics at UD, and Clavel Gempesaw, who obtained her Ph.D. from UD in Urban Affairs in 1991. His younger brother David is a freshman in the business program.

Julianne Twomey

Senior juggles sports and academics

Julianne Twomey (BME2008) believes strongly that "you have to try a little bit of everything to know what you want and then get to be good at one thing." Right now, she knows she's very interested in the biomedical field, particularly in the area of implants and orthopaedic devices.

But she isn't sure whether she wants to go to grad school or get a job, so she's applying for both. She has already gained some experience in the field by working for Stryker Orthopaedics in Mahwah, New Jersey, where she learned a lot about the operations side of the business.

Twomey, whose mother is an electrical engineer, chose ME as a major because she loved physics in high school. Her experiences in UD-ME have all been positive. "I love how interactive the professors are," she says. "I've gotten to know them really well. It's also great being in a major with a relatively small number of students because we're a really close-knit group."

Although she says that Senior Design doesn't leave a lot of time for other things, Twomey keeps quite a few balls in the air. She is Vice President of the student chapter of ASME and a member of the Student Advisory Committee for UD-ME. She also serves as an Engineering Ambassador and is on the planning committee for the department's annual career celebration and business conference. And she is also a member of UD's track & field and cross-country teams. Her specialty on the track team is the 3000-meter steeplechase.

Originally from Orange County, New York, Twomey grew up in a small town near West Point. One of three children, she is the only one to follow in her mother's engineering footsteps. Her older sister majored in English major at St. Joe's, and her younger brother, a high school senior, is interested in exercise science.

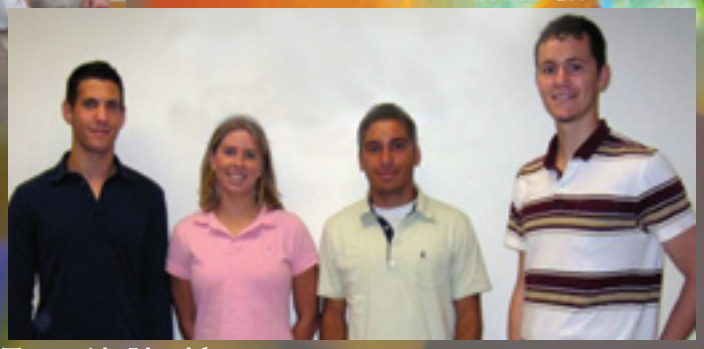
Senior Design 2007

"16 student 'senior design' teams prepare in early September 2007 to begin their Senior Design Adventure with Industrial sponsors*, addressing a diverse array of business needs for product enhancements; and/or process improvements. All of the teams successfully completed their projects - demonstrating their ability to apply their undergraduate academic experience to real world engineering needs from the synthesis of new concepts, based on business needs, to the 'design-build-test' demonstration of the commercial viability of their concepts. Some prototype systems were put into service immediately following the semester in December 2007!

Project results (Fall 2007) can be reviewed at http://www.me.udel.edu/meeg401/MEEG401_prior-year-examples.html

