The possibility of developing new technologies to improve the health of people around the world is what drives Peter Lillehoj.

He joined the faculty in the mechanical engineering department as an assistant professor in August and is bringing a new research focus area to the department—utilizing microtechnologies and nanotechnologies, particularly for the diagnosis and treatment of infectious diseases. It’s an interest he developed as an undergraduate student at Johns Hopkins University, which expanded during his graduate studies at the University of California, Los Angeles.

“This area of micro- and nanotechnology has been around for the past 30 years, but it’s still a relatively new area in mechanical engineering,” says Lillehoj. “There are a lot of unknowns. The idea of scientific discovery and innovation got me interested in this field. When there is so much unknown, there is also much to be discovered and multiple directions that one can take in the research. The idea of being able to work in the micro- and nanoscale and, specifically, being able to manipulate biological components such as cells and proteins, is very interesting and fascinating.”

Micro- and nanotechnology typically refers to the science and technology at the micrometer (1x10⁻⁶ m) and nanometer (1x10⁻⁹ m) scales. Just to give you an idea of how small this is, the diameters of a human hair, red

continued on page 7

continued on page 3
To our alumni and friends, greetings from MSU and the Department of Mechanical Engineering.

Our department is doing very well. This fall semester we welcomed the largest incoming class of freshmen interested in ME in recent years. For the new academic year, the number of ME students in all classes exceeded 1,100 for the first time. This interest in mechanical engineering is fueled, at least in part, by a strong demand from recruiters. In a recent survey our graduating seniors report receiving an average 1.8 job offers before graduation. The vast majority report having job offers within one month of leaving MSU.

The large incoming class also presents some challenges in classrooms and laboratories. We are working to meet these challenges, updating class offerings, and modernizing labs. A new faculty member joined the department this year. Prof. Peter Lillehoj joined us in August after receiving his PhD from UCLA. We are very happy to welcome him into our department, and we are looking forward to the new and exciting contributions he will make in bringing advanced micro- and nanotechnologies into our research portfolio and our instructional program. You can learn more about Peter elsewhere in this publication. A new academic specialist also joined the department in August—Ms. Katherine Stevenson. Kathy will be in charge of our computer graphics courses, and she will also lead new efforts to introduce manufacturing technologies such as 3-D printing and additive manufacturing technologies in our undergraduate curriculum. We are very pleased to welcome Kathy and look forward to the changes she will bring to the undergraduate program.

Our research enterprise continues to thrive. With the addition of new PhD students arriving this fall, enrollment in our PhD program is the largest it has ever been. The new students will join ongoing projects in one of our many research labs. Our faculty is engaged in many new, exciting research projects. You may be interested in learning more about their work by looking at our newly updated research profiles brochure, which you can download from our department web page at www.egr.msu.edu/me/research.

There is always a lot happening in ME, and I hope this brief newsletter gives you an overview of recent events. Please keep in touch.

ALEJANDRO DIAZ

Chair from the

2012 Claud R. Erickson Distinguished Alumni Award

Sami R. Al-Araji (BS ’67, PhD ’73) received the 2012 College of Engineering Claud R. Erickson Distinguished Alumni Award at the annual College of Engineering Alumni Awards Banquet in May. Established in 1982, Claud Erickson, for whom the award was named, was the first recipient. Since then, it has been given annually to a College of Engineering graduate with a minimum of 15 years’ professional experience who has attained the highest level of professional accomplishment; provided distinguished and meritorious service to the college and the engineering profession; and engaged in voluntary service.

Al-Araji has a special place in his heart for the Michigan State University campus and community as well as his native Iraq, which he is working to help rebuild. In his current post, Al-Araji leads the Iraqi National Investment Commission (minister rank), the official promoter and facilitator of private investment in the country since 2009, which is creating opportunities for foreign and domestic investors as well as for Iraq’s more than 30 million citizens.

