

INTEGRATIONS

APPLIED ENGINEERING SCIENCES PROGRAM

Three Generations Share the Diversity of Engineering

Allison Mills is a familiar face in the Engineering Building. She mentors for Engineering 100 and 102. She feels that early success and connectedness for freshman engineering students factors into their decision to stick with an engineering degree. Not all students have the engineering support system Allison has had.

Engineering runs in the Mills family. Robert Mills, Allison's grandfather, earned a degree in mechanical engineering from MSU in 1959. Allison's parents, Dave Mills and Diane Croskey Mills, both have degrees in engineering arts from MSU. Their daughter, Allison Mills, will graduate in December 2010 with a bachelor's degree in applied engineering sciences from MSU.

"I promised myself I would not blindly choose engineering as a career," says Allison. "I eventually decided on my own time. I love what I do and it fell naturally into place, not because my parents and my grandfather were engineers." Allison's mom adds, "We were very fortunate as parents never having to assemble children's toys early on Christmas morning because Allison always did it before we could!"

Allison began her academic career as a finance student at Grand Valley State University in Allendale, Mich. She transferred to MSU in her junior year and decided that the Applied Engineering Sciences (AES) program offered the right mix of business and engineering. "I learned that an engineering

degree gives students a lifetime of unique opportunities because of the analytical skills and problem solving skills developed that can be applied across many different types of career. As a transfer student I had to figure out a lot of things on my own, so now I enjoy being a mentor to younger students."

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AES student Allison Mills with her dog, Milo.

Applied Engineering Sciences Distinguished Alumni Award



Donnie Haye receives the AES Distinguished Alumni Award from AES director Jon Sticklen.

Donnie D. Haye (BS '81) received the Applied Engineering Sciences Distinguished Alumni Award at a College of Engineering banquet in May. Established in 2004, this award annually honors a graduate who has had a distinguished career, evidenced by significant accomplishments, high standards of integrity, recognized leadership, and support of the AES program.

Haye began her career with IBM as a product manager in Princeton, New Jersey. She held

various marketing research positions before becoming a financial analyst for the high-end server and storage businesses of IBM's Asia Pacific Group, headquartered in Tokyo, Japan. Haye later was a part of a small IBM team working on the formation of the Lexmark Corp. She held additional financial management positions in the semiconductor group of IBM and then was appointed Rochester site and WW AS400 manufacturing controller. She was later named the WW manufacturing controller for the PC

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As summer is coming to a close – maybe a little too rapidly – it’s time to start thinking about the 2010-2011 academic year. This will be a year of new starts for AES.

First, as many of you know, our revised curriculum for AES was approved last May. After over a year of input by alumni, students, college faculty, college of business faculty, college administrators, and the college curriculum committee, the proposal was approved by the College of Engineering last February and started the long path toward university approval. The AES new curriculum is summarized on an interim Web site: <https://sites.google.com/a/msu.edu/new-curriculum-msu-aes>

Going into the new academic year, we are bound to have some growing pains with our new curriculum. I definitely welcome any feedback you have about the new coursework, and especially about the two new concentrations.

A part of the new program is a shift from “cognates” to “concentrations.” The major difference students will find with “concentrations” is

that your official MSU transcript will indicate your concentration once you graduate—as opposed to the situation previously when cognates had no official stature on transcripts.

Dr. Amanda Idema, the AES academic adviser, and I will work hard for students during the coming year to ease the transition to the new curriculum. You may have noticed - its **DR.** Idema now. Amanda was awarded her PhD last spring. (Congratulations, Amanda!)

Second, a new AES tradition was started at the College Design Day last April. For the first time, the AES capstone course used externally defined projects. Project sponsors ranged from local non profit organizations such as the Mid-Michigan Food Bank, the Ingham County Food Bank, and the Girl Scouts of America; to an internal unit at MSU, the Fill-the-Bus project sponsored by The Center for Service-Learning and Civic Engagement (CSLCE) at Michigan State University; to a local engineering spinoff company founded by University Distinguished Professor Lawrence T. Drzal. In addition to having real-world problems to work on, the AES capstone groups also competed for three awards. AES capstone awards were sponsored by Phil Fioravante, an AES alumnus, and a very successful risk capital executive in Detroit. (Thank you again, Phil!)

