

CONNECTIONS

DEPARTMENT OF CIVIL & ENVIRONMENTAL ENGINEERING

Advanced Computer Simulations Aid Understanding of Groundwater Systems

Dramatic new developments in computer and information technology are revolutionizing science discovery and engineering innovation, making it possible to see the unseen and understand the invisible. That's clearly evident in the Laboratory of Excellence for Realtime Computing and Multiscale Modeling at the Engineering Research Complex. Entering the lab, you are surrounded by large screen monitors, displays, and a 13-foot by 6-foot high-resolution visualization wall. Shu-Guang Li, professor of civil and environmental engineering and director of the lab, is investigating new ways to model flow and contaminant transport in complex groundwater systems. "The focus is on understanding the complexity and tackling the many fundamental bottlenecks in large-scale simulation and data assimilation," says Li.

The lab is equipped with state-of-the-art modeling hardware, software, databases, communication, and visualization capabilities. "These new capabilities allow, for the first time, real-time groundwater modeling and visualization," says Li, who enjoys showing visitors exactly what he means. Using the visualization wall, Li demonstrates how quickly one can point and click to predict and visualize groundwater flow virtually anywhere in Michigan's glacial aquifer. "We can also zoom into a particular area and create a cascade of nested models, taking advantage of Michigan's high-resolution statewide environmental databases," says Li.

Under the sponsorship of the National Science Foundation (NSF) and the Michigan Department of Environmental Quality (MDEQ), Li and his research team have recently developed a new computing paradigm, intelligent "hierarchical multiscale" modeling methods, and a GIS-based Interactive Ground Water (IGW) software environment for simulating and visualizing Michigan's groundwater systems. The software is live-linked to Michigan's streams, lakes, wetlands, wells, geology, watersheds, contamination sites, and hundreds of other GIS data layers. "We are moving from a 'data-poor' paradigm to an increasingly



The Laboratory of Excellence for Realtime Computing and Multiscale Modeling is a state-of-the-art facility that will aid in investigating new ways to understand complex groundwater systems across multiple scales.

'data-rich' paradigm thanks to today's information technologies and MDEQ's recent massive statewide data integration efforts," says Li. The system has significantly impacted Michigan's ability to manage its water resources and, in some cases, drastically reduced the costs of management investigations in Michigan. Both Elgar Brown, chief of Drinking Water and Environmental Health for MDEQ, and Scott Ross, chief of the state's Source Water Protection Unit, call this a "break-through-the-barriers" kind of research leading to a "technological leap forward" in the state's ability to protect its groundwater resources.

Not only does this technology have practical applications for real-world situations, it is being used by students, and they are excited about the opportunities for hands-on projects and discovery learning. For a CEE groundwater modeling course, students get "live" experiences in managing, planning, and researching water problems. "They can do hypothesis testing based on real data, and solve complex problems interactively in real time," says Li.

The classroom dynamics are also different with the software, according to Li, because students are engaged and energized. "They

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from the Chair

RONALD HARICHANDRAN

These are exciting times for the Department of Civil and Environmental Engineering (CEE). At MSU, student demand for civil engineering (CE) is at its highest point over the last 10 years, and the number of freshmen (including Honors College students) declaring CE as their intended major is also high. There is full employment for CE graduates, although more are leaving Michigan for neighboring states than in the past. CEE is at the center of some of the most pressing problems facing society, including providing access to clean water, and restoring and improving the nation's infrastructure. These are two of the 14 grand challenges for engineering in the 21st century unveiled by the National Academy of Engineering in February. These

pressing social issues, and a sense of job security due to minimal outsourcing within the profession, appear to be the driving factors attracting students to CE nationwide.

In order to develop solutions to the complex problems facing modern society, civil engineers must be broadly trained and be familiar with emerging technologies, as well as professional practice issues that will allow them to protect public safety, health, and welfare. Recognizing this need, in February the American Society of Civil Engineers (ASCE) published the second edition of the Civil Engineering Body of Knowledge for the 21st Century that identifies 24 outcomes to be achieved by civil engineers prior to licensure. Much of this achievement must take place during the formal bachelor's and master's education provided by universities. I was privileged to serve on the ASCE committee that developed the recommendations, and our department is actively revising its curriculum to be in alignment with the recommendations.

