

ME Bulletin

News for
Mechanical
Engineering Majors

Vol. 44, No. 2 ME Advising Office • 2560 EB • 355-3338 Spring, 2007

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in Germany and Australia! 5
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PHOTO BY HARLEY SEELEY

MSU President Lou Anna Simon presents ME Academic Specialist Tim Hinds with his Distinguished Academic Staff Award. Read more about Tim on page 3!

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Department News



HARLEY SEELY

Jeffrey F. Rhoads, ME graduate student, received an Excellence-in-Teaching Citation at the Academic Awards Convocation on February 8. The citation was awarded to only six MSU graduate teaching assistants who have distinguished themselves by the care they have given and the skill they have shown in meeting their classroom responsibilities. Jeff is pursuing a Ph.D. in mechanical engineering.



JENNIFER HODGES

Amy Radford-Popp, who has served as the ME Freshman/Sophomore Advisor for three years, received her Ph.D. in Higher Adult and Lifelong Education in December. She has accepted a new position as the Assistant Director for Staff Selection and Development in the Department of Residence Life in Wilson Hall.

Dr. Brian Thompson recently traveled to Tanzania to arrange for a new study abroad experience for mechanical engineering students. He met with university and government officials to develop an experience based on the implementation of alternative energy technologies in East Africa.

Dr. Craig W. Somerton traveled to Tanzania with five current students and four alumni as an alternative spring break associated with an ME 481 project. The team spent two weeks in southern Tanzania building and testing several prototype solar ovens they had designed in an effort to create a solar oven industry.

A Dedication Ceremony for the new Energy and Automotive Research Laboratory (EARL) is planned for August. This 29,000 foot building, located on the east side of campus next to the Engineering Research Complex, includes labs for powertrain and energy research, as well as two new engine test cells with a shared control room, plus faculty and graduate student offices and conference rooms.

ME Bulletin

The *ME Bulletin* is published once each semester for sophomores, juniors, seniors, faculty and staff of the Department of Mechanical Engineering. It is also published as a PDF file at the following location:

<http://www.egr.msu.edu/me/undergrad/newsletter>

Photos were taken by Craig Gunn unless noted otherwise.

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Faculty - Staff Design Team Wins an Award!

By Professor Brian Thompson

PHOTO PROVIDED BY DR. SOMERTON



Front: Dr. Haddow. Back: Jill Bielawski, Dr. Somerton, Roy Bailiff, Dr. Thompson. Not present: Drs. Hubbard, Kwon, Mukherjee, and Reid-Bush.

Each year the Michigan Community Service Commission and the Michigan Campus Compact together recognize outstanding contributions to the community-service-learning activities of students on college campuses statewide, and one award is assigned to each university in the state of Michigan. For the first time in the history of our department we struck gold!

The recipients of the 2006-2007 Michigan Campus Compact Faculty-Staff Community Service Award are the Faculty Director, and the Faculty and Staff Advisors of the mechanical engineering department's Senior Design Humanitarian Projects: **Roy Bailiff, Jill Bielawski, and professors Haddow, Hubbard, Kwon, Mukherjee, Reid-Bush, Somerton and Thompson.**

In her letter of nomination, MSU's **President Lou Anna K. Simon** wrote, "Since 1998, dedicated faculty and

staff committed to the *Mechanical Engineering Humanitarian Projects* have empowered senior mechanical engineering students to maximize and exhibit their design and manufacturing skills in contribution to the public good. Their focus on utilizing their talents and expertise to create adaptive mobility and other specialized devices to improve the daily lives of those challenged in navigating or interacting in the community, clearly has addressed the mission of Michigan State University as the pioneer land-grant university. Their work embodies two strategic imperatives of Boldness by Design, MSU's vision for the articulation of what it means to be a land-grant university in the twenty-first century: to enhance the student experience and to enrich community, economic, and family life."