You can see examples of the work of the AES capstone teams in this newsletter. In spring 2011, we will continue this new model for the AES capstone course.

Third, in spring 2011, most juniors in AES will be taking a new AES course (EGR 310). This new AES course is themed as a sustainability course much as EGR 210 is themed as a globalization course. The 310 course core will be case studies in sustainable systems and analysis tools to apply to the case studies. EGR 310 will focus on developing “systems thinking” mindsets at the top level.

Fourth, please join me in welcoming professor Ron Rosenberg to the AES faculty. Professor Rosenberg was a steady and supportive hand in helping to develop the revised curriculum, and with the approval of Dean Udpa, has now assumed duties as the associate director of AES. We are fortunate to have Dr. Rosenberg as part of the AES family. Ron brings his long experience as a mechanical engineering (ME) professor, as chair of the ME department, and as associate dean for research of the College. (Welcome aboard, Ron!)

So, this academic year will be an exciting time for all of us in AES. 🌱

Distinguished Alumni Award (continued from page 1)

business, followed by the position of CFO for IBM’s PC business in Europe, the Middle East, and Africa, then headquartered in Paris, France.

She later became vice president of operations for one of the server brands and is currently vice president, Client and Channel Enablement, Integrated Supply Chain. In this role she and her teams work with client groups, business partners, and global functions to improve processes and enhance value for IBM clients and their businesses. She has received multiple IBM awards and has a patent pending.

Haye was raised in Ohio, Indiana, and Michigan. She attended the University of Southern California before transferring to Michigan State University and earning her BS degree in engineering arts (now applied engineering sciences). While at Michigan State, Donnie was elected president of the Alpha Phi sorority and named to the MSU Senior Class Council. She was selected for the 1980 Homecoming Court and the Mortar

Board National Honor Society. She was also a member of Tau Beta Pi, Phi Kappa Phi, and Golden Key International Honor Society.

Upon graduation from MSU, Haye attended the Kellogg School at Northwestern University. She was an FC Austin Scholar and received her MBA in policy, finance, and marketing. She was also a member of Beta Gamma Sigma National Business Honor Society.

Haye currently resides in Chapel Hill, North Carolina, and works in Research Triangle Park. She enjoys travel (having visited 55 countries), cycling, photography, and gardening. She is a member of the Friends of Duke Chapel. Donnie is an avid Spartan fan and can be seen in green on game day, even while living in the land of the various “shades of blue” (Tar Heel and Blue Devil, that is). 🌱

2010 Capstone Projects

This year the senior capstone projects focused on service learning. Eleven teams worked on projects from the MSU Center for Service Learning and Civic Engagement (CSLCE), the Girl Scouts Heart of Michigan Council, MSU Extension, the Greater Lansing Food Bank, Mid-Michigan Red Cross, the Mid-Michigan Food Bank, and XG Sciences.

In addition, Phil Fioravante (BS '84) sponsored awards for the projects. Winners were determined based on both final written project reports and on oral presentations at Design Day, which was held at the end of April.

The overall winning team was Team 1 (Fill the Bus). The team judged to have the highest impact was Team 2 in its project for the Girl Scouts Heart of Michigan Council. Team 7, which worked on volunteer training for the Mid-Michigan Food Bank, was judged most innovative.

Here is a recap of what each team did.

Team 1: This team collaborated with the Center for Service-Learning and Civic Engagement (CSLCE) to make the annual Fill-the-Bus event for MSU students an even greater success this upcoming year by reaching a larger number of students and maximizing the impact on the community.

The team did this by developing a plan that optimizes sorting, scheduling, and sourcing activities during the event. Improving the distribution of these donations will ensure that each recipient organization receives goods best suited to their needs. This was accomplished by utilizing process mapping and project planning software. In addition, the team developed



Members of Team 1, which was judged the overall winner in the capstone competition, pose with their project. From left: Sarah Crete, Amy Gerstacker, Kevin Bowen, Jon Witta, and Kelsi Franckowiak.

an enhanced marketing plan to broaden the campaign this year to target all MSU students to not only increase the amount of donations, but simultaneously better reinforce the message of civic engagement to the entire Spartan community.