Prior to this position, he was the Deputy Minister at the Ministry of Industry and Minerals, where he held numerous positions including Director General of Planning, and Director General of Engineering Inspection and Quality Control. Prior to that, he was the head of the Nuclear Safety Authority at the Atomic Energy Commission.

In 1991, Al-Araji participated in the construction program of the oil and electrical industries. He also led the engineering safety and quality works for a number of projects. He participated in the rehabilitation of the damaged factories of the Ministry of Industry and coordinated and supervised the ministry’s projects. He actively participated in State Owned Enterprise (SOE) restructuring and reform and plays an active role in the development of the Iraqi private sector.

Al-Araji is a member of many committees, including the economic committee of the council of ministers of Iraq. He is also involved with numerous professional societies and organizations worldwide; he was accepted as a member of the American Institute of Aeronautics and Astronautics, the American Society of Mechanical Engineers, the American Nuclear Society, and the North American Research Society. In addition, he chairs several bilateral business councils and has more than 80 publications to his credit.

Born and raised in Baghdad, he earned a scholarship to study engineering at Michigan State. After receiving his bachelor’s degree in mechanical engineering at MSU, he went on to earn a master’s degree from the University of Connecticut. He returned to MSU for his doctorate in mechanical engineering. During that time, he worked as a graduate adviser in Owen Hall. He cites former professors James Beck (his PhD adviser), Merle Potter, and John Foss for their mentorship.

After graduation, Al-Araji worked for about two years with Consumers Energy (then known as Consumers Power) in Jackson, Michigan, before returning to Iraq, where he has dedicated more than 30 years to working in various government agencies.

“I am an Iraqi who is educated in one of the fine institutions of America, which is Michigan State University,” says Al-Araji. “And I use part of my education for the service of Iraq.”

He and his wife, Professor Menahil A. Al-Nawas, reside in Baghdad, Iraq. They have two children, Olla and Sarah.
Susan Pacheco (BS ’84) received the 2012 Mechanical Engineering Distinguished Alumni Award at the annual College of Engineering Alumni Awards Banquet in May. Established in 2004, this award honors a graduate of the department who has a minimum of 15 years of professional experience in an engineering or engineering-related field; provides leadership in engineering, engineering education, the related sciences, or technical management; contributes to the department, the college, or MSU; and is actively involved in the community.

Pacheco, who has been with Ford Motor Company for 27 years, currently serves as director of Global Advanced Product Marketing. She is responsible for strengthening Ford’s product portfolio by inspiring and delivering the strongest customer connection of any automotive brand. She has also served as director of Advanced Product Strategy and Planning in North America and South America, working in partnership with marketing and product development to develop and execute successful product and business strategies.

She served as president of Ford Unlimited, part of Ford Automotive Operations, where she managed and led the creation of new businesses focused on improving the driving lives of Ford consumers. Prior to her role with Ford Unlimited, she served as chief program engineer, where she was responsible for the technical, sales, and business execution of the 1999 Ford F-150 and Expedition, as well as the Lincoln Navigator.

During her tenure at Ford, Pacheco has served in various engineering and project management positions in the Truck Division of Product Development, including: Aerostar Vehicle Line Director, Export Explorer Program Manager, and various Chassis Engineering positions. Throughout her career, she has been recognized and honored by leading organizations such as the Automotive Hall of Fame, HENAAC (Hispanic Engineers National Achievement Award Conference), and the National Hispanic Corporate Achievers.

But above all, Pacheco loves being a Spartan. “I am so proud when I get to tell people that I graduated from Michigan State University,” she says.

MSU is a family tradition for the Pacheco family. Susan’s father, Jorge Pacheco, came to the United States from Bolivia to attend MSU and receive his degree in civil engineering. Susan’s sisters—Debra Pacheco and Julie Pacheco-Smith—also graduated from MSU. And finally, the next generation is carrying on the tradition as Susan’s niece, Chelsea Smith, is in her first year of medical school at MSU. Pacheco played soccer during all four years she attended MSU and still enjoys playing and coaching the game. “Every year,” she says, “I look forward to seeing what Tom Saxton and the team will accomplish.”