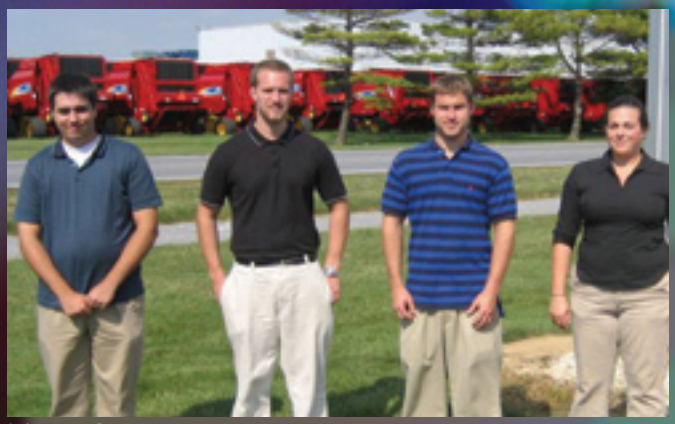
Team Air Products

Team GE



Team Air Liquide

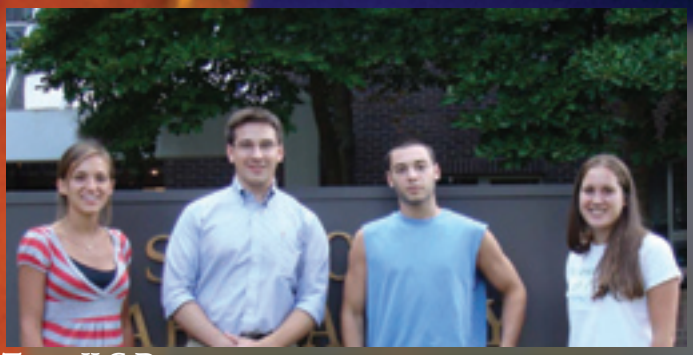
Team ThermoFisher



Team CNH

Team Gore

Team Siemens



Team ILC Dover

Team PAC

Team PMI

Team Speakman

Team Black and Decker

Team PATS

Team Southco

Team RAC

Team SP&S

MaryKate Wioncek

Student leader and world traveler

MaryKate Wioncek (BME2008) chose ME because of the diversity of its applications, and she feels she made the right choice. She has really enjoyed the strong bonding of the group and the ready availability of help when it's needed. She admits that being a mechanical engineer has made her look at things in the physical world differently. "I look at my water bottle and think about fluid dynamics," she jokes.

Wioncek, who is from Massachusetts, loves to travel, and she took full advantage of UD's outstanding Study Abroad programs. "I like to have a broad view," she says. Wonciak participated in international programs all four years of her undergraduate career, studying political science in Italy, history and cross-cultural etiquette in South Africa, marketing in Peru, and women's studies in India. The trip to South Africa was a service learning opportunity, and Wioncek worked in a day care center during her stay there.

Serving on the planning committee for the department's annual career celebration and business conference has been a great experience for Wioncek. "It's an excellent group," she says, "and they work hard to make a great event for alumni."

"The event shows recent grads that there is an alumni base," she continues. "I know I'll stay involved, probably because of having served on this committee."

Wioncek has not yet identified a specific technical area that interests her, but she likes project management. "I enjoy managing a project through all of the stages to the end," she says.

She is currently job hunting and has an open mind about the location but would like to work for an entrepreneurial company that "encourages employees to be accountable and in charge of their own projects," she says.

In addition to her contributions to the career celebration planning committee, Wioncek is President of the student chapter of ASME, a member of the ME Student Advisory Council, and Chair of E-week. She has also served on the Committee for Curriculum Change.

MaryKate Wioncek may not yet know exactly where she's going, but all of her travels and experiences as an undergrad will undoubtedly help her as she figures it out.

UD-ME student named Miss Liberia in the U.S.

Talented junior stays in touch with her native country

Mamawa Fofana, a junior mechanical engineering major from Baltimore, was crowned Miss Liberia in the U.S. 2007-08, in July.

Fofana, Maryland's Miss Liberia in the U.S., competed against contestants from 12 other states. For the talent competition, she did a combined cultural, hip-hop dance.

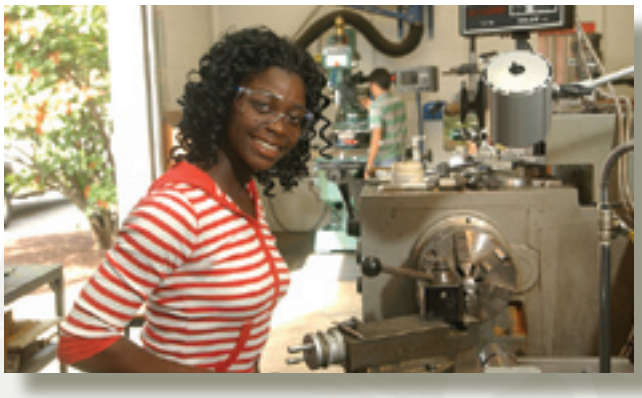
As the new Miss Liberia in the U.S., Fofana will attend community service events to help raise money for Liberian causes. "I feel blessed and am happy to be the new title holder," she said.

The scholarship pageant was developed and sponsored by Liberian United Women in Progress (LUWIP), a nonprofit community-based resource group headquartered in Philadelphia. LUWIP helped found the Miss Liberia in the U.S. pageant seven years ago as a way for young women of Liberian decent to embrace and promote their culture and demonstrate their talent, beauty and accomplishments.

Liberians began emigrating to the U.S. in the early 1990s when Charles Taylor led an army into Liberia and overthrew the democratically elected government, leading to 20 years of civil unrest that took the lives of thousands. The country stabilized after Taylor was overthrown and Ellen Johnson-Sirleaf was elected president in 2005. During those 20 years, a substantial Liberian community formed in the U.S.

Fofana was born in the U.S. after her parents left Liberia at the start of the civil war. She said she stays in contact with the Liberian community in Baltimore. "I do plan on going back to Liberia after my education to work on projects that will help further the development of the country since the war."

Note: This article, written by Barbara Garrison, originally appeared in the Oct. 15, 2007, issue of UDaily.