On the research front, our department is actively engaged in developing solutions to

many societal problems. Our environmental engineering and hydrology faculty are developing: advanced membrane filtration systems for delivering clean water; rapid techniques to detect contaminants in water; methods to treat emerging pathogens and pharmaceutical products in water; and advanced techniques to model contaminant transport in ground and surface waters. Our civil engineering faculty are developing: structural systems and design methods to build infrastructure that can withstand fire and earthquakes; long-lasting pavements that can withstand heavy trucks and severe environments; and improved materials and methods to rehabilitate our crumbling infrastructure.

More and more alumni, friends, and industry are supporting the department's missions through gifts for scholarships/fellowships, student awards, faculty positions, and laboratory enhancements. I thank all of you who have provided support and will be delighted to discuss possibilities with those who are thinking about it. 🌱

Advanced Computer Simulations (continued from page 1)

talk, they ask high-level questions, and they think more critically," says Li, who teaches the course using a decentralized, project-based instructional model. "It minimizes the gap between the classroom and the real world." An earlier educational version of the IGW software won the prestigious 2002 Premier Award. About 50 other universities worldwide are using the software developed by Li's team to enhance student learning.

Over the years, the CEE department has been at the forefront of hydrologic and environmental modeling research, especially in stochastic modeling, GIS-based modeling, hydrodynamic modeling, and reactive transport modeling. Now the department and Li's lab are poised to go to the next level.

MSU and MDEQ Sign Water Resource Partnership

MSU recently signed a formal Water Resource Partnership with MDEQ through a joint funding agreement (JFA). The JFA aims at capitalizing on Li's research and related research conducted at MSU's Institute of Water Research (IWR). MDEQ is supplying \$1 million in funding, while the university is contributing \$500,000. The JFA will be used to develop the next generation of IGW software tools and other GIS-enabled mapping, modeling, and visualization technologies for groundwater research, outreach, and science-based water resources management.

"Our long-term vision is to establish a statewide cyberinfrastructure or a living data repository and cyber-enabled discovery

environment for integrated hydrological research and education and to create a new paradigm for cross-boundary collaboration between universities, government agencies, and industries," says Li. This will include cyber-enabled data mining, analyses, mapping, and visualization, as well as integrated flow and transport modeling in surface water, groundwater, unsaturated soils, and on the land surfaces.

The plan is to bring together hydrologists, hydrogeologists, modelers, numerical analysts, statisticians, mathematicians, IT and GIS experts, and computer scientists from across the campus. "Collaboration is critical," says Li. The new research agenda will expand the collaborative relationship between MSU and MDEQ and will take advantage of the

Advanced Computer Simulations (continued from page 2)

significant strength MSU has in different colleges and departments in hydrologic and environmental modeling research.

NSF Initiative on Cyber-Enabled Discovery

In the next 5 years, NSF will spend \$750 million on a major new initiative for cyber-

enabled discovery and innovation with a goal of substantially enhancing the ability to understand complex systems. The NSF program emphasizes synergistic data integration, diverse partnerships, and especially new computational thinking to process massive

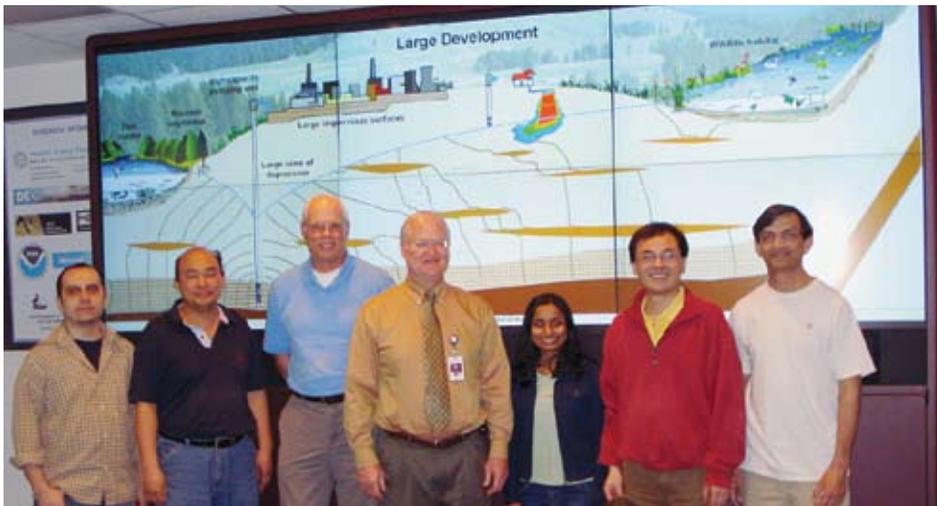
datasets and transform data into knowledge.