She credits George Mase, her first professor in the mechanical engineering department, with being an inspiration in her life. “He taught my first dynamics class, but he taught me so much more than just the principles of mechanical engineering; he taught me the most valuable leadership lesson of all—building and treasuring relationships. I feel his influence every day in my life. I am very grateful to all of my professors, my coaches, and my teammates for making my experience at Michigan State so special.”

In addition to her bachelor’s degree, Pacheco earned an MBA from the University of Detroit in 1989. She and her husband, John Forsythe, reside in Commerce Township, Mich. They have two sons—Alex and Adam Baker. She says that spending time with family and friends will always be her priority.

That early training has helped Tindall accomplish many of his goals. He will get his bachelor’s degree this December and has accepted a job offer with Marathon Petroleum Corporation. But before completing his ME curriculum at the end of this semester, he hopes to accomplish one of his long-term dreams—building a steam engine.

“I always wanted to build a steam engine; I bought the blueprints in high school,” says Tindall, who worked for ME technician Roy Bailiff in the college’s engineering machine shop for four years. So Tindall dug out his blueprints and started working in earnest on the project in January. He drew the parts needed for the engine using industry standard computer-aided design (CAD) software that is used in a required ME course. He then took the part file down to the CNC mill, uploaded it into the mill’s controller and the machine made the part.

It all sounds pretty simple, but Tindall knows different. “Every single step was a challenge. One particular problem was that I did not have that much experience with fixturing. That’s the part that holds the piece you are trying to mill.”

After overcoming numerous obstacles, the project is now complete and will be on display during Design Day at the end of the fall semester. One day, Tindall hopes to use it to power a small boat on one of Michigan’s inland lakes.

The process Tindall used will be documented, and information will be made available, so other students will have a step-by-step reference for making parts using the CNC mill.

Bailiff hopes this project will jump-start more classes in post-processing and lead to training programs on using the CNC mill and other machine shop equipment. “I try to keep on top of equipment trends,” says Bailiff. “When you look at what manufacturing is doing, you see that a lot of it is returning to the United States because of the kinds of equipment, like a CNC mill, that are available in the states. This type of equipment is making it happen. I believe if you can show our future engineers how parts are made and even give them some experience making parts on the equipment, they will be better engineers.”

—Jane L. DePriest
Mahmoodul Haq has joined the Department of Mechanical Engineering as an assistant professor working at the Composite Vehicle Research Center. He has been a research associate at the center since 2009. Haq received his MS and PhD degrees in civil engineering with a specialization in structural engineering mechanics and materials from Michigan State University in 2005 and 2009 respectively. He holds a bachelor’s degree in civil engineering from the University of Madras, India, where he was the top student among 2,000 graduates.

Haq’s research interests include multimaterial joining, especially the development of robust structural joints of composites and dissimilar materials with improved mechanical properties, enhanced damage resistance, and sensing and healing capabilities. He also researches computational design of materials and structures; develops and implements novel materials for aerospace, marine, defense, automotive, and other structural applications; and applies various non-destructive evaluation tools for health monitoring and repair of composites and structural joints.

He is the principal investigator on a few current U.S. Army TARDEC grants. Haq received numerous awards and fellowships while working on his degrees and is the author of many scientific publications. He is a member of the American Society of Mechanical Engineers, the Society of Experimental Mechanics, the American Society of Composites, and the American Society of Civil Engineers.

Peter Lillehoj has joined the Department of Mechanical Engineering as an assistant professor. Lillehoj received a BS degree in mechanical engineering from The Johns Hopkins University in 2006 and MS and PhD degrees in mechanical engineering from the University of California, Los Angeles (UCLA) in 2007 and 2011, respectively. Before joining MSU, he was a postdoctoral researcher in the mechanical and aerospace engineering department at UCLA. His research interests include MEMS, microfluidics, biosensors, lab-on-chips, and point-of-care diagnostics. At MSU, Lillehoj hopes to develop state-of-the-art, point-of-care technologies for current and emerging applications in clinical diagnosis, biodetection, and bioprocessing. These platforms combine cutting edge principles of micro- and nanotechnology with contemporary techniques of molecular and cell biology.