Phil Fioravante (left) offers congratulations to members of Team 2 whose project was judged to have the highest impact. From left: Sam Moser, Clayton Rice, Steven Moyers, and Cory Gregory.

Team 2: This capstone group created a comprehensive plan for the Girl Scouts Heart of Michigan Council, headquartered in Lansing. The plan was geared toward increasing sales revenue and reducing reliance on cookie sales while increasing revenue from donations and merchandise sales. The team came up with ways to keep a record of where sales were both made and attempted, which can increase the number of customers asked to buy products, reduce redundancy in attempted sales, and reveal trends in sales.

Surveying potential customers allowed the team to better understand the effect on sales if customers were made more aware of how supporting Girl Scouts is both tax deductible and a good cause. Through looking at the success of selling cookies in unconventional ways, such as at sporting or holiday events, Girl Scouts may potentially increase overall sales revenue considerably.

Team 3: The MSU Ingham County Extension is committed to helping American families in Ingham County who are experiencing stress during these current economic times.

Working together with Michigan State University, the Ingham County Fresh Food

Initiative is designed to give the citizens of the Greater Lansing area fresher fruits, vegetables, dairy products, and meat.

The Greater Lansing region is home to many seasonal and year-round fresh food producers; however the Greater Lansing Food Bank collects only a small amount of these fruits and vegetables. The main objective of this team was to make recommendations on the feasibility of incorporating fresh-foods into the emergency food networks' supply chain. This can be done by identifying farmers interested in donating to emergency food providers, finding incentives for farmers such as tax breaks, and developing good marketing strategies to promote this cause.

Team 4: The Greater Lansing Food Bank operates a field gleaning program called The Garden Project. It provides food pantries with fresh produce that would normally go to waste. It also supplies organizations, residents of subsidized housing, and others in need. In previous years, volunteers of the gleaning program have relied on donated banana boxes from a Meijer distribution center to store and distribute the produce. In 2009, the program used over 7,600 boxes to move 336,000 pounds of fresh produce—including over 225,000 pounds of apples. Due to the closing of the distribution center and a change in the supply chain, Meijer can no longer provide packaging materials for the project.

The team accepted the challenge to make sure that The Garden Project had a reliable and sustainable alternative to package and distribute the food. They procure reusable as well as disposable packaging in an efficient and cost effective manner, enabling the Garden Project to concentrate on feeding the hungry in the greater Lansing area.

Team 5: The Greater Lansing Food Bank, in conjunction with the Mid-Michigan Food Bank and the Ingham County Food Bank, has been working for years to distribute food to families in need in the tri-county area. Recently, a lack of information sharing and data collection has become a roadblock in their operations, causing inefficiency and redundant measuring systems.

The team implemented a system that improved the data collection and processing

within the Food Bank system. This system measured the amount of food entering and leaving the system, in order to produce reliable data about the number of people served, the number of meals provided, and the amount of food collected. A uniform information system was implemented throughout the food collection system in order to increase the quality of data. This system improved the quality and regularity of the entire system. This will allow for better external reporting and identification of internal problem areas

Team 6: The Greater Lansing Food Bank (GLFB), servicing the tri-county area of Ingham, Eaton, and Clinton counties, provides food to tens of thousands of people each year. These people include seniors, children, and the “working poor”—those individuals who don’t earn enough to meet their daily basic needs. The Greater Lansing Food Bank works closely with the Mid-Michigan Food Bank, which provides similar services in seven counties that overlap with GLFB’s three counties.

The challenge was to optimize truck route coordination between GLFB and the Mid-Michigan Food Bank, ultimately saving gas, time, and money. The project allowed the students to bring together engineering and business skills to create a viable solution to this challenge. They used a Six Sigma approach to process design in order to eliminate redundancies. In the end, the team presented GLFB with an efficient route alteration, utilizing the Mid-Michigan Food Bank’s resources and vice versa.



Phil Fioravante and Kevin Guimont (right), who represented members of Team 7 at the awards presentation.