These are broad and ambitious goals, but they are within reach, according to Li, because Michigan already has a statewide infrastructure for data integration and multiscale data mining, statistical analysis, modeling, and visualization. “Our research matches well with NSF’s strategic direction in the 21st century,” says Li.

“There will be lots of competition in this area for funding, but we are uniquely positioned. Few have gone as far as we have in terms of both data integration and intelligent data mining and multiscale modeling on a statewide scale,” says Li. He hopes that the new research agenda will lead to significant future funding and possibly a center for cyber-enabled discovery and innovation in hydrological science and engineering at MSU.

“The proposed cyberinfrastructure, once completed, will substantially reduce the cost of managing Michigan’s water resources, yield major payback for the university, and significantly increase MSU’s research productivity,” says Li. 🌱

– Jane L. DePriest



CEE faculty and researchers recently discussed the groundwater project with representatives from the Michigan Department of Environmental Quality (MDEQ). From left: Mehmet Oztan, CEE research assistant; Huasheng Liao, CEE visiting professor; Richard Mandle, manager, Groundwater Modeling Program with MDEQ; Scott Ross, chief, Source Water Protection Unit with MDEQ; Dipa Dey, CEE research assistant; Shu-Guang Li, CEE professor; and Hassan Abbas, CEE research assistant.

A Team Effort

To accomplish the ambitious research agenda for a cyberinfrastructure in hydrological sciences and engineering, a wide range of expertise is needed. Some of the people who will be involved and their areas of expertise are:

- **Jon Bartholic**, professor of crop and soil sciences and director of MSU’s Institute of Water Research – information systems for water quality and quantity planning
- **David Hyndman**, associate professor of geological sciences in MSU’s College of Natural Science – hydrogeology and geophysical data assimilation
- **Milind Khire**, associate professor of CEE – unsaturated flow modeling
- **Huasheng Liao**, CEE visiting research associate – computational fluid dynamics, parallel computing, and numerical methods
- **David Lusch**, senior research specialist with MSU’s Remote Sensing and Geographic Information Services (GIS) Research and Outreach Services – GIS expertise
- **Richard Mandle**, manager of MDEQ’s groundwater modeling program – applied groundwater modeling
- **Phanikumar Mantha**, associate professor of CEE – hydrodynamic and reactive transport modeling
- **Mark Meerschaert**, professor and chairperson of the department of statistics and probability in MSU’s College of Natural Science – statistical hydrology
- **Jianguo Qi**, professor of geography and director of MSU’s Center for Global Change & Earth Observations – remote sensing and GIS
- **Howard Reeves**, adjunct professor of CEE and senior research scientist of the U. S. Geological Survey, Michigan District – groundwater hydrology and modeling
- **Roger Wallace**, associate professor of CEE – groundwater and surface water hydrology
- **Yimin Xiao**, professor of statistics and probability in MSU’s College of Natural Science – statistical modeling and multiscale random fields
- **Adrian Zhou**, research specialist with CEE – software engineer and information technology expert
- **Zhengfang Zhou**, professor of mathematics in MSU’s College of Natural Science – partial differential equations and multiscale methods

Faculty and Staff Connections

2008 Withrow Teaching Excellence Award



Richard W. Lyles, professor of civil and environmental engineering, received the 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 the recipient is based primarily on nominations from students.