Alumni News

Mark Your Calendars: Fourth Annual Alumni Conference to be Held on April 25

The Fourth Annual Alumni Business, Technology & Careers Conference will be held at the University's Clayton Hall Conference Center on Friday, April 25, 2008. The conference will feature a keynote address by new University of Delaware president Patrick Harker, who will talk about the University's vision and the important role to be played by the College of Engineering. The dual-track program will include seminars by faculty, alumni, and students on engineering technology, engineering business topics, and career planning and experiences.

The popular seminars will continue the trend of the past three years to offer state-of-the-art material on technical topics current to the department's research program, business-related topics of current national interest, and career-related topics popular with both the students and alumni in attendance. Topics for this year include technical summaries of current research on exoskeletons and robotics as well as osteoarthritis. Additional seminars are planned to discuss global small business ventures and to highlight two ME senior design projects, among others.

"This event is a unique opportunity for students, faculty, and alumni to come together and share information about careers and breakthroughs in research and technology," says ME Alumni Relations Coordinator Nate Cloud (BME1964). "It's a great chance for networking and information exchange. We've made some changes to the program and schedule this year to enhance the networking opportunities."

The event was initiated in 2005 to honor distinguished ME alumni and has since been expanded to include talks on current research by ME faculty as well as business-oriented presentations.

"We're working very hard to make this program exciting and fresh for attendees," says planning committee member Jim Hutchison (BME1978). "Now that we're in our fourth year, we've gotten lots of feedback about worked and what didn't in the past three years, and we're doing our best to respond to the comments and craft a program that offers value for everyone. We're particularly excited to offer Dr. Harker as our keynote speaker and believe he will energize all of us with his plans for a great new future for the University and the Mechanical Engineering Department."

For more information, contact Nate Cloud (cloudn@udel.edu) or visit the ME web site http://www.me.udel.edu) for details on the program.

Last year's event included opportunities for networking, technical and career-oriented talks, and a display of the SAE formula style racecar.

Five ME Alums to be Honored with Career Awards

From doctors to entrepreneurs, honorees exemplify breadth of ME discipline

Five alumni who graduated between 1968 and 1987 have been chosen to receive this year's Distinguished Career Alumni Award. While all have degrees in mechanical engineering, their fields of employment range from aerospace to medicine, and their areas of expertise run from venture capital generation to orthopedic surgery. They have worked for companies, universities, and hospitals, as well as in private practice.

"These individuals were selected from a very qualified group of people," says Bill Wagamon (BME1962), chair of the sub-committee that presented the slate of nominees for consideration by the selection panel.

"They are working in a variety of fields, but their level of experience is significant, and their collective accomplishments are extraordinary. We have doctors, inventors, and corporate officers in this group, and we're very honored that they've agreed to accept this award and join us in April for our fourth annual business and technology conference."

Brief biographies of the five winners appear below.

Raymond V. Feehery, Jr., earned a bachelor's degree in Mechanical Engineering Administration from the University of Delaware in 1974. He went on to earn an M.S. in Biomechanics at Penn State and a D.P.M. from the Temple University of Podiatric Medicine in Philadelphia. Feehery has a private practice in the Wilmington, Delaware area and is an Adjunct Professor in the Department of Orthopedics at the Pennsylvania College of Podiatric Medicine and in the Department of Physical Therapy at the University of Delaware.

Feehery lectures frequently at local, regional, and national meetings on topics primarily related to biomechanics and sports medicine. He has won several awards for his contributions to education, and he has published a number of articles in professional and medical journals.

Feehery's personal interests include sports, primarily distance running, swimming, and involvement in youth soccer and basketball. He is an active runner himself as well as a critical resource to the running community. Hundreds of athletes in the northern Delaware area wear orthotics prescribed by Feehery.

"Ray Feehery, being a runner himself, understands that runners want to keep running," says Dave McCorquodale, a local runner. "While conducting a successful podiatric practice, Ray always takes the time to evaluate the needs of each individual he treats. When he's out on the trails of White Clay Creek State Park, he's no longer Dr. Feehery, but one's equal, another runner."

Feehery serves as Director of FIT FEET for Special Olympics Delaware and as a consultant to the Delaware State Police. He recently completed the Dublin Marathon as part of the Leukemia and Lymphoma Team in Training Program, finishing in a time of four hours and 25 minutes.

"I feel lucky that I have been able to combine my passion for running and sports with my education and training in engineering, biomechanics, and sports medicine," Feehery says. "It has provided me with the opportunity to help people every day to walk and run with less risk of injury, not only to their feet, but also to their knees, hips, and lower back. I truly feel like a good mechanic who tries to keep people on the go."

