

# THE BOND

DEPARTMENT OF CHEMICAL ENGINEERING &amp; MATERIALS SCIENCE

## Outreach Program Stimulates Interest in MSE

For faculty and college students, working with state-of-the-art equipment is taken for granted. For high school and middle school students, having the opportunity to visit a university research lab and work with that equipment is a thrill — and a learning experience. That is exactly what the Scanning Electron Microscope Education (SEMED) is all about. This outreach program is designed to educate K-12 students and their teachers and is funded by a grant from the National Science Foundation.

"The program offers rare access for students and teachers to the same high-tech equipment used by scientists and engineers," says Carl Boehlert, associate professor of materials science and the director of the SEMED program. "They can experience first-hand what it is like to work with this type of equipment." This past year student groups from Manistee, Flushing, St. Johns, and Inkster, as well as Lansing-area schools were involved in the SEMED program. In June, there were SEMED sessions held for Exploration Days, a 4-H program that brings more than 2,500 teens to

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K-12 students work with the SEM.

## Looking to the Future: New Alloys for Biomedical Implants

Modern medicine is leaping forward with improved biomedical implants and as the population ages the need for these implants grows. Although Americans are living longer, they are requiring implants at a younger age. Research like that being conducted in the Department of Chemical Engineering and Materials Science will result in alternative materials that can be used to produce the implants, making them even more "user friendly."

Titanium alloys, introduced in the early 1950s, have been the backbone material for biomedical implants, as well as for uses in the aerospace, energy, and chemical fields. "Titanium is excellent for implants. Its mechanical properties are better than bone and it is not toxic to the body," says Carl Boehlert, associate professor of chemical engineering and materials science. Part of Boehlert's research focuses on new titanium alloys for biomedical implants.

Commercially pure titanium and titanium alloys are currently widely used as structural biomaterials for the replacement of hard tissues in devices such as artificial hip joints, total knee replacements, and dental implants. In fact, more than 1.3 million joint replacement surgeries are performed each year worldwide. The number of implants needed for these kinds of surgeries is expected to increase, especially as the U.S. population ages. Titanium alloys are used so extensively because of their excellent mechanical properties and their electrochemical corrosion resistance. In addition, among metallic biomaterials, titanium alloys have exceptional

biocompatibility characteristics. That means the human body will accept an implant made from a titanium alloy and the body's cells will grow into and intertwine with it.

The most-used titanium alloy, Ti-6Al-4V (wt. %), is a combination of titanium, aluminum, and vanadium. "In its pure form, vanadium is toxic, but in small amounts it stays in the alloy. However, over a period of time, vanadium has the potential to be detrimental," says Boehlert. He is developing a vanadium-free titanium alloy, using niobium, which is not toxic. He recently submitted a patent through MSU for titanium alloy compositions containing niobium. "The alloy with niobium has mechanical properties equivalent to or better than those for Ti-6Al-4V (wt. %)," says Boehlert who joined the faculty of the CHEMS department in 2005. He used an NSF CAREER grant to work on the general properties of the new alloy. In addition to his work on biomedical implants, Boehlert has an international reputation for his work on titanium-based alloys for high temperature aerospace materials. He has also received a Department of Energy Presidential Early Career Award for Science and Engineering (PECASE) and for the last three years has received summer faculty fellowships from the American Society for Engineering Education to conduct research at the Air Force Research Laboratory in Dayton, Ohio. In February, Boehlert was recognized with a Teacher-Scholar Award at the annual university-wide Awards Convocation, and in 2007 he received the Withrow Teaching Award for the CHEMS department.

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## from the Chair

MARTIN HAWLEY

The 21st century is proving to be an exciting time, especially for those of us in the Department of Chemical Engineering and Materials Science. As the 2007-2008 academic year drew to a close we saw graduating seniors enter a new stage in their lives, beginning careers or pursuing additional studies in graduate programs. Many of them have been honored with awards for their accomplishments during their undergraduate days. The faculty and staff are proud of these young people and strive to equip them with knowledge and skills for the 21st century. The department's goal is to continue to improve our programs to better prepare graduates for successful careers.