Lyles is a passionate, creative, interactive, and effective teacher. Known for his Socratic teaching style, he engenders a high level of class participation. Students learn through debate, questioning assumptions, and thinking outside the box. He led the development of the freshman Introduction to Civil Engineering class, which he has co-taught since its inception. Student nominations of Lyles for this award include comments such as: "Encourages debate and questioning of standards, assumptions, etc."; "Focuses on learning concepts and applying them to projects"; "Great knowledge and delivery"; "Fun learning environment"; "Makes us work extremely hard, but he is funny and knows the material"; "His class is one of the best formats I have been a part of"; and "Available to students."

Kodur Named Fellow of American Concrete Institute



Venkatesh Kodur, professor of civil and environmental engineering, was elected a fellow of the American Concrete Institute in recognition of his contributions to the work of ACI. His

election was formally announced at a March 30 awards ceremony at the Hyatt Regency Century Plaza in Los Angeles.

Kodur's research focuses on the effects of fire on materials and structural systems like beams, columns, and slabs. Kodur was part of the FEMA/ASCE Building Performance Assessment Team that investigated the collapse of the World Trade Center. According to Kodur, many of the new materials used today to build bridges and other structures are less fire resistant than some of the conventional materials used fifty years ago. "The only way to move our work forward is through new research and development in the area of structural and materials fire safety," says Kodur.

Li Named Fellow of ASCE and GSA



Shu-Guang Li, professor of civil and environmental engineering, was recently elected a fellow of both the American Society of Civil Engineers (ASCE) and the Geological Society

of America (GSA) in recognition of his significant contributions to the field of groundwater modeling. His research on non-stationary stochastic modeling and hierarchical multi-scale modeling has advanced the ability to simulate complex groundwater systems. His research in GIS-based groundwater modeling and innovative use of Michigan's statewide groundwater databases has led to a "technological leap forward" in the state's ability to protect its groundwater resources, according to both Elgar Brown, chief of Drinking Water and Environmental Health for the Michigan Department of Environmental Quality and Scott Ross, chief of the state's Source Water Protection Unit.

Li has published extensively in hydrology, especially in groundwater modeling and stochastic groundwater modeling. His research has been continuously funded by the National Science

Foundation (NSF) during the past decade. He is an associate editor for the ASCE *Journal of Hydrologic Engineering*, the National Groundwater Association's *Journal of Ground Water*, and the *Journal of Stochastic Environmental Research and Risk Assessment*. He received the 2002 Premier Award from the NSF's National Engineering Education Delivery System Organization.

21st Century Jobs Fund Award



Syed Hashsham, Edwin Willits associate professor of civil and environmental engineering, recently had a project funded through Michigan's 21st Century Jobs Fund. His project, entitled

"A PCR-Chip for Air and Water Safety," aims to develop a hand-held platform for highly parallel and sensitive analysis of genetic signatures. It was one of 11 MSU projects funded through the program.

The project was awarded \$966,608 and is funded for three years. James Tiedje, MSU University Distinguished Professor in crop and soil sciences, and Erdogan Gulari, professor of chemical engineering at the University of Michigan, are co-PIs on the project.

Partnerships with Chinese Universities

Ronald Harichandran, chair of the Department of Civil and Environmental Engineering, was part of an MSU delegation that visited Zhejiang University, an amalgamation of four former individual universities in Hangzhou, China, in the fall of 2006. Zhejiang University is ranked third amongst China's prestigious research universities. Subsequently, the MSU College of Engineering formalized a reciprocal agreement with Zhejiang University (ZJU) for master's degree programs in civil and environmental engineering, as well as chemical engineering, computer science, electrical engineering, mechanical engineering,

materials science engineering, and public policy. There are specific qualifications that ZJU students must meet in order to participate in the program. In the fall of 2008, about five ZJU students are expected to enroll in the department's environmental engineering graduate program, and about five students will be enrolled in other environmental science-related programs at MSU.

In January 2008, several MSU faculty members with expertise in environmental science, engineering, and public policy traveled to Zhejiang University to conduct a joint workshop with Chinese faculty to explore collaborative research opportunities. Additional efforts will be undertaken this year to strengthen the research partnership.