Team 7: The demand for food assistance is growing throughout Michigan. There are several agencies and nonprofit organizations such as the American Red Cross, Feeding America, and the Mid-Michigan Food Bank. While partnering with other food banks and programs, effective time utilization and minimization of costs are key factors in effectively managing a volunteer-based nonprofit

organization.

This team worked with the Mid-Michigan Food Bank, creating training modules and operating procedures for different volunteer tasks. The modules allow volunteers to quickly and easily acclimate themselves to various job duties and business processes. This also helps optimize use of time and resources by volunteers and staff members.

Team 8: Currently the Mid-Michigan Food Bank (MMFB) is facing the challenge of volume optimization. With the varying size and weight of the distributed products, the challenge lies in creating an accurate picture of the volume of the items they are trying to ship. This is resulting in extra transportation legs and increased costs due to their current distribution process. By correlating outgoing shipments with the pick-up of the donations, the MMFB would have a more accurate way of utilizing the volume of their transportation. The objective was to develop better distribution modes and increase planning accuracy and make recommendations for optimal transportation strategies.

Team 9: Recently, great importance has been placed on developing an effective alternative fuel source. One of the most promising technologies developed has been the fuel cell. One main issue holding back the fuel cell market is cost. The materials needed for a fuel cell are very expensive. Most of the high cost is directly attributable to how the materials are processed.

XG Sciences, Inc. develops and produces multifunctional materials, one of which is called xGnP or Exfoliated Graphite (Graphene) Nanoplatelets. When added to other materials these nanoplatelets can greatly increase their properties. One such property is electrical conductivity, a key property for a fuel cell material.

The goal for this team was to analyze the advantages that would stem from replacing current materials used in production with xGnP as well as generate comparative analysis of competitive materials. Working with XG Sciences the team determined the advantages to venturing into the fuel cell market, providing the graphene nanoplatelets for use within fuel cells.

Team 10: Today’s batteries are built for either power or capacity, but not both. XG Sciences, Inc. offers graphene technology that



From left: AES alumna Phil Fioravante; Shawnee Vickery, professor and co-director of the Institute for Entrepreneurship in the MSU College of Business; and Ron Rosenberg, the new associate director of the AES program, judge the 2010 capstone projects.

will revolutionize the battery industry. This team conducted an analysis of the high performance battery market to recommend growth strategies. Functionalized graphene-based batteries have the capacity to overcome conventional trade-offs, thus providing the best of both worlds—a high-capacity, high-powered battery. Wind and solar energy industries have always been set back by the lack of mass energy storage capacity. Graphene-based battery electrodes could very well be the key technology needed to boost the green energy industry to a level of self-sustenance.

Team 11: In this age of constantly evolving technology with use of innovative materials, it is essential for companies to continuously stay on top of developments while creating and adapting to competitive technologies. Manufacturers of supercapacitors are able to replace carbon nanotubes and other comparable materials with a new material developed by XG Sciences called xGnP, or Exfoliated Graphite (Graphene) Nanoplatelets, which still retains similar electrical properties. Moreover, the use of graphene will provide up to 99% cost savings to the manufacturers.

Collaborating with XG Sciences, the team conducted a full market analysis for supercapacitors based on costs, safety, and its current specification for the xGnP brand of graphene nanoplatelets. The analysis helped the team give recommendations to XG Sciences on current areas where xGnP Graphene Nanoplatelets technology can be implemented, as well as possible emerging fields in which this technology can be developed for the future. 🌱

Three Generations (continued from page 1)

In addition to her interest in mentoring, Allison continues to further develop her finance skills. She serves as the treasurer for the MSU chapter of the Society of Women Engineers. At Grand Valley, she was involved in Student Senate as a finance chair for the media and entertainment organizations. A few of these organizations included the school newspaper and the radio station.

One of Allison's favorite subjects is computer programming, and she is especially interested in MATLAB, a high-level language and interactive environment that enables you to perform computational intensive tasks faster than with traditional programming. Allison is a teaching assistant for Introduction to Engineering Modeling (EGR 102), where MATLAB applications are taught—and she serves as a mentor for freshmen student.