This winter, U.S. Senator Carl Levin visited the Energy & Automotive Research Laboratories. Our materials science researchers were on hand to show him that the College of Engineering and our department are on the cutting edge of energy research and associated issues. More recently, the department was honored that the University Research Corridor (URC), an alliance of Michigan's three research universities, announced that its first seed fund grants will go to two energy projects led by CHEMS faculty.

Of the five College of Engineering faculty members who were recognized at the annual university-wide Awards Convocation in February, two were from our department. Congratulations to Bruce Dale who received the Distinguished Faculty Award, and Carl Boehlert who received the Teacher-Scholar Award. Others on the faculty have also received awards and are showing leadership in significant research areas.

Our research themes are energy and sustainability, nanotechnology and materials, and biotechnology and medicine. Symposiums and forums throughout the year continue to update everyone in the department. In all of this work we encourage collaborations, not only within the department, but with other engineering departments, and within the MSU community, as well as with other academic researchers and industrial partners. To further international collaboration, the department recently signed a Memorandum of Understanding with Tsing Hua University, one of the highest ranked universities in Taiwan. This memorandum will enable research collaboration between graduate students and faculty at both universities.

In closing, I want to take this opportunity to thank students, faculty, alumni, and friends for their dedication and support. Have a great summer! 🌻

## University Research Corridor Funds Energy Projects

Two projects led by faculty in the Department of Chemical Engineering and Materials Science recently received significant funding from the University Research Corridor (URC), an alliance of Michigan's three research universities. MSU President Lou Anna K. Simon, University of Michigan President Mary Sue Coleman, and incoming Wayne State University President Jay Noren announced the first grants at the Detroit Regional Chamber's Mackinac Policy Conference on May 29.

The seed investments will help launch two collaborations for efficient development of cheaper forms of electricity and fuel, one involving all three universities and the other involving MSU and U-M. The two projects are:

**Thermoelectric materials for power generation** (\$523,282 covering a three-year period). The goal of this project is to develop bulk thermoelectric materials exhibiting nanostructure with enhanced thermoelectric properties because such systems offer the promise of low cost, ease of manufacturability, and wide application.

Collaborators include:



Donald Morelli

**Donald Morelli**, Project leader, MSU professor of chemical engineering and materials science

**Stephanie Brock**, Wayne State University associate professor of chemistry

**Jeffrey Sakamoto**, MSU assistant professor of chemical engineering and materials science

**Ctirad Uher**, University of Michigan professor of physics

**Improved ethanol from switchgrass, corn stovers** (\$283,231 over a two-year period). This MSU/U-M project with Lansing-based Technova Corp. has as its goal to develop nano-biocarriers to rapidly and efficiently produce low-cost ethanol from switchgrass or corn stovers (the leaves and stalks that make up about half of a corn crop). Production facilities would require a much smaller footprint.

Collaborators include:



Ilsoon Lee

**Ilsoon Lee**, Project leader, MSU assistant professor of chemical engineering and materials science

**Jinsang Kim**, U-M assistant professor of materials science and engineering and chemical engineering

**Wei Liao**, MSU assistant professor of biosystems and agricultural engineering

**Lawrence Drzal**, MSU University Distinguished Professor and director of MSU's Composite Materials and Structures Center

## Outreach Program (continued from page 1)

the MSU campus, and Grandparents University, a three-day, university-wide educational experience for grandparents and their grandchildren.

SEMED is designed to stimulate student interest in learning about materials science engineering. MSE graduate and undergraduate students are involved in teaching the students SEM techniques and theory, which helps the MSE students develop leadership and communication skills. In addition, Boehlert instructs an honors research seminar titled "Introduction to Materials Research through Scanning Electron Microscopy" for undergraduate students who are majoring in various fields at MSU. Once they are trained in



Savannah Garthe (left) of Hazel Park, Mich., and Jessica Graves (right) of Lowell, Mich., help Carl Boehlert with a materials science demonstration during one of the SEMED programs.

using a SEM, they are encouraged to serve as student instructors for the K-12 students.

Each SEMED program takes place in the Engineering Building. The session begins with a brief explanation of what a scanning electron microscope (SEM) is, how it works, and the scientific concepts behind it. Students are also briefed on typical careers in materials science engineering and, in particular, the training needed for the microscopy field. Then the fun really begins with hands-on demonstrations in one of the SEM labs. Depending on the number of K-12 students, these demonstrations are performed using the CHEMS SEMs, the Composite Materials and Structures Center's SEM (operated by Per Askeland), and the MSU Center for Advanced Microscopy (SEM) (operated by Stan Flegler, Carol Flegler, and Ewa Danielewicz).