These individuals go beyond what is required of faculty and staff involved in the corporate-sponsored design projects. They most willingly give of their time and talents to support students who wish to contribute to the non-profit community and their clients. They are truly deserving of this recognition from Michigan Campus Compact and Michigan State University."

Hubert H. Humphrey, 38th Vice-President of the United States wrote, "*The moral test of a society is how that society treats those who are at the dawn of life – the children; those who are in the twilight of life – the elderly; and those who are in the shadows of life – the sick, the needy, and the handicapped.*"

Tim Hinds Receives Distinguished Academic Staff Award!

Timothy J. Hinds, ME Academic Specialist, was presented with a Distinguished Academic Staff Award at the Academic Awards Convocation on February 8. The National Academy of Engineering has identified the lack of industrial experience in those who educate our engineers as one of the critical deficiencies in the educators of tomorrow's engineers.

Hinds has made a point of incorporating his industry experience and perspective into the knowledgebase he brings to students, thus providing students with insight into the world of engineering. His dedication to educating students has truly transformed lives. His deep concern and respect for the future of students and the field of engineering is evident in his teaching and research activities. Innovation, creativity, and excellence characterize Hinds' contributions to mechanical engineering.

He received one of only three prestigious 2004 ASME Innovation in Mechanical Engineering Curriculum Innovation honorable mention awards for his contributions to the department's INTenD Program and his role in the education of our students in the global practice of mechanical engineering.

Academic Advising

- 1) **ME Freshmen & Most Sophomores** are advised by the College of Engineering Undergraduate Studies Office. To schedule an appointment, call 355-6616 x 1, or go to 1415 EB.
- 2) **ME Juniors-to-Be with a 3.0+ GPA & All ME Juniors and Seniors** are advised by **Gaile Griffore** this semester. For an appointment, call 355-3338, or go to 2560 EB. (*A "junior-to-be" is a sophomore who will be a junior at the end of Spring Semester 2007.*)

Associate Chair's Corner

by Professor Craig W. Somerton



You will be graduating from a mechanical engineering program that is accredited by the Engineering Accreditation Commission of ABET. Is this important? What is accreditation about?

Accreditation certifies that an educational program satisfies a set of standards. As ABET says, "it is simply assurance that a program or institution meets established quality standards." ABET accreditation is to engineering programs as ISO certification is to manufacturing companies. Graduating from an accredited program certifies that you have the basic skills to succeed in the engineering profession. These basic skills are the outcomes of the program and are stated by ABET to be:

- (a) an ability to apply knowledge of mathematics, science, and engineering
- (b) an ability to design and conduct experiments, as well as to analyze and interpret data
- (c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
- (d) an ability to function on multi-disciplinary teams
- (e) an ability to identify, formulate, and solve engineering problems
- (f) an understanding of professional and ethical responsibility
- (g) an ability to communicate effectively
- (h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
- (i) a recognition of the need for, and an ability to engage in life-long learning
- (j) a knowledge of contemporary issues
- (k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

To maintain accreditation a program must demonstrate that its graduates are achieving these outcomes. Our program has developed and implanted an assessment process to provide the required evidence. For each outcome three pieces of evidence have been identified and a metric has been set for minimum competency. As an example, consider outcome b, an ability to design and conduct experiments, as well as to analyze and interpret data. The department's assessment process identifies the following three pieces of evidence with their corresponding metric goal.

- i. Eighty percent of the students shall exceed the minimum competency level on their project in ME 332 lab.
- ii. Ninety percent of the students shall exceed the minimum competency level on their error experiment in ME 412.
- iii. Ninety-five percent of the students shall exceed the minimum competency level on their radiation experiment in ME 412.

One of my duties as Associate Chair for the Undergraduate Program is to collect and process this data. This data is then used to identify problems in the curriculum or opportunities for improvement. In our department, we have taken the accreditation requirements as a vehicle to implement a continuous quality improvement (CQI) process for our program.

