Clare Rimnac Received Distinguished Alumni Award

On Friday, September 26, 2008, we presented our department’s Distinguished Alumni Award to Dr. Clare Rimnac (MS ’80, PhD’83). Dr. Rimnac is the Wilbert J. Austin Professor of Engineering and Chair of the Department of Mechanical and Aerospace Engineering at Case Western Reserve University. Her research focuses on the mechanical behavior of materials used in total joint replacements, and the damage and fracture behavior of bone tissue. Her many contributions to the field have been recognized by an AAOS Kappa Delta Award, the Otto AuFranc and Frank Stinchfield awards from the Hip Society, and an award from the Knee Society. Dr. Rimnac is also a Fellow of the American Institute for Medical and Biological Engineering.

Chair’s Chat

Spring is here again, and as you will see from the remainder of the issue, many members of the MSE community have been recognized for their outstanding contributions. One of the highlights of last semester was the awarding of our distinguished Alumni award to Dr. Clare Rimnac. Dr. Rimnac obtained her Ph.D. from the department in 1983, under the supervision of Profs. Richard Hertzberg and the late John Manson. Dr. Rimnac is currently the Wilbert J. Austin Professor of Engineering in the department of Mechanical and Aerospace Engineering at Case Western Reserve University in Cleveland, Ohio. She also holds appointments in the school’s programs in biomedical engineering and orthopaedics. It was wonderful to meet Clare again after the almost 25 years since we overlapped briefly at Whitaker, and to see the remarkable trajectory of her career.

It’s been a long road, but the tele-communications recabling project at Whitaker is nearing completion. In order to accommodate the new equipment, laboratory and student space needed to be renovated, and offices shuffled. There have been several months when the corridors have been like construction sites, with students weaving between groups of hard-hatted construction workers and huge cable coils and to get to class. Indeed, we have all become accustomed to walking halls without ceiling tiles, and having strange holes suddenly appear in the walls and ceilings of our offices! When finally done, however, the disruption will all have been worthwhile. The network infrastructure in the building will be completely replaced, with a new bandwidth capability of 10 Gbps. There will also be a wireless network throughout the building with a new standard (802.11n) – this will be the first deployment of this standard on campus, and allows speeds up to 100 Mbps over the wireless link. From a purely physical aspect, the number of data jacks available within building has roughly doubled, minimizing the need for multiple hubs.

Thanks to the support of Dean Wu and RCEAS, our department will be upgrading its processing and characterization facilities for undergraduate laboratories. New equipment items include an UV-VIS spectrometer, and a high temperature furnace (1700 °C) for ceramic processing and heat-treatment. In addition, we will also be updating our use of commercial analytical software in our thermo and materials processing classes. On a final note, I would like to thank all of you who have sent donations to the department. As we are all aware, the economic landscape has changed greatly since the last newsletter, and your generosity in these uncertain times is especially appreciated.
Rimnac’s presentation at the reception was titled “Engineering the Natural History of Total Joint Replacements.” In the presentation, she talked about the crosslinked formulations of polyethylene that are used to mitigate loosening of artificial joint replacements that contain metal and plastic components.

The science of joint replacements not only requires knowledge of multiple disciplines, Rimnac said, but it also deals with large numbers. The average person puts three million cycles of wear each year on an artificial joint. This creates problems as implants increase in longevity.

“Some joint replacements last as much as 20 years,” she said. “That means that we are asking materials that cannot repair themselves to survive 60 million cycles of wear.”

A second number is more astronomical. Wear can cause tiny fragments of debris, smaller in size than a human cell, to separate from the implant, especially in a polyethylene sterilized with gamma radiation in air, a technique used until the mid-1990s. As many as 100 million of these particles can be generated each day. They can cause the body’s cells to respond in a way that promotes bone loss near the implant and, ultimately, the failure of the replacement joint.

“The body responds to the device,” said Rimnac, “and the device also responds to the body. It goes both ways.”

In hopes of reducing wear on replacement joints, Rimnac has spent a decade studying the crosslinking of polyethylene. Crosslinking, a technique first used in Japan and South Africa in the 1970s, has been shown in laboratory simulations and clinical studies to reduce wear damage to artificial hip joints, Rimnac said. But this improvement comes with consequences that are not fully understood.

“Crosslinked devices have brought about a major improvement in the performance of joint-replacement devices,” she said. “They reduce the debris from wear to negligible levels. But they can cause loss in ductility and fracture toughness.”

Rimnac is the 10th person to receive the materials science and engineering department’s Distinguished Alumni Award. She is also the first woman to earn a Ph.D. from the department and the first woman to receive the alumni award.

At the award reception, Rimnac told her audience that she had benefited as a graduate from her department’s collegial environment. “I have so many fond memories of that time,” said Rimnac, who started her presentation by showing photos of herself and her colleagues from a quarter-century ago. “There was such a good camaraderie between faculty and students.”