Isabella Davids, 12, from Hazel Park, Mich., had no fear of handling the controls of the SEM. Davids was part of a 4-H group on campus for Exploration Days. The two-day session in the materials science labs energized the Exploration

Days students. The SEM can be used to test and characterize biomedical materials, but for the SEMED program bugs are a popular choice to view with the microscope. The images, in this case a ladybug, come up on monitors. The controls can be used to "zoom in" to a high magnification on a particular part of the object being viewed. The images can also be captured and saved on a computer for others to view at a later time. In addition to working with the microscope, the Exploration Days students, with the help of Boehlert, did experiments with different materials in a research lab.

Boehlert hopes the SEMED program will have far-reaching results. "This educational outreach program is expected to contribute to an increase in the number of undergraduate students majoring in MSE. In addition, it gives non-materials science college students greater knowledge and appreciation regarding what MSE entails."

For more information about SEMED, visit [www.egr.msu.edu/~boehlert/SEMED](http://www.egr.msu.edu/~boehlert/SEMED). 🌱

– Jane L. DePriest

## New Alloys (continued from page 1)

"Fatigue strength and wear resistance are two important mechanical parameters that are needed in order to assess the reliability of materials used in medical implants," says Boehlert. That's because an implant has to withstand not only one-time peak stresses but also the several million load cycles it usually experiences during its lifetime. Boehlert has compared several titanium alloys made with niobium to other titanium-based biomedical alloys. "We test the alloys at different stress levels and environments and try to mimic situations that might occur in the body. The biocompatibility and mechanical properties of our alloy are equivalent to or better than those for the traditional titanium alloys used for biomedical implants," says Boehlert.

There is still much work ahead in order to get a titanium-aluminum-niobium alloy approved for human implants. The next steps include testing the alloy in live cells to see how the alloy reacts. This is being done by implanting particles in mice and seeing how well the particles adhere to the cells. Testing in humans is still a long way off, but obviously that is a goal. For further details on Boehlert's work in this area, visit <http://www.egr.msu.edu/~boehlert/GROUP>. 🌱

## Sen. Levin Visits Research Labs

U. S. Senator Carl Levin, D-Mich., was impressed with the advances in technology made by researchers during a visit in January 2008 to the Energy & Automotive Research Laboratories.

The facility, which was dedicated in August 2007, was funded approximately 50 percent by donors and 50 percent by the university. A bill was supported by Levin will provide additional funds to help evaluate hybrid powertrains that are currently being researched at the lab. These projects use the expertise of CHEMS faculty to develop appropriate materials.

"I thought it was great," Levin said of the tour. "MSU is at the cutting edge of the potential of thermoelectricity. They try to convert this heat into electricity, and they've been here a long time at the forefront, but this is more and more an important part of the whole energy picture."



Eldon Case (left), CHEMS professor, talks to Sen. Carl Levin during a tour of the Energy & Automotive Laboratories while Bradley Hall (right), graduate student, demonstrates equipment.

In one demonstration for the senator, Jeff Sakamoto, assistant professor of chemical engineering and materials science, used a piece of aerogel, an extremely lightweight material used as a thermal insulator, to demonstrate the material's ability to block heat. Sakamoto placed a red crayon on a piece of aerogel and lit a blowtorch beneath the aerogel without melting the crayon. To prove the crayon was real, he then melted it with the torch. 🌱



# Faculty and Staff Bond

## 2008 Distinguished Faculty Award



**Bruce Dale**, professor of chemical engineering, was recognized at the annual university-wide Awards Convocation in February. He received the Distinguished Faculty

Award, which is given to individuals who have demonstrated sustained scholarly excellence in research, instruction, and outreach and have made widely recognized contributions to their field. Only 10 faculty members university-wide received this honor.