In November 2007, **Harichandran** and **Larry Galehouse**, director of the National Center for Pavement Preservation, visited the South China University of Technology (SCUT) in Guangzhou, China, to establish a partnership with the College of Traffic and Communications in the area of road transportation systems engineering.

SCUT was established in 1952 through the amalgamation of the technical faculties of 12 universities in central and southern China, and is presently one of the largest technical universities in southern China. The College of Traffic and Communications at SCUT has particular strength in road transportation systems engineering, encompassing bridge, pavement, and traffic engineering that are well matched with the strengths of MSU's CEE department.

The first activity in this partnership will be an international workshop to be held in Guangzhou and organized jointly by SCUT and MSU. It is likely to be attended by Americans representing the U.S. pavement preservation industry, Chinese representing their paving industry, and representatives of federal agencies in the U.S. and China. As part of the agreement, students from SCUT are encouraged to apply for graduate studies in CEE at MSU.

Alumni Connections

Nazrullah Abeer (PhD '92) is at the Pakistan Army's engineering headquarters in Rawalpindi. He is working on a landslide study in the earthquake-hit area of Azad Kashmir, the raising of the Mangla Dam, and a flood channel project at Rawalpindi. He also teaches at the National University of Science and Technology.

Yakup Darama (MS '85, PhD '91) is deputy director at the State Hydraulic Works in Ankara, Turkey. He also is an associate professor in the Civil Engineering Department of the Middle East Technical University where he teaches hydraulics and hydrology courses.



Daniel Johns

Daniel Johns (BS '83) was recently appointed managing principal for Walker Parking Consultants' Los Angeles office. Walker Parking Consultants is a leader in parking consulting nationwide. Johns will play a key role in Walker's expanding southern California operations.

Atef Tili (BS '87, PhD '93) is the GM Overseas Distribution Corp. regional manager for the UAE, Qatar, and Oman.

Ron Harichandran met Atef and his wife **Boutheina Kzadri Tili** (BS '87, MS '89, PhD '94 all in ECE) when he was in Dubai in

February. Atef claims that marketing for GM is more lucrative than being a civil engineer! Boutheina, who is a die-hard Spartan, will soon be the acting program director of the computer engineering program at MSU-Dubai. 🌸



Atef Tili and Boutheina Kzadri Tili

Endowments, Donations, and Gifts



Donald and Nancy A. Hodgkiss recently established an endowed chair in civil engineering through a charitable bequest of retirement plan assets. Don and Nancy are both MSU graduates. Don received his bachelor's degree in civil engineering in 1949, and Nancy received her bachelor's degree in education in 1952. Their gift, which will be known as the Donald and Nancy A. Hodgkiss Endowed Chair in Civil Engineering, will support a faculty position that focuses on civil infrastructure with emphasis on road and airport design, construction, and materials.

Fritz J. Klingler (BS '87, MS '88), representing the employees of **NTH Consultants, Ltd.**, recently created the **Chi Epsilon – NTH Consultants Scholarship/Fellowship**, an endowed fellowship/scholarship to make awards to student members of the Chi Epsilon civil engineering honor society. Students are invited to join Chi Epsilon during their junior or senior year based on scholarship and individual merit. Chi Epsilon members who intend to pursue an MS degree in civil engineering or environmental engineering at MSU will be given additional consideration. The chair of the Department of Civil and Environmental Engineering determines the number and amount of awards and selects recipients in accordance with MSU procedures. Klingler is vice president of NTH Consultants, Ltd., an infrastructure and environmental engineering firm based in Detroit, Michigan. Klingler is also the current vice chair of the professional advisory board for CEE.