Feehery and his wife, Christine, have two sons and a daughter ranging in age from 18 to 22. Their oldest daughter, Kaitlin, graduated from UD in 2007.

James J. Gitney (BME1978) is President and Founder of Group 50 Consulting in Los Angeles, California. Established four years ago, the company focuses on assisting companies with "special needs"—e.g., those that are under stress, undergoing mergers, or attempting to improve the cost-effectiveness of their supply chains. Gitney, who holds an MBA in Finance and Strategic Planning from Gannon University in addition to his ME degree, is also head of Champion Arrowhead, LLC, which manufactures brass plumbing and irrigation products.

Gitney started out at UD as an accounting major but switched to engineering because he "wanted to understand why things do the things they do."

"Going from business to engineering was doing things backwards," Gitney says, "and since then, my whole career has pretty much involved doing things backwards."

He has never regretted the switch. "The single most important thing that an engineering education provides is a way to think," he says. "I'll put an engineer in any job because I know how engineers think."

Gitney started his career focusing on operations and supply chain issues and later moved into the sales and marketing areas. "Knowing about how to market and sell, combined with understanding how things work, has prepared me to do almost anything," he says.

During his 25-year career, Gitney has worked with such highly respected companies as GE, Black & Decker, Sunbeam, and Rain Bird. He had major roles in launching Snake Light®, DustBuster®, Steam Master® Iron, Grillmaster®, and various irrigation products. He has managed operating budgets as large as $650M and organizations with more than 5,000 people.

Gitney found himself needing a change from the corporate world at the same time that it was becoming increasingly difficult for small companies to afford in-house experts to direct their business operations. His company fills a need for these organizations who wish to hire such experts on a consulting basis.

Gitney recalls that his professor in the Intro to ME course told the class "If you learn just one thing this semester, remember that reality is just a special case of the theoretical."

"I've applied that throughout my career," Gitney says. "Whether you're reengineering business processes or engineering products, it all follows the

same set of rules—everything follows theory."

And even though he switched from accounting to engineering in his choice of major, Gitney still understands that "everything you do should be based on an analysis of the numbers."

"It doesn't matter whether you're talking about sales trends or engineering equations," he says, "you have to look at the numbers."

Gitney has made a number of career changes throughout his working life, but two things have always driven him: "I need to get up in the morning and look forward to what I'm going to do. I've left jobs because I wasn't having fun. And it was also important to me to know that what I was doing was meeting the needs of my family."

Those two criteria may not be intuitively obvious as the basis for career success, but they've certainly worked for Jim Gitney.

Gitney lives in Los Angeles, California, with his Cheri Jo. The couple has three grown children.

David Meyers (BME1981), Chief Operating Officer at Apogee

Technology, a publicly traded technology company in Massachusetts that is developing drug delivery and sensor systems based on MEMS (Microelectrical Mechanical Systems) technology. He has been with the company since 1996 working in roles from design engineering, business development and corporate management. During this period the company received an award in 2004 as the fastest growing technology company in New England and was listed on the American Stock Exchange. Prior to that, he worked primarily in the aerospace industry, first for Rockwell on the Space Shuttle and Space Station in the control systems area and later for Northrop developing aircraft and missile navigation systems.

Meyers credits his unique and interesting career to his "good fortune in working in a range of engineering and business roles across diverse fields including aerospace, semiconductor, sensor systems and drug delivery."

Meyers's accomplishments have been in both the technical and business arenas. He not only is inventor on seven patents and patent applications in the areas of drug delivery, MEMS sensors and audio signal processing, but has also been the author on papers related to navigation and aircraft communication architectures. Recently he has hired a team of leading scientists to develop the company's MEMS-based transdermal drug delivery system for vaccines and other pharmaceuticals, acquired a MEMS company and established a new division within Apogee, and raised equity capital by developing and presenting the company's strategic business plans to the investment community and shareholders.

"In April of 1981," he recalls, "I was ready to accept one of the two job offers I had received through the interview program at Delaware when I saw the Space Shuttle launch. At that point I knew exactly what I wanted to do. I declined my current job offers and began applying to Space Shuttle contractors, with the goal of working for Rockwell International, the primary contractor for the program. A long summer followed, accented by growing parental and family pressures to get a job."

"At the end of August," he continues, "I finally received an offer from Rockwell based upon my fluid dynamics focus at Delaware and the passion expressed in my application letter. I learned early that if you really care about something, people will believe in you enough to hire you over the telephone."