Dale, who has been at MSU since 1996 and is a former chairperson of the Department of Chemical Engineering and Materials Science, is an internationally recognized leader in the application of biotechnology principles to produce fuels, chemicals, and other industrial products from renewable plant resources. His pioneering research on the ammonia freeze-explosion process, a leading pretreatment method for lignocellulose, is now being commercialized by a major ethanol producer. Dale uses his expertise in life cycle analysis to understand the environmental impacts of these bioconversion systems. As a teacher and mentor, he is sensitive to the human element involved in the application of engineering science and encourages this sensitivity in his students.

As associate director of MSU's Office of Biobased Technologies, Dale works to marshal MSU resources in the plant sciences, chemistry, agricultural sciences, and engineering fields and fosters connections with public and private sector initiatives, with the goal of transforming Michigan's economy.

In 1996 the Symposium on Biotechnology for Fuels and Chemicals awarded Dale the Charles D. Scott Award. He co-chaired a National Research Council report published in 2000 entitled "Biobased Industrial Products: Research and Commercialization Priorities."

He has authored more than 90 refereed journal papers, is an active consultant to industry, and holds 15 U.S. and international patents. In 2007, he was selected as editor in chief of the new journal *Biofuels, Bioproducts & Biorefining*.

Dale met with President Bush at the White House in Feb. 2007 as part of a group of experts on the subject of alternative fuels for transportation, and then testified in April before the U.S. Senate. He was selected as the 2007 Sterling B. Hendricks Memorial Lecturer by the Agricultural Research Service (ARS), the USDA's primary research agency, in recognition of his outstanding contributions to the chemical science of agriculture.

## 2008 Teacher-Scholar Award



**Carl Boehlert**, associate professor of chemical engineering and materials science, was recognized at the annual university-wide Awards Convocation in February. He

received the Teacher-Scholar Award, which is presented to faculty who early in their careers have earned the respect of students and colleagues for their devotion to and skill in teaching and who have shown scholarly promise.

Boehlert, who has been a faculty member since 2005, has an international reputation for his work on titanium-based alloys for biomedical implants and high-temperature aerospace materials and biomedical implants. He is widely published in professional journals and has attracted high levels of support for his research. His work has been recognized by major peer professional groups. Honors include a National Science Foundation CAREER Award (2002); a Department of Energy Presidential Early Career Award for Science and Engineering (PECASE) (2002); Summer Faculty Fellowships from the American

Society for Engineering Education to conduct research at the Air Force Research Laboratory in Dayton, Ohio (2005, 2006, 2007); and the American Institute of Mining, Metallurgical, and Petroleum Engineers "Rossiter W. Raymond Memorial Award" (2003).

He is regarded by students as an enthusiastic, approachable, and dedicated teacher who creates a comfortable, positive learning environment. He relates coursework to real-life situations and involves undergraduates in research projects. He encourages students to develop their leadership skills through participation in the Materials Science and Engineering Society and community outreach activities. In 2007 Boehlert received the College of Engineering Withrow Teaching Excellence Award for the CHEMS department.

## 2008 Withrow Teaching Excellence Award



**Carl T. Lira**, associate professor of chemical engineering and materials science, received the 2008 Withrow Teaching Excellence Award at the college's

annual awards luncheon in March. This award recognizes faculty and staff who have demonstrated excellence in instructional and scholarly activities and rendered distinguished service to the university and the student body. Selection of recipients is based primarily on nominations from students.

Lira promotes student participation and success in an enjoyable, yet challenging, manner. His comprehensive knowledge of thermodynamics is evident in the textbook he coauthored, *Introductory Chemical Engineering Thermodynamics*, which is the primary text in ChE 321. He gives students the tools to apply thermodynamics to real-life problems and creates computer programs and simulations to aid in their understanding.

One student noted, "He can explain

difficult material in ten different ways.” Another student said, “His passion for chemical engineering and undergraduate education is evident in every single lecture.” He is always willing to help students outside of class. He also teaches students how to use Excel, Aspen, MATLAB, and other computer programs and simulations to solve engineering problems. Lira is a third-time recipient of this award.

### Nano 50 Award



Lawrence T. Drzal

A new nanotechnology material developed at Michigan State University has enabled XG Sciences, Inc., a start-up company headquartered in East Lansing, to be named a winner

in the third annual *Nanotech Briefs* Nano 50 awards program.