A program is reaccredited every six years. In preparation for reaccreditation, a program must prepare a self study that documents its assessment process and its program. The department must also host a visiting team that reviews the program on site. The accreditation team is made up of individuals from universities and industry. I serve on these accreditation teams, and though it is a lot of work, it is also a great learning experience.

So, in answer the first question asked in this article, YES it is important to graduate from an accredited program. In most states only graduates from accredited programs can become registered as professional engineers. Companies know that you, as a graduate from an accredited program, have the basic set of skills to be a successful engineer. Of course it is still up to you to make that success happen. —Dr.S.

Special Overrides

1) **Transfer Prerequisite Override Requests:** If you plan to take the prerequisite for an ME course at another institution this summer, you must complete a form that can be found at: <http://www.egr.msu.edu/me/undergrad/forms> [Click on TRANSFER OVERRIDE FORM] You will receive a prerequisite override so that you can enroll in the next course in the sequence.

2) **ME 410 and 412** may be taken concurrently during Summer Semester *only*, but you will need a prerequisite override for ME 412. First enroll in ME 410. Then, complete the ME *Override Form* on the ME undergraduate website. Select "Other" for Reason for Request and write that you are taking ME 412 concurrently with ME 410 this summer.

3) **ISS 3xx Overrides:** Transfer students who transferred their first ISS course need to obtain a prerequisite override before enrolling in ISS 3xx. You can receive a prerequisite override for ISS 3xx by calling 517-355-9733 on Monday-Friday at 8:30 a.m.-4:30 p.m. (or you can go to 302 Berkey Hall during the same hours).

➤ *Be prepared to tell them the course number and section you are requesting.*

The **NEW** ME Program at the RWTH-Aachen

by Professor Foss

Check out the NEW mechanical engineering program at the premier European university: The RWTH-Aachen. Significant changes to the program are intended to expand the opportunity for our students to have a substantive overseas study experience for Summer 2008 and beyond.

This exchange program, available in the spring since 1983, will now be offered in the summer: mid-May through the end of July. The summer semester allows for six credits as a full-time load (this is important for the receipt of scholarship and financial aid support), and the *new* program will offer a nine-credit experience: ME 490 (5 credits) and GRM 102 (or higher) at 4 credits. The strategy of a four-day week with travel possibilities from Friday through Sunday will still be used. Tours of cultural and industrial sites will continue as part of the program.

The 5-credit independent study will continue to involve research work in one of the RWTH institutes. Our students will join a research team and carry out their research under the guidance of the team leader.

The significant benefits of this experience in Germany are attested to by the former students who report that it is a major focus of their job interviews. One participant wrote: "I am now more culturally wise and my experience with my research will help a lot when I'm job searching."

Students who have completed their junior year or who are in their last year of study are welcome to apply by contacting **J.F. Foss** <foss@egr.msu.edu>. You are also encouraged to discuss your academic course schedule, as it relates to this program, with **Gaile Griffore**.

Study Abroad in Australia This Summer!

by Judy Cordes

Australia, the Land Down Under. Home to great beaches, a rain forest, the famous opera house, koala bears and kangaroos, and the Great Barrier Reef. If you are interested in visiting this amazing country, read on!

Mechanical engineering has just joined a summer Study Abroad program sponsored by the University of New South Wales (UNSW) called Energy Tomorrow: An Engineering and Management Perspective. ME students who have completed ME 332 and carry at least a 3.0 GPA are eligible to participate. Twenty-five students from across the United States join with faculty from UNSW and travel around Australia studying current and future options for energy.

All students will study the same course and topics, which includes lectures, field trips, a camping trip to the Kakadu Rain Forest, and group presentations. When finished, students will receive eight transfer credits. Please note: 3 of these credits will be used as Senior **Non-Design** Electives, and the other 5 will be elective credits.