Apogee recently moved from developing and marketing its proprietary all-digital audio amplifier integrated circuits to its current focus on drug delivery and sensor based health monitoring systems. "These new business endeavors are very exciting," Meyers says, "and I find myself again starting from scratch to learn and develop new technologies in a new field. The novel intelligent sensing systems we're creating now have the potential to improve the security and health of the elderly in the future."

Meyers lives in Walpole, Mass., with his wife and three children.

Martha Meaney Murray M.D. (BME 1987) is an Assistant Professor in Orthopaedic Surgery at Children's Hospital Boston. She earned her M.D.

at the University of Pennsylvania after completing an M.S. degree in materials science and engineering at Stanford University.

Murray is currently an orthopaedic surgeon who specializes in sports medicine. Her research focuses on developing new and improved treatment of injuries of the anterior cruciate ligament (ACL).

With support from the National Institutes of Health, the National Football League, and the Orthopaedic Research and Education Foundation, Murray and her colleagues at Children's Hospital are developing a new approach to (ACL) repair. Each year, she points out, some 250,000 people tear the ACL in their knees. Teen-aged girls are five times more likely than boys to injure their knees playing sports, and fourteen years after treatment, almost eighty percent of patients with an ACL tear will develop premature osteoarthritis. Murray would like to do more for her young patients with ACL injuries. "It worries me that their risk for arthritis is so high," she says. "If you're only 14, getting arthritis 14 years later is a big problem."

While in graduate school, Murray had a friend who tore his ACL. He had a procedure to treat the injury which involved removing the torn ligament, harvesting a graft of tendon and passing the tendon through bone tunnels to replace the ligament, a procedure called ACL reconstruction, the current gold standard of treatment for these injuries. As an engineer, Murray wondered why ACL tears couldn't be successfully stitched back together, allowing a person to could keep his or her own ACL rather than have it replaced. As a PhD candidate, Murray wanted to do her thesis on ACL healing. But at the time, 15 years ago, engineering programs had little interest in biomedicine. "I couldn't find a faculty advisor for the project," Murray says, "so I went to medical school so I wouldn't have to."

Over the past fifteen years, she and her team have been conducting research into finding a better "fix" than the traditional replacement surgery. Using novel technology, she and her team are working to find a way to repair the

injury via two small incisions, using a camera to view the tear and a "gun" to squirt in a gel that can stimulate healing of the torn ligament. Her group is also working on various enhancements to the gel in an effort to speed the healing process.

Murray is currently the recipient of the ACL Study Group Traveling Scientist Award, an award that has funded her to travel and speak about her work at locations throughout the world. She has also received the American Orthopaedic Society for Sports Medicine (AOSSM) Cabaud Award and the American Orthopaedic Association Travel Award, both for her research on the ACL—as well as the first-place award for her senior design project in ME at the University of Delaware in 1987.

Murray has published 23 papers on her work in medical and professional journals and is one of only a handful of orthopaedic surgeons who are currently funded with multiple large grants from the NIH.

She lives outside Boston with her husband, Mike, the clinical chief of Genetics at the Brigham and Women's Hospital, and their three children.

Oren B. Phillips (BME1968) was appointed Chairman of the Board of Trustees of the Utah State University Research Foundation (USURF) in December 2006. USURF, with its Space Dynamics Laboratory and Calibration Facility, is an international leader in sensor and calibration technology.

Phillips retired in 2004 as Vice President of Business Development for ATK Thiokol Propulsion and Vice President and Board Director of Thiokol Technologies International.

He joined Thiokol Chemical Corporation's Government Systems Division in Elkton, Maryland, in 1967, and spent his entire career with the company, working at various sites and on a variety of projects.

"When I graduated in 1968," he says, "the country was very excited about the space program, and by the following year, we would be sending men to the moon. At Thiokol, I had the opportunity to lead the design, development, and marketing of the STAR™ series of satellite and launch vehicle solid propulsion systems, which were instrumental in placing 90 to 95 percent of spacecraft into orbit."

"This was the start of the satellite era," Phillips continues, "and space was beginning to be utilized as a tool for weather, communications, and observation functions. It was a very exciting time for me because we were launching something from somewhere in the world almost every week." In addition to multiple sites in the U.S., he traveled to Russia, Sweden, Japan, and China for satellite launches during that time.

Phillips, who has published a number of technical papers and served on a number of prominent boards and foundations, attributes his success to his education. "Engineering is the best training program in the world," he says, "because it enables you to take problems that seem insurmountable, break them down into manageable pieces, and find solutions. And I'm not talking about just engineering problems, but problems of any kind—from legal to medical."