*Nanotech Briefs* is a digital magazine that presents the best of government, industry,

and university nanotech innovations that have real-world applications in the areas of electronics, materials, sensors, manufacturing, biomedicine, optics/photonics, and aerospace/defense. Nano 50 awards recognize the top 50 technologies, products, and innovators that have significantly impacted (or are expected to impact) the state of the art in nanotechnology. XG Sciences, Inc., was recognized for its new nanomaterial — xGnP™ Exfoliated Graphite NanoPlatelets — a practical, inexpensive nanoscale material that has a unique set of physical, chemical, and morphological attributes. This new material is the result of several years of research led by **Lawrence T. Drzal**, University Distinguished Professor in the Department of Chemical Engineering and Materials Science, director of MSU’s Composite Materials and Structures Center (CMSC), and chief scientist at XG Sciences.

The key to the new material’s capabilities is a fast and inexpensive process for separating layers of graphite (graphene) into stacks less than 10 nanometers in thickness but with lateral dimensions anywhere from 100 nm to

several microns, coupled with the ability to tailor the particle surface chemistry to make it compatible with water, resin, or plastic systems.

“This is an exciting development from a variety of perspectives,” said Drzal. “This research has achieved recognition as a major new advance in the field of nanotechnology and it is an example of how student and faculty research conducted in the MSU College of Engineering has the potential to transition to the commercial sector, make a positive economic impact, and be a technological benefit to Michigan and the nation.”

Funding and support for xGnP research was provided by MSU and by a grant from the Michigan Economic Development Corporation’s 21st Century Jobs Fund. Nano 50 award winners were recognized at a dinner at the NASA Tech Briefs National Nano Engineering Conference (NNEC 2007) in Boston. To learn more about XG Sciences and xGnP technology, visit <http://www.xgsciences.com/about/>. 🌱

## 10th Annual Johansen-Crosby Lecture

Distinguished professor and chair of the Department of Chemical Engineering at The State University of New York (SUNY) at Buffalo, David Kofke delivered the 10th annual Johansen-Crosby guest lecture April 17, 2008. Kofke addressed the audience in the Engineering Building on the subject of molecular simulation and its application in the calculation of free energy.

With years of expertise in molecular simulation and statistical thermodynamics, his research interests currently involve the understanding and development of molecular simulation methods. Kofke is also working on object-oriented molecular simulation software designed for educational and research application. He has authored nearly 100 publications and is the recipient of several highly recognized awards, including the SUNY Chancellor’s Excellence in Research and Creativity Award, which he received in 2004; the triennial John M. Prausnitz Award for applied chemical thermodynamics, also received in 2004; and the Jacob F. Schoellkopf Medal from the Western New York section of the American Chemical Society.



David Kofke

The Johansen-Crosby lecture was instituted to honor the parents of Professor Edwin Johansen Crosby, an alumnus of Michigan State University. Earning his bachelor’s degree in chemical engineering from MSU, Crosby went on to receive a PhD from the University of Wisconsin-Madison in 1955. Author of the landmark book *Experiments in Transport Phenomena*, published in 1961, Crosby dedicated his life as a professor and researcher to the Department of Chemical Engineering at the University of Wisconsin-Madison until 1991. His parents, Edwin Rallard Crosby and Thora Anne Johansen Crosby were both residents of Flint, Mich., and contributed greatly to the community. 🌱

– Samira Obeid

# Student Bond

## 2008 Symposium Day

The 18th annual Symposium Day for the Department of Chemical Engineering and Materials Science was held April 7 at the Kellogg Center. This event informs students about what to expect from industry as aspiring undergraduates look for positions in their chosen field.

Paul S. Satoh, vice president of basic and exploratory research at Neogen Corporation, delivered the keynote address on "Academic Research and Industrial Applications." Gary T. Seng, chief of the Structures and Materials Division at the NASA Glenn Research Center, also addressed the audience on recent progress in materials and structures research technology. In addition, the symposium included talks by specialists from Shell and Nucor.

This student-oriented event is organized by students in the department, under the guidance of Robert Y. Ofoli, associate professor of chemical engineering and materials science, and faculty adviser to the students for this event. The student chapter of the American Institute of Chemical Engineers (AIChE) elects a student council, which includes the co-chairs who head the coordination of the symposium.