This summer the program will run from June 17 to July 30, and the cost is **\$6300AUS (about \$4750US)**. Don't let the price scare you – as the program fee includes tuition; all accommodation; all meals in Kakadu National Park; breakfasts and lunches in Sydney; breakfast in Cairns; all excursion travel and park entry fees; orientation programs; airport shuttle services and a UNSW student card (allowing access to all UNSW facilities).

There is very limited space for this summer, and the deadline is fast approaching. So if you are interested in Energy and would like to visit Australia, please contact **Judy Cordes**, the program coordinator. You can set up a meeting with her by calling 355-6616 ext.1.

One Month in Lyon, France by Professor Bénard

The Department of Mechanical Engineering will be offering a study abroad program in Lyon, France for one month during the Summer of 2007 (June 7– July 4). Students will stay at ECAM (Ecole Catholique d'Arts et Métiers), a French engineering school, located in the old part of Lyon, for the entire month of June. Students will be housed on-campus in residence halls. The program is open to junior-level students. Students are required to enroll for a minimum of 3 credits and will begin work on a research project (independent study) guided by a mechanical engineering professor. They will also take a French language course "French Language and Culture for Foreigners." This is a unique opportunity to earn additional credits toward your engineering diploma as well as visit France economically. Students interested in this program should contact **Ms. Maggie Blair-Ramsey** (blairram@egr.msu.edu) or **Professor Andre Bénard** <benard@egr.msu.edu> for more information; the deadline for applying is March 15.

Russia Program

by Elena Y Selezneva

ME students have a great opportunity to study abroad in Russia during Summer 2007! This University-wide program offers classes from a variety of disciplines. Most relevant to ME majors are the fundamental engineering courses *CE 221 Statics, ME 201 Thermodynamics, ME 361 Dynamics, STT 351 Statistics for Engineers, MTH 234 Multivariable Calculus, and MTH 235 Differential Equations.*

Students also have multiple options to fulfill their IAH requirements. Two popular choices are *IAH 221(C) Russian Language and Culture* and *IAH 221(C) World War II – The Eastern Front*. This latter course is

Con'd on page 12

Enroll Now for Summer Semester!

The following courses are on the summer schedule and will be of particular interest to ME majors:

- **First Session:** CE 221; ME 361, 391, 410; 491/101; MSE 250, 426; STT 351.
- **Second Session:** ME 201, 222, 471; STT 351.
- **Full Session:** ME 332, 412, 451, 461 and 490.

You will also find several Integrative Studies and Bioscience courses, plus courses that can be used as Other Electives.

A number of extension courses, including ISS and IAH, will be offered in the Detroit, Flint, and Grand Rapids areas. STT 351 will be available as an extension course in Farmington Hills. In addition the following Integrative Studies Courses will be offered online:

IAH 211C and 241C
ISS 310 and 315

If you decide to take the prerequisite for an ME course at another institution this summer, please follow the Special Override instructions on page 4.

Scheduled enrollment for summer begins on March 12, and your enrollment appointment is posted in StuInfo.

➤ *Summer semester enrollments as of March 24 will be used by the ME department to determine whether there are enough students to offer each course.*

So, it is in your own best interest to enroll in your summer courses by March 24!

REMEMBER!
LOW ENROLLMENTS CAN MEAN CANCELLED COURSES!