When asked to take over a business development effort within Thiokol earlier in his career, Phillips admits that his first reaction was "I've never done this—I build motors for satellite launches." But he quickly learned that problems could be solved by putting engineering teams together and getting the company to invest in worthwhile ideas.

He also learned, after being in and out of project management and marketing over a period of several years, that even failures present opportunities. He was instrumental in getting the space program back on its feet after two major satellite failures as well as the deadly crash of the Challenger Shuttle. The latter led him to Utah, where he retired and joined USURF two decades later.

When asked what advice he would give to students just starting out, Phillips responds, "You don't know where your career is going to go or what opportunities may present themselves to you. Just view engineering as a great training program that will give you the tools to do whatever you want."

A native of Wilmington, Delaware, Phillips and his wife, Judy, now live in Ogden, Utah. Their daughter, Ashley, is an engineer living and working in Connecticut.

Thackrah Receives Major Promotion

John Thackrah (BME1979), who was honored in 2005 as a Distinguished Career Alumnus, was appointed Assistant Secretary of the Navy for Research, Development and Acquisition in November 2007. In this position, he is responsible for about $50B per year in Navy acquisition accounts and about 120,000 civilian and military people.

"It's overwhelming when you think of it in those terms," Thackrah says, "so I don't. I'm honored to serve and deeply honored to have been selected by the Secretary to serve and support our great nation."

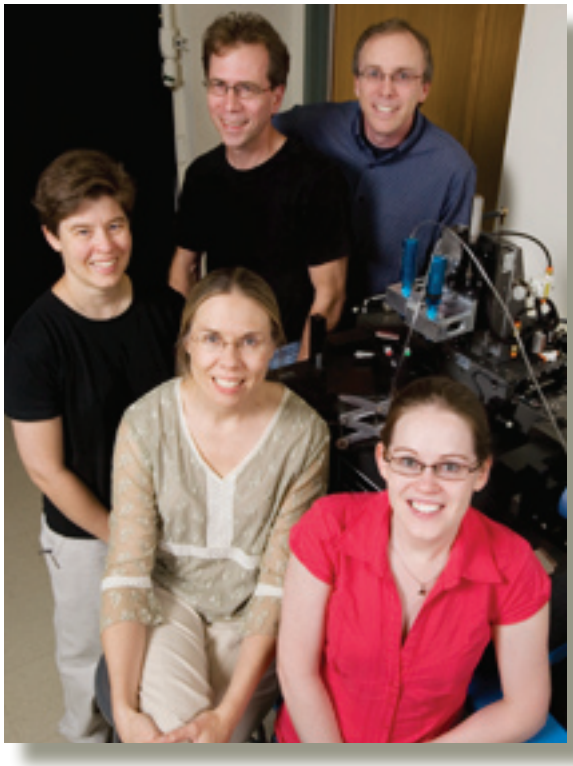
At the Third Annual ME Alumni Business/Technology & Careers Conference last year, Thackrah spoke about being "CRISP" in the twenty-first century workplace. "Today's graduating engineer has a great opportunity to contribute to our nation's competitiveness," he said. "Being 'CRISP' in that opportunity is fundamental to your success: Commitment, Results, Investment, Sweat the details, and Personal performance and perception mean more today than ever."

Thackrah has obviously followed his own advice.

Work of ME Alum Cited by NASA

Agency recognizes potential of self-healing materials

Nancy R. Sottos, (BME1986, Ph.D.1991) honored as a Distiguished Career Alumnus in 2007, is part of a research group whose work has been highlighted by NASA as among the top advances for 2007. Sottos, who is now Donald B. Willett Professor of Engineering at the University of Illinois at Urbana-Champaign (UIUC), is co-inventor of a polymeric material that mimics human skin by repeatedly healing itself. The novel material is one of just seven innovative technologies cited by NASA for the year.



L. Brian Stauffer, University of Illinois at Urbana-Champaign

Conducted by Sottos and several of her colleagues at UIUC, the work was reported in the June 10, 2007, issue of Nature Materials. According to the paper, the process involves depositing an epoxy coating onto a more ductile substrate that contains a pervasive 3-D microvascular network. After crack initiation occurs at the surface of the coating, the resulting cracks are attracted to the more compliant regions of the substrate created by the presence of fluid-filled microchannels and then arrested at the coating–substrate interface. After damage occurs in the coating, capillary action causes a healing agent to wick from the microchannels into the cracks.

"Currently, the material can heal cracks in the epoxy coating—analogous to small cuts in skin," Sottos said. "The next step is to extend the design to where the network can heal 'lacerations' that extend into the material's substrate."

The technology was selected as a top advance by Linda Bell, editorial director of NASA's Tech Briefs. Bell made her selection after consulting dozens of resources reporting on cutting-edge technologies in industry, government, and academia.