According to Ofoli, who has been a faculty adviser for the symposium for the last 12 years, this is a way for students to "gain professional knowledge." He says the symposium is a day for students to be professional. From formal wear to making sure their guests are comfortable at the venue, the students are placed in charge of every task. He adds that on occasion alumni who are now employed in industry are invited to speak at the symposium. "This is important because they have seen both sides of the coin and relate well with their younger peers," says Ofoli. Because this is a well-recognized event for the department, the list of people speaking at the symposium has become more elite every year.

– Samira Obeid

## Capstone Course Helps Future Engineers Solve Problems

For students in Chemical Engineering 434, the senior capstone course, it's all about solving problems, and the problem presented to students this year was timely. Students were asked to design a process to convert coal to methanol and then develop the economics for the design. There were 40 students in the class; some worked in teams of two and others presented individual projects. "We try to have contemporary problems that are germane to what these students may be asked to do when they are a part of the workforce," says Martin Hawley, chair of the department and instructor for the course.

At the end of the semester, students presented their solutions in class. For spring 2008, the first-place individual winner was **Benjamin Omell**; second-place went to **Eric Miller**. The first-place team winners were **Alisa Smith** and **Becca van Houwelingen**; second-place team members were **Peter Do** and **Traci Taylor**. All of these designs were submitted in the 2008 National Design Problem Competition sponsored by the American Institute of Chemical Engineers (AIChE). "The MSU chemical engineering department has one of the best records for winning in this national competition each year," says Hawley. Results will be announced later this year.

## 2008 Academic Awards

Congratulations to the following students from the Department of Chemical Engineering and Materials Science who were recognized at a College of Engineering reception in March for academic excellence and service to the community.

### Outstanding Graduate Student Award:

**Jeffery Quast** for Materials Science and Engineering. Carl Boehlert is the faculty adviser.

**Xuerui Yang** for Chemical Engineering. Kris Chan is the faculty adviser.

**Service Award:** Catherine Burnham, and Michelle Nicole Marinich, both in Chemical Engineering; Jessica Micklash, Materials Science and Engineering.

**Undergraduate Academic Achievement Awards for Chemical Engineering:** Justin Biega, Elizabeth English, Jennifer Hall, Michelle Marinich, Wai Kan Mui, Linsey Seitz, and Maria Tenorio-Bernal.

**Undergraduate Academic Achievement Awards for Materials Science and Engineering:** Tori Buckley, Robert Friederichs, Ryan Oswald, and Kendell Pawelec.

**2007-2008 Ambassadors:** Elizabeth Castro for Materials Science and Engineering; Erik Stitt for Chemical Engineering.

## Society of Women Engineers Award



**Traci Taylor** received an outstanding senior award at the Women in Engineering awards banquet in February. The award is based on extracurricular and community involve-

ment and academic excellence and is given to one senior from each major. The Chemical Engineering Award is sponsored by Shell Oil Company. **Linsey Seitz** received the outstanding sophomore award, which is sponsored by the Whirlpool Corporation.

## 2008 Fitch Beach Awards

**Xuerui Yang**, a chemical engineering graduate student, received honorable mention in the 2008 Fitch Beach Outstanding Graduate Research Awards, which were determined on the basis of a technical presentation and outstanding research in a PhD program in the MSU College of Engineering. The MSU Engineering Research and Graduate Studies Committee determines the winners of this award. Kris Chan, associate professor of CHEMS, is the faculty adviser.

## MSE Grad Student Receives Prestigious Summer Internship



**Sara Longanbach**, a first-year graduate student in the Materials Science and Engineering PhD program, received a summer internship in the Mickey Leland Energy Fellowship

(MLEF) Program and is completing a 10-week internship at Pacific Northwest National Laboratory in Richland, Wash. Chris Cowen, a former MSU graduate student who now works for the National Energy Technology Laboratory in Albany, Oreg., suggested she apply for the internship. "I thought it would be a great opportunity to gain experience working in a national lab environment," says Longanbach. She also sees it as a networking opportunity for a research position when she finishes her graduate studies.