The Walfred E. and Gradie T. Nordberg Endowed Scholarship/Fellowship established through a bequest from the personal trust of **James E. Nordberg** (BS '70) is now in effect. This scholarship provides financial assistance to undergraduate and graduate students within the CEE department. Nordberg established this scholarship in honor of his late father, who graduated from the MSU civil engineering department in 1924, and in honor of his late mother. 🌸

Student Connections

2008 National Awards



Laura Burke, CE senior, is the recipient of the 2008 Samuel Fletcher Tapman ASCE Student Chapter Scholarship. This national honor was awarded to Burke because

of her outstanding scholarship, volunteer activities, and participation in the MSU ASCE Student Chapter. Burke has been on the Dean's Honor List for three years and is ranked in the top 10 percent of her civil engineering class. She also volunteers for Big Brothers Big Sisters, Habitat for Humanity, and a local humane society.

Abrar Siddiqui, a transportation engineering PhD student, received an Eisenhower Graduate Fellowship from the Federal Highway Administration. Abrar was selected for this prestigious award by a national review panel. **Richard Lyles**, professor, is his faculty adviser.

The MSU chapter received the third place Student Chapter Award from the national Air and Waste Management Association (A&WMA). **Rebecca Hullman** accepted the award at the A&WM annual meeting in Portland, Oregon, in June 2008.

2008 Regional Awards

Elodie Pasco, an environmental engineering PhD student, was awarded the John P. Hennessey Scholarship by the Michigan Water Environmental Association. **Volodymyr Tarabara**, assistant professor, is her faculty adviser.

Julian Taurozzi, an environmental engineering PhD student, was awarded first place in the "Fresh Ideas" Poster Competition held by the American Water Works Association. Volodymyr Tarabara, assistant professor, is his faculty adviser.

2008 College and Department Awards

The graduate student award recipients listed below were recognized for their research productivity as reflected by their publications in journal and conference proceedings. Undergraduate student award recipients were recognized for their GPA and service contributions.

Robert Stedtfeld, a PhD student in environmental engineering, was selected as the first-place winner of the 2008 Fitch Beach Outstanding Graduate Research Award. **Syed Hashsham**, Edwin Willits associate professor of civil and environmental engineering, is his faculty adviser. The awardees were determined by the Engineering Research and Graduate Studies Committee. Stedtfeld's research includes the development of a hand-held gene analyzer and polymerase chain reaction-based microfluidic chip for rapid and quantitative detection of DNA biomarkers targeting human pathogens.



From left: Robert Stedtfeld receives the Fitch Beach Award with his wife, Tiffany, their son, Steven, and Syed Hashsham looking on.

Outstanding PhD Student Awards: **Monther Dwaikat** and **Nizar Lajnef**, civil engineering students; faculty advisers, Venkatesh Kodur and Niell Elvin, respectively. **Dieter Tourlousse**, environmental engineering; faculty adviser, Syed Hashsham.

Outstanding MS Student Awards: **Rustin Fike**, civil engineering; faculty adviser, Venkatesh Kodur. **Vidya Srinivasan**; faculty adviser, Syed Hashsham.

Graduate Fellowships: Farhan Ahmad, Tewodros Ghebrab, Mahmoodul Haq, Golrokh Nossoni Chaopen Shen, Abrar Siddiqui

Undergraduate Academic Achievement Awards for Civil Engineering: Lindsey Diggelmann, James Ensign, Bradley Fase, Timothy Francisco, Brian Goldberg, Brent Kanner, Jason Provines, and Angela Rhone.



Society of Women Engineers Award: **Angela Rhone** received an outstanding senior award, which is given to one senior from each major. The CEE Award is sponsored by

Marathon Oil Company

Service Awards: Melissa Thompson and Amanda Westmoreland.

2007-2008 Ambassadors: Nnaemeka Ezekwemba, and Adarsh Menon.

Study Abroad in Russia

A successful study abroad experience was provided in Volgograd, Russia, again this summer for 23 engineering students. Most of the students were CE's. Courses in calculus, differential equations, dynamics, structural analysis, steel design, highway design, and the history of Russian architecture and arts were offered. This year a significant change was introduced by transferring most of the responsibility for the program to the Volgograd State University of Architecture and Civil Engineering (VSUACE) under the direction of **Vera Galishnikova** who received her PhD from the CEE department in 2004. Students registered for the courses at VSUACE and credits will transfer to MSU. Courses were taught by VSUACE and MSU instructors. 🌸



MSU's steel bridge team finished third overall in the American Society of Civil Engineers regional competition, which was hosted by MSU on April 5, 2008. Team members (left to right), standing: Andrew Ziegler, Matt McCloskey, Josh Fink, Christin Pageau, Marcus Bush (team captain), Andy Gronowski (team captain), Chris Ciesa (team captain), Therese Pasichnyk, Bill Lansing; kneeling: Tim Francisco (team captain), A.J. Cardinale, Brad Crandall, Nick Bassett.