He also is investigating the use of mobile devices (i.e. cell phones, tablets) for biodetection, which is a new and extremely promising direction of research. These systems use microfluidic chips that integrate sample processing components and sensors onto single-use, disposable platforms. This technology is currently being developed for the detection of malaria, one of the deadliest infectious diseases in the world, and aims to improve the convenience and accessibility of diagnostic testing worldwide.

“The detection of biological species, toxins, and chemical compounds is essential for a broad range of real world applications including clinical diagnosis, food/water safety, environmental monitoring, and homeland security,” said Lillehoj.

Joseph M. Colucci (BS ME ’58) received the Donald W. Ableson Award for Visionary Leadership from SAE International on May 16, 2012, during the SAE Foundation’s 25th Anniversary Celebration at Ford Field in Detroit, Mich. He was recognized for his leadership within the SAE Foundation and for his significant contributions to improving STEM education and advancing the SAE mission.

Colucci, a world-recognized automobile expert and a member of the National Academy of Engineering, is president of Automotive Fuels Consulting, Inc., of Clarkston, Mich. Previously, Colucci was executive director, Materials Research, at GM R&D. Prior to that he had been department head of Fuels and Lubricants, leading GM’s efforts to improve commercial fuel and lubricant quality for better vehicle performance and reduced vehicle emissions.

He was a member of the SAE board of directors and the Foundation’s board of trustees and is a fellow of SAE. In 2010 he received the SAE Medal of Honor, and he has been inducted into his high school Hall of Fame. He is a member of the Michigan State University College of Engineering Alumni Association Board and received the college’s highest distinction, the Claud R. Erickson Award, in 2003.

In addition to receiving his bachelor’s degree in mechanical engineering from MSU in 1958, he earned a master’s degree in mechanical engineering from the California Institute of Technology in 1959.

When asked what advice he would give to a 12-year-old, Colucci laughs heartily and says, “I’d tell them the same thing I tell my grandkids... you won’t learn anything taking easy classes. You don’t learn from easy things... you learn from making mistakes. If a teacher makes it hard, you’ll learn more. You’ll look back years later and remember that your teacher was a great teacher.”

In Memoriam

Charles W. Festian Jr. (BS ’66), 69, of Cape Coral, Fla., died September 13, 2012.

Verghese Kurien (MS ’48), the architect of India’s “white revolution” that transformed the country from a milk-deficient country to the world’s biggest milk producer, died September 9, 2012, at age 90.


To read complete obituaries, visit www.msu.edu/alumni/class-notes-obits.
“Current laboratory-based detection technologies generally require specialized facilities and equipment, highly trained personnel, and processes that are time consuming and laborious, which hinders their applicability. New technologies are needed that are compact, inexpensive, and simple to use for improved usability and accessibility, especially in resource-limited settings and the developing world.”

Lilhøj is a member of the American Society of Mechanical Engineers, the Biomedical Engineering Society, and the Institute of Electrical and Electronics Engineers.

William M. Murray Lecture

University Distinguished Professor Gary L. Cloud received the Murray Medal and delivered the William M. Murray Lecture at the 2012 Society for Experimental Mechanics (SEM) International Congress and Exposition in June in Costa Mesa, California.

He was selected for this honor in recognition of his distinguished contributions uniting optical and electronic techniques to solve significant problems in mechanics. His lecture was titled “Some Curious Unresolved Problems, Speculations, and Advances in Mechanical Fastening.”

“Mechanical joining is one of the oldest, most important, and most neglected aspects of engineering design of machines and structures of all types and sizes,” explains Cloud. “Approximately 250 U.S. companies manufacture fasteners worth more than $12 million per year. However, most failures of structures, including aircraft, originate at fasteners, suggesting that improved understanding of the fundamental mechanics of joining is required.”