As a Ph.D. candidate at the University of Delaware, Sottos conducted research on the behavior of the interphase in polymer composites under the joint advisorship of Profs. Roy McCullough and Selcuk Guceri. In 2002, she received the University's Presidential Citation for Outstanding Achievement, which honors University of Delaware graduates of the past 20 years who exhibit great promise in their professional career and/or public service activities. At that time, Sottos credited her success to the outstanding undergraduate research program at UD, the interdisciplinary research environment at CCM, and her professors at Delaware, particularly McCullough.

Potential applications of the novel materials include self-healing medical implants and self-repairing materials for use in airplanes and spacecraft. The technology also has potential use in cooling microprocessors and electronic circuits, and it could open the door to coatings that regenerate themselves.

Wind Power Class Helps Alum Make Career Decision

Matt Worthington (BME2007), who took Len Schwartz's Wind Power Engineering as a tech elective last spring, recently sent Schwartz this email:

> I was a member of your wind energy class last semester. I really enjoyed the class and decided to look into wind energy as a career. It took a while, but I finally found a position with Gamesa in Fairless Hills, Pa. I'm working in their Technical Office on mechanical issues and failures in the active wind turbines. I've been working here since August and I'm really enjoying it. I'm leaving for the headquarters in Pamplona, Spain, next week for a month of training. After that, I'll be working out of the Fairless Hills office and traveling to the various wind farms from time to time.
>
> I would like to thank you for sparking my interest in wind energy. I don't think I would have found a position that I enjoy this much without having taken your class.
>
> Gamesa is expanding rapidly in the US. I'm sure there will be plenty of openings in the future for anyone with an engineering background. I'd be happy to put in a good word for any of your students.

Schwartz reports that Worthington is actually the second student from that class to find employment in the wind power industry. Another student, Aaron Wynn, is now working for GE's Turbine Division.

Steve Andersen

Research and applications matchmaker

Steve Andersen's (BME90, MME97) job as Assistant Director for Military Programs in UD's Center for Composite Materials (CCM) requires him to be a kind of "matchmaker," bridging the gap between research and applications.

At CCM, Andersen works with the Center's researchers to identify the best and most promising new materials, processes, and software products and apply those technologies to programs in which the Center is already involved with industry and the military. He also works with DOD and industrial sponsors to determine their needs and uses this information to identify new directions for CCM's research, with an eye toward results that will be usable in two or three years.

Andersen describes his career path since graduation as "twisty."

"I've spent most of my time at small startup companies," he says, "with a move to the west coast for a few years in between. I've worked on a very wide variety of projects from military and defense products, to medical and x-ray devices, to wind turbines and other commercial and transportation products."

Andersen says his most challenging project was serving as the Engineering Manager/Chief Engineer for a design-build project for a German company. "We designed, built, disassembled, and rebuilt in Germany a 20-tonne structure for use as the cargo-carrying module on the world's largest 'Lighter than Air Vehicle,' in the short span of 13 months," he says.

Although Andersen uses the word twisty to describe his career path, he has actually come full circle. He did undergraduate research at CCM in the late 1980s, came back to do a master's degree focusing on composites, and now has a leadership position in the Center.

"I feel the work I am doing currently at UD-CCM is my most significant achievement," Andersen says, "since my current work focuses on lightweight material applications for U.S. military vehicles, including multifunctional structures for ballistic protection and vehicle structures. To know that things I am working on may help saves the lives of our soldiers is obviously significant."

Andersen says that his degree and his education have served two primary purposes. "The first is that they gave me the required foundation to be a good engineer," he says, "which means knowing how to solve problems in a very general sense and knowing where to find the resources to execute."

"The second," he continues, "is that it provided me with the contacts and relationships that returned me to the UD as a member of the CCM professional staff."

Several faculty members had an "immense impact" on Andersen's development, both as an engineer and as a person. "I credit several of my professors during my undergraduate study for my interest in the areas of design/mechanics, composites, and processing, including Dr. Ralph Cope, Dr. Mike Santare, Dr. Suresh Advani, Dr. Ian Hall, Dr. Jack Vinson, Dr. Jack Gillespie, Dr. Mike Keefe, and Dr. Tsu-Wei Chou."

"From there," he continues, "my work with Dr. Vinson as an undergraduate researcher and my Senior Design project work with Dr. Gillespie cultivated my interest in composites. Ironically, I had the pleasure of working with Dr. Cope on the aforementioned load frame project in 1999-2000 as a peer. Currently, I have daily contact and interaction with Dr. Gillespie, who is my boss and probably qualifies as my mentor, and Dr. Advani at CCM. I also get to cross paths regularly with Dr. Santare, Dr. Hall, Dr. Keefe and Dr. Vinson on various CCM projects. So, the influence has been significant, and quite far reaching."