As a Ph.D. candidate, Rimnac was advised by Richard Hertzberg, a professor emeritus of materials science and engineering, and also by the late John A. Manson, who was a professor of chemistry and a polymer scientist.

“I owe much of my success to those two professors,” Rimnac said. “They taught me how to build interdisciplinary teams to work on engineering problems. When I left here, I thought that if I could set up a collaboration like the one John and Dick had, that would be awesome. I’ve been fortunate to be able to bring together people from many different disciplines. That makes our approach to research so much richer.” (Kurt Pfitzer)

**Faculty News**

Rick Vinci received the 2008 P.C. Rossin College of Engineering Teaching Excellence Award, which is given by the student officers of the professional engineering society chapters for “teaching mainly within a department.”

Helen Chan and Rick Vinci each chaired a Gordon Research Conference in their respective areas of expertise in the summer of 2008. The Gordon Research Conferences were established in 1931, and provide an international forum for the presentation and discussion of research at the frontiers of science. Speakers are generally recognized as leaders in their discipline. Attendees mingle over the course of the week long conferences in a workshop-like setting to discuss the status and future directions of the field.

A local PBS TV station in the Lehigh Valley recently featured EMV Technologies, LLC, a spin-off company from the Materials Science and Engineering Department at Lehigh University. The program entitled “Tempo – Public Square” was focused on small companies, their products and their important ties to the local community. Dr. William Van Geertruyden, a General Manager of EMV Technologies was interviewed in this program and described how partnership between his company and Lehigh University benefits both parties.

EMV Technologies, LLC, has sponsored an Integrated Business and Engineering (IBE) and an Integrated Product De-
development (IPD) team from Lehigh University last year. Both projects were related to the nanoporous ceramic membrane being developed by EMV Technologies which has straight channel pores with sizes less than 100 nm. The IPD project involved having a team of six IBE seniors seek new applications of the membrane for their capstone project. The students concluded that EMV Technologies should partner with a leading medical device company, whose patented technology filters viruses such as HIV from the blood. The IPD project involved having a team of six students determine the effect of sterilization chemicals on the nanoporous membrane to show feasibility in the kidney dialysis process. The membrane development at EMV Technologies has been funded by the National Institutes of Health and Pennsylvania state programs such as the Keystone Innovation Zone. William Van Geertruyden is also an Adjunct Professor in the Materials Science and Engineering Department at Lehigh. He is very involved in research conducted in the Institute for Metal Forming where he advises graduate students on their work. A perfect example of such collaboration is combining graduate student support in the form of the endowed Loewy Graduate Fellowship with research project supported by EMV Technologies. Dr. Van Geertruyden has also been a mentor in the entrepreneurship track of Lehigh’s Global Village and is the program coordinator for Lehigh Study Abroad Program in Dortmund, Germany.

**Undergraduate News**

**Tom Nizolek** '10 received the prestigious 2008 Best-in-Show Jacquet-Lucas Award, jointly conferred by the International Metallographic Society and ASM International. He joins the proud ranks of previous Lehigh winners, including former graduate students Ryan Deacon and Rick Noecker. Tom’s entry was entitled, “Metallography of a Modern Pattern-Welded Steel Knife Blade.” His entry was chosen over dozens of others, all of which were submitted by graduate students or professionals.

**Alice Kodama** ’09 received Lehigh University Women's Club Award in October 2008. Alice has many academic honors including Dean’s List (Spring 2005, Fall2006, Spring 2008), the Tarby Award for best academic performance in Materials Science during her first two years, and is recognized as a Rossin Junior Fellow. As a freshman, Alice began to get involved with environmental clubs on campus. She was president of Green Action in the fall semester of her junior year and had many accomplishments during that period. She organized and found approximately $5,000 funding for 20 Lehigh students to attend PowerShift 2007, a national youth conference on global warming in Washington D.C., helped organize Green Week, and organized Green Summit, a campus wide meeting for environmental clubs. She also helped founded the Environmental Coalition and the Green House and is part of the Lehigh Environmental Advisory Group to President Gast. Alice hopes to continue to study Materials Science in graduate school focusing on materials that benefit the environment, and possibly design green building materials as a career.


**Ahmed Issa** ’09 spent his summer in Germany conducting research in the Dortmund University laboratory. Issa’s research project on gold-rub glass was part of the undergraduate study program sponsored by the International Materials Institute for New Functionalities in Glass (IMI-NFG), directed by Himanshu Jain. The IMI-NFG was established in August 2004 through an initiative of the National Science Foundation for enhancing international collaborations on glass research and education. In four years, more than 350 people from 31 countries have participated in IMI-NFG’s research exchange programs, undergraduate study programs, workshops and schools. The IMI-NFG has arranged 74 exchanges between researchers at U.S. and foreign universities, and three or four more research exchanges are scheduled for the spring of 2009.