The MLEF Program is dedicated to recruiting women and underrepresented minorities who are matriculating in math, science, and engineering from an accredited college or university. The goal of MLEF is to promote careers in the U. S. Department of Energy's Office of Fossil Energy and to promote engineering, science, and technology, particularly in fossil fuel research and development.

Longanbach's project this summer involves investigating the corrosion and protection of high-temperature materials for application in slagging coal gasifiers. Her mentor at the Pacific Northwest National Laboratory is S. K. Sundaram.

Longanbach received her bachelor's degree in MSE from MSU in the spring of 2007. Her hometown is Mulliken, Mich. She attended elementary, middle, and high school in Portland, Mich. She is the daughter of John and Teresa Longanbach. 🌟

## Research Agreement with Chinese University

In a move to extend its international reach, the Department of Chemical Engineering and Materials Sciences recently signed a memorandum of understanding with one of Taiwan's highest ranked universities, Tsing Hua University.

According to Andre Lee, associate professor of chemical engineering and materials science, the intent of the memorandum is to enable research collaboration between graduate students and faculty at both universities. "The Department of Chemical Engineering and Materials Science at Tsing Hua University is the same as ours overall, and their research interests are very similar as well," says Lee. "With an enormous amount of activity currently taking place in bio-materials, this memorandum of understanding is likely to take ongoing research to a higher level at a greater pace."

The memorandum was signed March 13, 2008, at MSU and then taken to Taiwan where it was signed at Tsing-Hua University on April 8. 🌟

– Samira Obeid

## College Launches "Women in Engineering" Program

Nationwide, the number of women enrolling in engineering programs is dropping. It's a trend that the MSU College of Engineering would like to reverse. To that end, the college recently launched a Women in Engineering (WIE) program. "Women are underrepresented in the field of engineering. And the numbers are dropping," says Judy Cordes, coordinator of the program. "If we don't recruit women into engineering, we won't have enough engineers to fill the need in the future."

Fewer women across the nation are choosing careers in engineering today. At the K-12 level, girls usually don't consider engineering as a career choice simply because they aren't familiar with what an engineer really does.

In some engineering disciplines — such as chemical engineering and the biomedical area — women are better represented. "But if you look at the classical disciplines of engineering, we have done a poor job of communicating to women that it's a good profession," says Satish Udpa, dean of the College of Engineering.

The mission of WIE is to encourage women of all backgrounds to pursue careers in engineering, and to provide opportunities for academic, personal, and professional growth. The intent of WIE is to reach pre-college students, women who have been admitted to the college, and currently enrolled women. "It's about getting women into engineering majors — hopefully at MSU, retaining them through graduation, and getting them working in the field of engineering or into graduate school," says Cordes.

While WIE targets women, the program is open to everyone — men and women. For more information, visit <http://www.egr.msu.edu/wie>. 🌟



A "Future Engineer" stops at the Women in Engineering table to pick up information during the Future Engineers Open House, sponsored by the college.



# KEEPING IN TOUCH

NAME \_\_\_\_\_

STREET ADDRESS \_\_\_\_\_

CITY / STATE / ZIP \_\_\_\_\_ IS THIS A NEW ADDRESS?  YES  NO

OFFICE TELEPHONE \_\_\_\_\_ HOME TELEPHONE \_\_\_\_\_

E-MAIL \_\_\_\_\_

GRADUATION YEAR \_\_\_\_\_ DEGREE \_\_\_\_\_

CURRENT OCCUPATION \_\_\_\_\_

EMPLOYER \_\_\_\_\_ LOCATION \_\_\_\_\_

News of recent accomplishments, awards, or promotions (Use separate sheet if needed):

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SIGNATURE \_\_\_\_\_

A pledge of the following duration (maximum 5 years): \_\_\_\_\_  
Enclosed is my first payment of \$ \_\_\_\_\_  
Please send pledge reminders:  Annually  Quarterly  Semiannually  
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This pledge replaces all other outstanding pledges.  
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I or  my spouse (check one) works for a matching gift company:

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Carl Boehlert, associate professor of chemical engineering and materials science, demonstrates how to use a Charpy Impact Tester as part of a SEMED program for K-12 students. Isabella Davids of Hazel Park, Mich. looks on. See story on page 1.



Jessica Graves works with a powerful scanning electron microscope (SEM) in one of the CHEMS labs during a SEMED program.