Andersen is encouraged by what he sees as "a notable improvement" in the last few years with alumni communication through newsletters and activities such as the Alumni Career Celebration. He has served on the planning committee for the event and worked with students to prepare displays for the event.

"I think continuing to expand opportunities to get alumni and current students/faculty together and in touch with each other for networking opportunities, etc. should be at the forefront of department alumni efforts," he says.

Steve and his wife Jennifer live on a "farmette" in Cecil County, Maryland, with their four kids, two horses, a pony, two dogs, two cats, two lizards, a rabbit, a frog, and some fish.

DuPont Tour Opens Door to New Connections

On Monday, November 12, 2007, some 60 students, faculty, and research staff from ME and the Center for Composite Materials toured the DuPont Company's Engineering Mechanics Group, part of DuPont Engineering Technology, at their Chestnut Run site in Wilmington, Del.

The extensive tour, which featured demonstrations at 14 different laboratories, was organized and hosted by Mark Lamontia of DuPont Engineering and Research Technology. Amanda Lim, President of the UD SAMPE Chapter and a Ph.D. student in materials science, made the arrangements for the University group.

Lamontia, who has collaborated with the University since 1986, is interested in expanding all aspects of the connections between DuPont Engineering and UD. His group at DuPont focuses on evaluating the performance of end-use applications made from DuPont materials.

"We have 46 people right now, and we need more," Lamontia says. "We're always looking for talented people to work for us, and the tour was a way to give UD faculty, staff, and students some idea of what we do here. Our work covers the entire range of performance criteria, including mechanical performance, stress-strain, vibration, combustion, thermal, fluid, heat transfer, and so on, and we really wanted to show the students that DuPont does a lot of the things that they hope to do someday."

Tour demonstrations covered a broad range of technologies from polymer bonding and joining, environmental durability, and acoustic quieting, to combustion, tire durability, and material testing. But by far, the most popular demonstration—among not only the students but also the faculty—was the Highly Instrumented Impact Testing (HIIT) Lab, where tornado-resistant structures are tested.

"The tour was a great opportunity to see firsthand Du Pont's cutting-edge engineering," said ME Chair Tom Buchanan. "The friendly climate and exciting work made this a wonderful event. After all, what engineer wouldn't want to see a 15-foot-long two-by-four fly through a lab at 100 miles per hour to simulate tornado conditions?"

Other areas of interest were the Innovation Laboratory, where patent ideas are manufactured and tested, and a session focusing on careers, co-ops, and internships in Engineering Mechanics. "We're very interested in working with UD undergrads through co-ops and internships," Lamontia says. "We've actually had a couple of undergrads working in the Innovation Lab, which was a great help to us and provided them with valuable experience."

Lamontia values the hands-on experience that students get at the University of Delaware, and he lauds the faculty for their interest in industry's perspective. "Tom Buchanan came here with lots of questions for us about what courses are important to us and what we're looking for in the students we hire. He was obviously very interested in preparing his students for careers in engineering."

"The tour was fantastic, and I really appreciate the efforts of all the participants," said Gillespie. "On a personal note, it was great to see so many of my DuPont colleagues on the tour. The level of enthusiasm for engineering new multi-layer products was quite apparent, and I'm sure it was inspiring for all of the students who attended."

Tour participants witness a demo in which a cannon is used to simulate tornado conditions

Alumni Highlights

Yingxin Gao, MME2003, is an Assistant Professor at Cornell University. She earned her Ph.D. at the University of Michigan.

John McWilliams BME1990 received his certification as a 6-Sigma Black Belt in 2007. He continues to work as a quality specialist in Chassis Engineering at Ford Motor Company.

Karen (Price) Millsap, BME1985, is currently employed as Polyester Product Specialist at Ticona Engineering Resins, a business group of Celanese, where she has worked for the past 22 years. She also runs her own handmade glass bead and jewelry business and will be guest artist at a bead class in Asheville, NC, in September 2008. Her work has been published in "Beaded Pictures: Charts and Instructions for Beadweaving," and in *Bead and Button Magazine*. Her beads and jewelry are available on her website at www.beadsnsuch.com. She resides in Northern Kentucky with her husband and son.

Jessica (Broderdorp) Nee, BME1996, is now a demand response project manager for EnerNOC. She has two children, Jacob (5) and Alex (2), and she lives in Chester Springs, PA, with her husband, Jim.

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