He goes on to point out that the issue is exacerbated by increased demands on systems, particularly in the transportation and military sectors, and by the growing use of composites, for which current fastening practices seem to be underdeveloped owing to complexity.

Cloud, who was the founding director of the MSU Composite Vehicle Research Center, has been a member of SEM for 48 years. He is past president of SEM (’93-’94), having been vice president (’91-’92) and president elect (’92-’93). He also served as a technical editor of Experimental Mechanics from 1985-88. In 2008, his past students and associates founded the Dr. Gary L. Cloud SEM Scholarship Endowment to assist students who intend to make a career in experimental mechanics.

The Murray Lecture was initiated in 1952 as the society’s most prestigious lecture. It is presented each year as a continuing honor to William M. Murray, who was the organization’s first president and longtime secretary-treasurer, for his many contributions to SEM.

Curricular Service-Learning and Civic Engagement Award

Senior teaching specialist Tim Hinds is one of the recipients of the MSU Curricular Service-Learning and Civic Engagement Awards. He was nominated for the honor by Satish Udpa, dean of the College of Engineering, and Thomas Wolff, associate dean of the college. The awards are given in each college to faculty members or academic specialists who have demonstrated innovative and/or sustained efforts in academic, curricular service learning and civic engagement.

Hinds was nominated for his work with EGR 100, Introduction to Engineering Design, and with the MSU Resource Center for Persons with Disabilities (RCPD). The award was presented November 9 at the MSU Kellogg Center.

NIH R01 Grant

Associate professors Seungik Baek and Jongeun Choi have received a Research Project (R01) Grant from the National Institutes of Health (NIH). The four-year grant will support $769,975 for the research team to integrate their innovative, vascular-adaptation model of abdominal aortic aneurysm with advanced statistical methods to increase prediction capability of the rupture risk. R01 grants are the original and historically oldest grant mechanisms used by NIH. The R01 provides support for health-related research and development based on the mission of the NIH.

“During the past two decades, there have been significant advances in the understanding of pathophysiology and biomechanics of abdominal aortic aneurysms (AAAs),” says Baek. “In particular, incorporation of patient-specific geometries in computational biomechanical analysis promises that the computational biomechanics becomes an essential tool for AAA risk assessment. Conventional finite element analysis, however, uses advances in medical imaging only to define patient-specific lesion geometry, but do not relate the geometrical features with alterations in biomechanics from long-term vascular adaptation during the enlargement.”

Baek and Choi had previously studied CT images of small AAAs obtained from longitudinal studies of three patients and, using a growth and remodeling (G&R) model of AAAs that their research group developed, found that the stress distribution of AAAs can be altered by interacting with spine vertebrae during the enlargement.

In collaboration with Whal Lee, a medical doctor in the Department of Radiology at Seoul National University Hospital in South Korea, they have obtained two to nine sets of follow-up CT images from eight more patients with the mean surveillance interval of 355 days.

“Longitudinal image data of AAAs, particularly a series of high-resolution CT images taken from the same patients for such long periods, are rare,” says Baek. “Using this unique data, we will study how the morphology of AAAs changes from the initial shape interacting with surrounding tissues, and develop a statistical and computational framework to better predict rupture risk for small AAAs using medical images.”

The project is unique because of its novel G&R model and prediction methods along with a unique set of longitudinal patient data that is essential for building and validating such models. “The proposed research will significantly increase our understanding of biomechanics of AAAs during their progression and will provide a necessary step toward the clinical application of vascular G&R models for AAA risk assessment and treatment,” says Baek.
**Students @ ME**

**MSU Solar Car Team**

For the first time in university history, a Michigan State University team competed in the American Solar Challenge (ASC) cross-country race.