Curriculum News

- **NEW Biomechanical Option:** The ME department has approved a new Biomechanical Option. It is similar to the College of Engineering's Biomedical Option, except that it requires students to take BS 111 (BS 110 is not a choice on the new option). Students may elect to complete either the College of Engineering's Biomedical (BME) Option or the new ME Biomechanical Option, *but not both*. A list of requirements for the new Biomechanical Option can be found on page 13.
- **ME 481–ME Design Projects:** You need to receive department approval before enrolling in ME 481. To obtain approval, complete and submit the *ME 481 Enrollment Approval Form* located in the Forms/Handouts link on the ME undergraduate website. Since ME 481 must be taken during your last semester (spring semester for August grads), it is in your own best interest to have an accurate long-term schedule on file in the ME Advising Office. If you do not have a long-term schedule on file, or if your old one needs to be updated, please call 517-355-3338 and schedule an appointment with Gaile.
- **ME 486–Int'l Networked Teams for Engr Design** has been CANCELED for Fall 2007, because the professor will be on sabbatical.
- **ME 489–Technical Communications** (2 cr.) will be offered Spring 2007. Instructor: **Craig Gunn**, ME Director of Communications. *Note: This course does NOT count as a Senior Elective. Also, students who have previously taken this course as ME 491 may not take ME 489.*
- **ME 491/101–Refrigeration** will be offered this Summer 2007. It will count as a NON-design intensive Senior Elective.
- **ME Honors Section:** ME 180H is available only to Honors College students until April 13. After that, students with a 3.5+ GPA may request and receive overrides for open seats.
- **ME 372–Machine Tool Lab** will be offered both fall and spring semesters. Instructor: **Roy Bailiff**. *Note: ME Manufacturing Option students receive priority for seats in this course.*
- **ME 285–Computer Aided Design Tools** will be offered fall semester. Prereq: ME 180. Instructor: **Bob Chalou**. This course may be used as an Other Elective.
- **Class Standing** information for ME juniors and seniors is available in the ME Advising Office. You will need to present your MSU I.D. card. ME sophomores can obtain this information in 1415 EB.
- **ME graduate courses:** If your GPA is 3.5 or higher, you may be able to take a graduate-level course and apply it to your Senior Electives. To obtain permission, complete a *Graduate Course Override* form, available in the ME Advising Office. This is a paper form.
- **Prerequisites:** The ME department expects all students, *including members of the Honors College*, to observe all course prerequisites. If you have a question, contact the ME Advising Office at 355-3338.
- **Schedule Conflicts:** The ME department will assist students with conflicts between required courses. *However, the department cannot overfill required courses to resolve conflicts with Senior Electives, Other Electives, Integrative Studies courses and employment schedules.*

Spring 2007 Dean's List

Congratulations to the following 168 mechanical engineering majors who made the Dean's List after Fall Semester with a semester GPA of 3.5 or higher. *This list was taken from the Registrar's official website <http://www.reg.msu.edu/ROInfo/GradHonor/DeansList.asp>.*

Muamer Abdurahmanovic, Christine Abele, Joaquin Affonso, Jacob Agans, Paul Allen, Saud Alrakhayes, Nicole Arnold, Muhamman Aslam, Timothy Aspinall, Michael Balck, Kyle Bateman, Justin Bauer, Matt Bauer, Logan Beam, Nicholas Beechnau, George Bibbs, Ryan Boak, Adam Brannan, Adam Brennan, Andrew Brown, Kenneth Buchanan, Matthew Burdick, Keith Bury, Melissa Carrier, Christopher Cater, Andrew Cawood, Louis Cervone, Meridith Cischke, Matthew Compher, Kylar Dailey, Joel Darin, Joshua Davis, Ricardo De Majo, Timothy Degraff, Trevor DeLand, Anthony Dellicolli, Kevin Derrick, Daniel Diebolt, Jared Dorvinen, Scott Dosson, Michael Douglass, Rachel Durren, Allen Eyler, Wesley Fan, Neil Ferguson, Eric Fournier, Lauren Franke, Lucas Fratta, Raymond Gallagher, Richard Gates, Nathan Geib, Andrew Gillett, Nurit Golenberg, Joao Goncalves, Nicholas Griffin, Stephen Griffith, Brandon Gulker, Jacob Haf, Patrick Hammer, Joshua Hanai, John Hauska, Harold Hill, Jeffrey Holley, Jeremy Horgan, Stephen Hukill, Thomas Hull, Michel Hundt, Daniel Isaac, Cipto Joegiono, Zachary Kaltz, Ryan Kelly, Justin Ketterer, Matthew Kimball, Chad Kleinow, Hani Kobty, Joseph Kondratek, Sergey Korobov, Thomas Kret, Andrew Kruk, Ashley Kulczycki, Jeffrey Laforge, Gerald Landry, Christopher Lange, Matthew Langenderfer, Samuel Leitkam, Allison Lewis, Adam Link, Benjamin Llewellyn, Michelle Marinich, Matthew Marriott, Erik Marshall, Michael Mauer, Pearse McCarthy, Matthew McCartney, Kevin McKay, Justin Meeder, Kevin Miller, Scott Miller, Mollie Montague, Sara Murawa, Nicholas Nwabueze, Luke O'Brien, Basak Oguz, Thomas Pabst, Nicholas Pash, Kunjan Patel, Kelly Peterson, Daniel Petlicki, Bethany Pickett, Keith Pigeon, Steven Pisarski, Michael Priebe, Martin Priess, Matthew Pung, Thomas Qualman, Michelle Raetz, Jill Randall, Christopher Rawsky, Joy Reichenbach, Derek Riparip, Matthew Rokosz, Brent Rowland, Trevor Ruckle, Amanda Ruhno, Matthew Ryerkerk, Daniel Schleh, Mackenzie Schmidt, Jared Scott, Phillip Scott, Shangyun Shi, Shaheen Shidfar, Jared Sickles, Matthew Siero, Aaron Smith, Brian Smith, Charles Spaniola, Jacob Sprague, Cody Squibb, Sean Steffer,