MSU's concrete canoe team finished third overall in the American Society of Civil Engineers regional competition, hosted by MSU April 5-6, 2008. The sprint and distance races were held at nearby Hawk Island County Park. The team placed first in the final product category, and finished with third-place standings in technical presentation, technical paper, and the races. From left to right: George Stockman (Department of Computer Science and Engineering professor and associate chairperson), Chris Bowker, Rachel Cojnacki, Valerie Ingle, Mike Stall, Emeka Ezekwemba, Dan Williams, Brad Fase, Matt Czapiga, Rachel Lierman, Laura Burke, Wouter Brink, Brian Galietti, Neeraj Buch (team adviser).



The MSU steel bridge team assembles their bridge for the regional competition.



Laura Burke (left) and Rachel Cojnacki race to the finish in MSU's concrete canoe.

CEE Participates in College-Wide Design Days

For the first time CEE joined with other departments in the College of Engineering in the spring 2008 Design Days, held April 24 and 25 at the MSU Student Union. "This course prepares students for the workplace by providing a team-based, transitional capstone experience with many challenges that civil engineers face in the design and consulting business," says Roger Wallace, associate professor of civil and environmental engineering, and one of the instructors for CE 495, the CEE senior capstone course.

For the spring 2008 course, six teams of students developed preliminary designs for MSU's new Farm Lane entrance to the main campus. The entrance, running from Mt. Hope Road to near Trowbridge Road had to meet government design requirements, protect Baker Woodlot, minimize the impact on the

wetlands that lie on either side of Farm Lane, and provide an esthetically pleasing entrance to campus. The student teams also had to take into account the total cost of the project. Each student wrote a technical report covering his/her area of responsibility, and each team wrote a comprehensive final non-technical report describing the team's approach to the overall project. The teams' presentations at Design Days were directed to a nontechnical audience and were judged by the faculty and a panel of practicing engineers with experience in this type of design.

The winning team called themselves Vision Consultants. Team members included **Matthew Czapiga, Brandon Elegert, Megan Nickell, Ana Petrovic, Patrick Post, Jenna Thelen, and Joel Tichenor**. The team received \$600, and each team member received a plaque.

The sponsors of the CEE competition were Fishbeck, Thompson, Carr & Huber, Inc. (FTC&H) and Barr Engineering Co. FTC&H is a professional civil engineering, environmental consulting, architectural/engineering, and construction management company with clients in Michigan and throughout the nation. Barr Engineering is a professional engineering company providing engineering, environmental, and information technology services to clients across the nation and around the world. The CEE faculty and students gratefully acknowledge the generous contributions of these companies. Special thanks to John LeFevre with FTC&H and Tim Greenleaf with Barr Engineering.

In addition, 14 professionals served as evaluators for the projects. CEE sincerely thanks them for their time and appreciates their help with these student projects. ✿

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CHAIRPERSON
Ronald Harichandran

TEL (517) 355-5107
E-MAIL cee@egr.msu.edu
WEB www.egr.msu.edu

EDITOR **Jane L. DePriest**

PUBLICATIONS DIRECTOR
Laura Luptowski Seeley

PHOTOGRAPHERS
Harley J. Seeley
Patrick T. Power

MSU is an affirmative-action, equal-opportunity employer.

College Launches "Women in Engineering" Program

Nationally, 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 new Women in Engineering (WIE) program. "Women are underrepresented in the field of engineering and the numbers are dropping," says Judy Cordes, coordinator of the new 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 lousy 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. WIE plans to reach pre-college students, women who have been admitted to the college, and women currently enrolled. "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>.

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