The ASC, which is held biennially, is a competition in which collegiate teams design, build, and race solar-powered cars in a cross-country event. The Formula Sun Grand Prix (FSGP), held annually, is a three-day track racing event and qualifier for the ASC.

Last year, five members of the solar car team competed in the 2013 FSGP held in May in Indianapolis, Indiana. They completed 207 laps over two days, totaling 186.3 miles. They tied for 7th place with Western Michigan University, out of ten teams.

At this year's FSGP in July in Monticello, New York, the MSU team's car, Brasidius, finished 11th out of 15 teams and qualified for the 1,600-mile cross-country race. The MSU team also won the slalom event with the fastest time of 9.3 seconds.

While Brasidius did not complete the road competition, James Miller, the team's project manager and an ME senior, says, "I am glad we were able to push MSU Solar further than ever before. You can expect to see growing momentum by ASC 2014."

And there is something even more important than how a team places—or even if they finish the race; the competition is a learning experience, and team camaraderie is a hallmark of these races. The competitors never hesitate to help each other out by sharing advice, support, tools, or even car parts.

The MSU team has begun work on the design and construction of their new car, Leonidas. They plan to compete in the 2015 FSGP held in May in Indianapolis, Indiana. They completed 207 laps over two days, totaling 186.3 miles. They tied for 7th place with Western Michigan University, out of ten teams.

In addition to Miller, team members are: Ethan Akerly, Hasan Alali, Alex Benson, Matt Beutler, Meng Cao, Daniel Howarth, Colin Monroe, Scott O'Connor, Miles Turrell, and Steve Zajac. Norbert Müller, associate professor of mechanical engineering, is the faculty adviser.

**MSU Formula Racing Team**

The MSU Formula SAE team placed sixth overall in the Formula SAE (Society of Automotive Engineers) 2012 FSAE-West competition, held for the first time in Nebraska at the Lincoln Airpark, June 20-23. A field of 73 teams from across the United States, Canada, Mexico, and Brazil competed.

Formula SAE teams develop small Formula-style racecars and engage in competitions designed to evaluate the potential for production of their machines. Each student team designs, builds, and tests a prototype racecar based on a series of rules whose purpose is both to ensure on-site event operations and promote clever problem solving.

Highlights of the MSU team's performance at the June competition include:

- 6th overall
- 2nd in the acceleration event
- 4th in design
- 13th in the endurance event (one of only 24 teams to finish the event)
- Finished all static and dynamic events

Gary Cloud, team adviser and University Distinguished Professor of mechanical engineering, was especially proud of the team's work ethic.

"We were up against some very tough teams, most of which fielded far more participants. MSU is one of the minority of schools at which FSAE is strictly a student volunteer organization (no credit) and at which the car is entirely student-designed and student-built," he says. "The team this year has been outstanding in intelligence, design ability, teamwork, professional attitude and deportment, dedication, leadership, and overall classiness. They have been top-notch ambassadors for MSU and the College of Engineering."

Team members competing in Nebraska were: Brady Thom, project manager; Chris Archambo, chief engineer; David Caples, powertrain leader; Matt Bach, cooling/fluids leader; Kammi England, powertrain member; Ben Bosworth, chassis leader; Shiva Ramasami, suspension leader; Jason Thelen, wheel assembly leader; and Sylvia Reiser, brakes leader.

Eight of these nine team members will be returning to the team for the 2012-2013 season. The vehicle design is already underway.

"We cannot thank our sponsors enough for giving us the opportunity to experience what we did in Lincoln," says Caples, an ME junior.

"Not only did we learn many technical and life skills that will help us in our careers, but we built memories and friendships that will last for our entire lives."

MSU has been competing in the Formula SAE since the 1980s.

**International Corporate Tour**

Brittney Heatherington, an ME junior, participated in an intensive two-week tour held in May 2012 that gave 10 MSU College of Engineering and Eli Broad College of Business students a firsthand look at international corporations and the global marketplace. Stops on the International Corporate Tour (ICT) included BP (Sunbury, UK), Alcoa (Birmingham, UK), Whirlpool (Comerio, Italy), Alpine Convention (Bolzano-Bozen, Italy), Bosch Corporation (Stuttgart, Germany), Eaton Corporation (Rastatt, Germany), and Rampa (Hamburg, Germany).