88 Seniors to Graduate in May and August!

Congratulations and best wishes to all ME graduates! On behalf of the faculty, I wish you the greatest happiness and success in your careers, graduate studies, and personal lives. The following students had applied for graduation by March 2. If your name is missing, please contact me immediately <griffore@egr.msu.edu> Tele: 517-355-3338).—Gaile

May Graduates

Joaquin Joseph Affonso	Kyle Richard Jose	Jill Mackenzie Randall
Kathryn Marie Anderson	Shantanu Alhad Joshi	Joy Ellen Richenbach
Alexis Dalton Bauer	Zachary Thomas Kaltz	Trevor William Ruckle
Matt Alan Bauer	Justin Marcus Ketterer	Matthew Lee Ryerkerk
Mikal Evan Brewer	Kacy Lee King	John Clinton Sanburn
Christopher Robert Brzak	Chad Daniel Kleinow	Andrew Keith Schafer
Melissa Rae Carrier	Andrew Robert Kruk	Jacob John Schulz
Bethany Rae Danielski	Jennifer Ann Langridge	Jared Michael Sickles
Daniel James Diebolt	Megan Lynne Lawrence	Nancy Maher Sidrak
Scott William Dosson	Yip Fai Leung	Andrew William Siefert
Mark Mathias Ehrenberger	Allison Marie Lewis	Matthew Charles Siero
George Terrence Stephen Elliott	Christopher Tyrome Lowe	Ryan Thomas Slobodian
Wesley T Fan	James Edward Lussman	Aaron Sevrin Smith
Jason Christopher Flanigan	Jeffrey Alan Mann	William Lee Smits
Raymond Todd Gallagher	Kevin J Mckay	Ryan David Spiekermann
Andrew Benjamin Gillett	Christoph Joseph Miller	Christopher Arne Stevens
Seth Guider Grua	Michael David Nicley	Wayne Arthur Steward
Seung Hee Han	Matthew Alan Nowc	Sandip Suvedi
Nicholas Gerald Harrington	Basak Oguz	Lindsey Marie Verrier
Matthew Phillip Hartman	Keith Ryan Ortman	Matthew Joseph Warner
Matthew Tyrell Hays	Kristen Lynn Penk	Gerard Joseph Westover
Matthew Robert Holley	Keith Alan Pigeon	Matthew James Winkley
Daniel Isam Isaac	Richard Paul Pospiech	David Alan Wyrembelski
Cipto Yusti Joegiono	Stacie Lyn Proctor	Chi-Hong Yung
	Matthew Ryan Radley	