**Graduate News**

**Yi-Ling (Ivan) Liang** received the Excellence in Polymer Science & Engineering award at the meeting of the Lehigh Valley section of the Society of Plastics Engineers (SPE) in October 2008. Liang’s research focuses on the addition of toughening agents to improve the crack resistance of epoxy resins.

**Greg Brentrup** received the 2008 Cooper Scholars Award from the Glass & Optical Materials Division of the Ameri-
can Ceramic Society (ACerS) for his undergraduate research on bioactive and biocompatible form of glass. The award was presented at the ACerS meeting in Pittsburgh, PA, in October 2008.

The Adventure of Terrence and Joan
MSE alumni Terrence Hahn and Joan Stanescu, husband and wife, jet-setting materials scientists, and patrons of the academic department, met in the spring of 1987. Joan, a senior completing her B.S. in materials science and engineering, was outgoing president of Lehigh’s student chapter of ASM (the American Society of Materials). Terrence, a junior MS&E major, was incoming president.

After graduation, Joan took a job with DuPont’s electronic materials department and returned to Lehigh two years later to start on her M.S. in materials science and engineering. By this time Terrence had also graduated, joined Air Products and Chemicals Inc. and began studying part-time towards his M.Eng. in materials science and engineering. A mutual friend suggested they all go out for pizza. This time a spark was struck.

They married in 1993. Terrence was moving up at Air Products into a life of nonstop travel. From 1990 to 1992, he crisscrossed the U.S. to develop the gas-generation facilities serving the metal industries. From 1992 to 1994, he covered Canada and its resource industries. During this period he also earned a MBA at the Wharton School’s WEMBA program.

Joan joined IBM Technology Products in East Fishkill, N.Y., in 1991 and stayed until 1997, rising to staff engineer in microelectronics and then to manager of MiCRUS, a joint semiconductor device-manufacturing venture with Cirrus Logic.

In 1997, Air Products sent Terrence to Malaysia to serve as country manager and to run its industrial gas joint venture. The couple took an apartment in Kuala Lumpur. Not long afterwards, Joan was hired as principal engineer for Chartered Silicon Partners in neighboring Singapore.

In 1999, their first daughter, Eileen, was born in Singapore, and the family returned to the Lehigh Valley. Terrence, reassigned to Air Products’ electronics division, helped prepare the business to become a global market leader and also supervised the integration of acquisitions.

Two more daughters were born: Jocelyn in 2000 and Rene in 2002. The family put down roots. Terrence was promoted to business director for electronic specialty materials. Joan was promoted to Technical manager after one year at Agere’s optoelectronics site in Breinigsville. In 2004, Air Products wanted to send Terrence to Taiwan to be senior director for electronic specialty materials and move the business segment’s headquarters to Asia. Although Terrence was hesitant about moving the kids when they were so young, Joan per-

suaded Terrence that it was the perfect age for kids to be exposed to another culture and language, just like she was when she came to America at the age of 5.

The family lived three years in Taipei and went sightseeing again throughout China and South East Asia.

“The girls have climbed the temples at Angkor Wat in Cambodia,” says Joan. “They’ve ridden elephants in Phuket, Thailand, they’ve been to temples in Indonesia and they’ve traveled on the Great Wall of China. We’ve also been to the Hong Kong Disneyland when there were no lines! It was a week after the Chinese New Year.”

Later, Joan and Terrence would take the girls to Romania for a visit to the Stanescus’ ancestral hometown of Brasov, a medieval town in the Carpathian Mountains with cobblestone streets and terracotta roofs.

In 2007, Terrence was recruited by Honeywell International Inc. to be vice president and general manager for the company’s $1-billion fluorochemical business. The family has settled in New Jersey, and Joan has taken a position as Industry Liaison Associate for Lehigh’s Center for Advanced Materials and Nanotechnology.

Terrence and Joan have established the Terrence Hahn ‘88 and Joan D. Stanescu ‘87 Scholarship to provide funds to undergraduate students in the MS&E department.

“This department has been very important place for us,” says Terrence. “The faculty and staff are great at what they do. More importantly, they are great people and role models. They teach you about life and about being a good global citizen. They give you a solid technical grounding and impart the skills to be a good problem solver.”

“The MS&E program at Lehigh challenges you. Anyone who gets through has earned a great foundation for future success however they define it. It is also a great place to make friends and for a few lucky ones like me, a chance to find your soul mate. I really can’t ask Lehigh for anything more.” (Kurt Pfitzer)

MatAlumNews is published twice a year by the Department of Materials Science & Engineering at Lehigh University. Please address correspondence and contributions to: Dr. Helen Chan, Lehigh University, MS & E, 5 E. Packer Ave. Bethlehem, PA 18015 or email hmc0@lehigh.edu. For more department photos, please visit our web album at http://picasaweb.google.com/mse.lehigh