Along with unique perspectives into their organizations, host employers engaged students in project simulations. Examples included "The Trading Game," presented by BP in Sunbury, England; lunch on the factory floor at Rampa (an MSU alumni-owned engineering firm) that manufactures screws, inserts and other fasteners; and problem solving with representatives of the Alpine Convention, which is an agreement between various countries for the protection and sustainable development of the Alpine Region.

"The students embraced the opportunity to understand other cultures both from a social perspective as well as a corporate perspective," says Bernadette Friedrich, director of student engagement for the Center for Spartan Engineering. "They saw companies that they are familiar with in an unfamiliar environment and learned that even large corporations have to prepare for and react to local culture while having a global presence."

The tour was a "big deal" for Heatherington. "I don't have time during the summer to study abroad because I use my summers to make
money and build on work experience for the upcoming school year and ultimately for my future," says Heatherington. "I would not want to waste an internship opportunity in the summer, so that means I give up my chance to study abroad—and I love the school year too much to give up a semester at State, especially during the football season!"

The tour worked perfectly for her because she returned in time to work her summer internship. "The tour gave me the chance to work on my networking skills and become more comfortable talking to employers. It also gave me insight in terms of what I might do with my degree after college. It was very helpful to be able to see how different companies apply different degrees."

Heatherington is from Grand Haven, Mich., and is the daughter of David and Cammie Heatherington. She works for the Center for Spartan Engineering and is getting involved with the MSU student chapters of the Society of Women Engineers and the American Society of Mechanical Engineers.

Not only did the students benefit from the tour, which is in its first year, but several companies on the tour expressed an interest in working with the College of Engineering and Eli Broad College of Business to provide internship opportunities for MSU students, both domestically and internationally.

Participants were selected based on not having been abroad before; having a solid GPA (at least a 3.0); being involved in extracurricular activities; and balancing a work/school schedule.

There were four other College of Engineering students on the tour in addition to Heatherington: Erin Hoffman, computer science; Alexa Jones, biosystems engineering; Angelica Minisallei, electrical engineering; and Sara Mozdrzech, civil engineering.

The ICT was coordinated and led by the Center for Spartan Engineering and the Lear Career Center.

Five College of Engineering students participated in the first International Corporate Tour in May 2012.

The Changing Face (continued from page 1)

blood cell, and DNA strand are approximately 80 micrometers (µm), 10 µm, and 2 nanometers (nm), respectively.

Lillehoj is currently in the process of setting up his laboratory—the Integrated Microtechnologies Systems (IMS) Laboratory, and more information about his research can be found on his lab’s website: www.imslab.msu.edu.

"This area of research involves technology from multiple disciplines including molecular biology, materials science and engineering. In general, the devices we develop are designed from scratch and fabricated in a clean room," explains Lillehoj. "That is one of the areas where the mechanical aspect is involved because we apply design principles and often use computer simulation to optimize the performance of these devices."

One of the projects that Lillehoj is working on is a rapid diagnostic test for malaria. "I’m interested in applications where there is a huge need, especially for infectious diseases like HIV, tuberculosis, and malaria. These diseases are so prevalent in the world, primarily in developing nations. Many people are not aware of how big the problem is. These diseases kill millions of people each year!"

He already has found collaborators at MSU. Terrie Taylor and Karl Seydel, both with the MSU College of Osteopathic Medicine, are working on malaria prevention and control strategies in the African nation of Malawi. Lillehoj sees their work as an opportunity to collaborate in developing and testing new technologies for malaria diagnosis and prognosis.