August Graduates

Timothy Gauger Baumer	Aaron Andrew Cole Jr	Nicholas Chinedu Nwabueze
Anthony Deon Beal	Evan Richard DiMaggio	Daniel Michael Petlicki
Nicholas S Beechnau	Doo-Hwan Kim	Ronald Raymond Rogers
Ratikant Behera	Matthew David Kimball	Matthew C Rokosz
Agatha Ygerne Bone	Michael Roy Lambert	Steven Lee Wagner
Jimmy Jia Chen	Mary Maggie Martin	Steven Donald Yang



Zachary Steffes, Andrew Stewart, Justin Straley, Paul Streffling, Nicholas Strevel, Ryan Stull, Sandip Suvedi, Christopher Sweeney, Kyle Szytkiel, Jin Tam, Eric Tauzer, Bryce Thelen, Joseph Tideswell, Elliot Tippmann, Jamie Ueda, Brendan

Vidmar, Krishna Vistarakula, Bradley Wackerle, Bryan Wagenknecht, Eric Waggy, Cody Wagner, Richard Wahl, Ryan Wahula, Jillian Warner, Andrew White, Matthew Winkley, Ashley Wright, Chi-Hong Yung, Oliver Zemanek

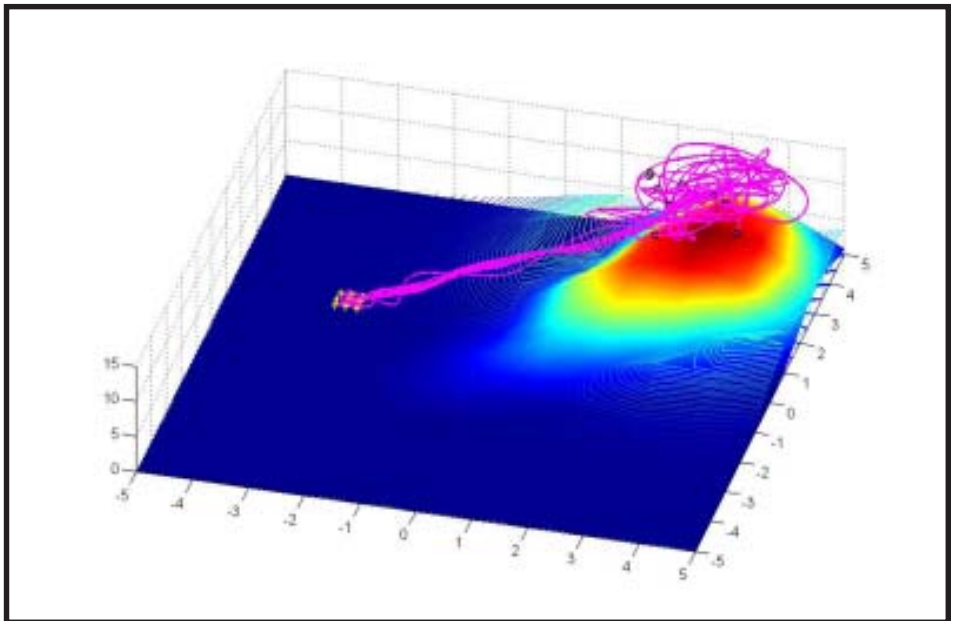
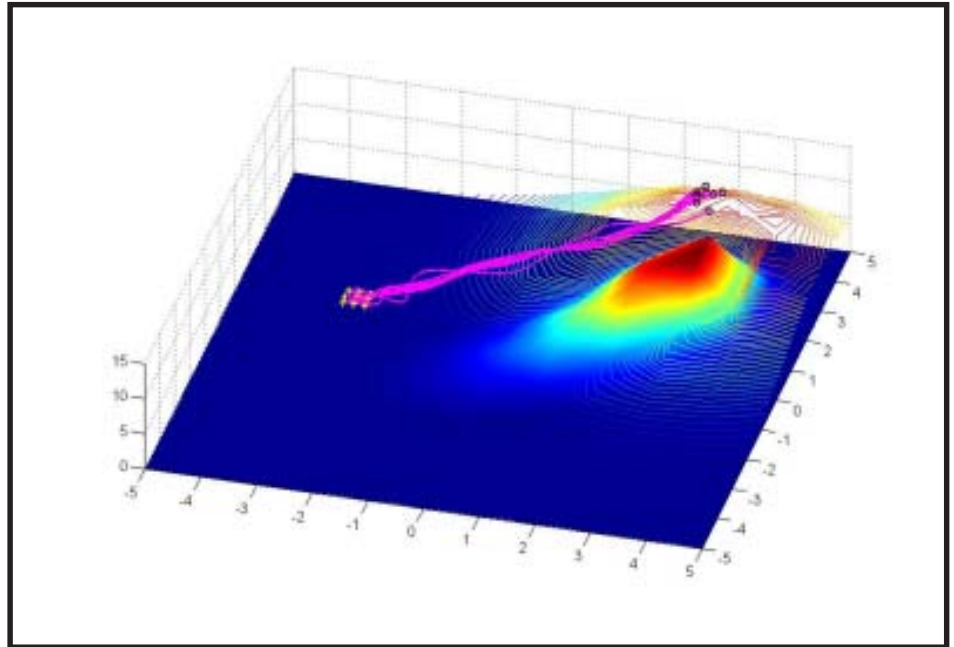
Research in Adaptive & Learning Control by Professor Jongeun Choi