Allison's father, Dave Mills, selected the engineering arts program at MSU because of the mix of business and engineering. Early on, he realized he really wanted to do what his Dad did. "My father had his own technical sales rep agency. I thought it was a nice life," says Dave Mills. "By my senior year, I was well prepared to enter the family business expanding it to West Michigan." Part of what helped prepare him was

an internship with Telemecanique in France during his junior year. Dave received his BS degree in 1981. He currently is a managing partner with CyberGear, LLC, in Rockford, Mich., which designs, builds, and services industrial solutions.

Allison's mother, Diane Croskey Mills, worked her way through college and earned her degree in 1982. "I love math and science, but felt that I wanted to spend my time in the business world," says Diane Mills. That's exactly what she did; she worked at Hewlett-Packard for eight years and then helped launch Pro/Engineer. The family chuckles that Allison was actually first introduced to Pro/E as a three year-old watching demonstrations of designing blenders!

"An effort to stay current on emerging technologies, led me to a new field—energy," says Diane. She continued her engineering education through the Association of Energy Engineers and this year earned certification as a Certified Energy Manager. "I find my role at Ameresco very fulfilling. I enjoy helping schools and local and state governments become more energy efficient. By improving their facilities and systems and incorporating renewable energy projects where feasible, we are reducing their carbon footprints, improving their bottom lines, and offering environments that help people



Allison Mills (left) with her mother, Diane Croskey Mills. perform better."

Allison's parents and her grandfather are proud of her and wish her the best as she pursues her degree and ventures into the workforce. Diane sums it up by saying, "I know she will work hard and always do to a great job because that is who Allison is. I also hope she finds a way to continue her mentoring and volunteerism so she can also continue to improve the lives of others and the next generation."

— Jane L. DePriest 🌸

AES Alumnus Elected Chief Executive Officer



Ingersoll Rand board of directors recently elected Michael W. Lamach (Engineering Arts, '85), chief executive officer and chairman of the board of directors. Prior to that he was the president and chief operating officer of the company.

Ingersoll Rand is a global diversified industrial firm providing products, services, and solutions to enhance the quality and comfort of air in homes and buildings, transport and protect food and perishables, secure homes and commercial properties, and enhance industrial productivity and efficiency.

"The board of directors has elected Mike Lamach as its chief executive officer recognizing his strong performance as president and COO during a very difficult economic period globally," says Richard Swift, lead

independent director of Ingersoll Rand's board and former chairman and CEO of Foster Wheeler Swift. "Mike has demonstrated both operational and strategic understanding of our businesses and has driven strong productivity and cash performance."

Lamach was president of Trane Commercial Systems after Ingersoll Rand acquired Trane Inc. Previously, he was president of Ingersoll Rand's Security Technologies Sector. He joined Ingersoll Rand in February 2004 after 18 years with Johnson Controls in both the automotive and controls businesses where he advanced into leadership roles with greater global responsibilities.

In addition to his BS degree from MSU, Lamach received a master's degree in business administration from Duke University. He also serves on the board of directors of Iron Mountain Inc. 🌸

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New Advisory Board Members

The AES Advisory Board welcomes the following new members:

Suzanne Osborne (BS Engineering Arts '95) – In addition to earning her BS at MSU, she received a certificate of completion in circulation technology in the Allied Medical Sciences program at Ohio State University in 1997. She is currently a manager of perfusion at Emory University Hospital in Atlanta, Ga.

Ross Scott (BS Applied Engineering Sciences '09) – He is currently a supply chain analyst at Integrated Strategies in Okemos, Mich.

If you are interested in participating in the AES Advisory Board, please contact the AES office.

High-Achieving Student Recognition

This winter students from various engineering department were recognized for their academic efforts. For the AES program they are: **Thomas Gartner, Amy Gerstacker, Patricia Gordon, Rami Janoudl, Michael Ryerkerk, and Christine Varley.** 🌟

2010 Capstone Projects



From left: Jonathan Stratton, Nicholas Dietz, Timat Hughes, Amarpreet Gill, and Jamar Lewis-Whatley made up Team 4 and worked on a project for the Greater Lansing Food Bank as part of the capstone projects. See story on page 3.