"Being able to rapidly diagnose the disease at a low cost is crucial in the developing world. Once it is diagnosed, there are effective drugs to treat malaria. A lot of current diagnostic methods are labor intensive, which can take several hours for results, or only provide qualitative results (such as “positive” or “negative”). However, obtaining quantitative measurements in 30 minutes or less is ideal, especially if the patient is showing signs of infection," says Lillehoj, who points out that the cost of the test can also be a challenge. "The test has to be inexpensive. If a test costs even a few dollars, it might be considered a day’s wage in many parts of the world. The tests need to cost less than $1 to be affordable and widely accessible."

Lillehoj also hopes to make use of mobile communication devices as a platform for disease diagnosis. One current project utilizes cell phones, which are widely accessible, even in developing countries. "Remarkably, many people in remote villages possess cell phones," says Lillehoj. "In addition to being widely available, cell phones can offer a simplified user interface by providing step-by-step instructions to the operator."

Lillehoj already has a reputation for his work. He was awarded a prestigious Grand Challenges in Global Health grant from the Bill & Melinda Gates Foundation, whose main aims include the enhancement of health care and reduction of extreme poverty worldwide. Additionally, his work has been published in several leading scientific journals and international conference proceedings.

Lillehoj considers himself part of a relatively new group of young engineers across the country who are performing research on contemporary topics. "My field integrates a lot of disciplines—engineering, chemistry, molecular biology, and biotechnology, which is different from traditional engineering disciplines that are more focused on a single topic or area of expertise. Also, there are a lot of emerging global issues that are major challenges, including energy, safety, and health care. A lot of new, young engineers want to use their expertise and training to address these issues and make a difference in the world."

While there are other researchers who study infectious diseases at MSU, he is one of the few in the College of Engineering; and Lillehoj hopes he can make micro- and nanotechnology a more prominent field in the college. "I am excited to have the opportunity to further contribute to this research area. It could lead to a new program in the college."

In selecting MSU and the ME department, Lillehoj was drawn by the many opportunities for collaboration and the warm response of the faculty and staff. "One of the things that stood out about the department when I first visited and started working here was that everyone was very friendly. They never hesitated to help when I needed assistance. It’s a unique atmosphere. It can be difficult to start your own research career, so I am excited about being here because of the friendly, helpful atmosphere."

— Jane L DePrist
Please fill out both sections when making a gift or pledge.

**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):

We want to know what’s happening with you! Update us by mail at Attn: Publications, MSU, 3412 Engineering Bldg., East Lansing, MI 48824-1226; by e-mail at editor@egr.msu.edu; or by fax at 517.355.2288.

**GIFT INFORMATION**

☐ I/we wish to make a gift/pledge in the amount of $ _____________________

designated for:  _______________________________________________

My/our total gift will be paid as indicated:

☐ Check payable to “Michigan State University”

☐ Credit card charge to:  
  ☐ MasterCard  ☐ Visa  ☐ Discover  ☐ AmEx

CARD NUMBER  
EXP. DATE

NAME AS IT APPEARS ON CARD

SIGNATURE

☐ A pledge of the following duration (maximum 5 years):  
  _______________________________________________

Enclosed is my first payment of $ _____________________

Please send pledge reminders:  
  ☐ Annually  ☐ Quarterly  ☐ Semiannually beginning:  
  MONTH  YEAR

☐ This pledge replaces all other outstanding pledges.

☐ This is a joint gift with my spouse:  
  _______________________________

SPOUSE’S NAME

☐ I or  ☐ my spouse (check one) works for a matching gift company:

EMPLOYER(S)

Please return to: Engineering Development, MSU, 3536 Engineering Building, East Lansing, MI 48824-1226, or make your gift online at www.givingtomsu.edu.

**MSU Formula Racing Team**

The MSU Formula SAE team placed sixth overall in the 2012 FSAE-West competition. See story on page 6.

**2012 Mechanical Engineering Distinguished Alumni Award**

Susan Pacheco, 2012 Mechanical Engineering Distinguished Alumni Award winner, with her family. See story on page 3.