Adaptive and learning control research is being conducted in the Control Research Laboratory located in 2553 Engineering Building. The research activities include adaptive, learning, distributed, and robust control, with applications to unsupervised competitive learning algorithms, self-organizing systems, distributed learning coordination algorithms for autonomous vehicles, multiple robust controllers, and micro-electromechanical systems (MEMS).

Cooperatively Learning Mobile Agents for Gradient Climbing

Currently, we are developing a network of collaboratively learning mobile sensing vehicles for achieving a global goal in an unknown changing environment. Our research combines the recent swarming system theoretical results with a cooperatively learning mechanism to form an “artificial intelligence” of each individual, which results in “Cooperatively Learning Mobile Agents” (CoLMAs). In particular, the sensing agent will receive collective measurements from its neighboring agents within a limited transmission range. Upon receiving cooperative measurements, each mobile sensing agent will recursively update the image of an unknown distribution locally. To locate the maximum (or source) of the distribution, the sensing agent will climb the gradient of its own updated image of the unknown distribution. Equipped with a swarming behavior, access to cooperatively sensed measurements, and the individual learning capability, CoLMAs are expected to be resilient not only to measurement noise but also to local maxima of a distribution.

The proposed CoLMAs exactly mimic the individual and social behaviors of a distributed pack of



FIGURES PROVIDED BY DR. CHOI

Figures 1 & 2. Trajectories of nine swarming mobile sensing agents. The emerging background in different colors represents the learned distribution of interests by agent 1. Contour lines represent the errors between the true distribution and the recursively estimated distribution by agent 1.

animals communicating locally to search their densest resources in an uncertain environment. In this way, the distributed and scalable control law can be derived without the knowledge of the density of interest in the environment, which is the main difference from other coordination algorithms. The adaptive mechanism will be based on radial basis function learning. The fish school's efficient performance of climbing nutrient gradients to search food resources and the exceptional geographical mapping capability of drug sniffing dogs, have provided strong incentives to invent cooperatively learning mobile sensing agents.

The convergence properties of the proposed swarming system are analyzed using the ODE approach and verified by a simulation study. This research has numerous applications including homeland security, toxic-chemical plume tracing, environmental monitoring, and wildfire monitoring. It has been supported by

Intramural Research Grants Program in Michigan State University.

Multiple Robust Controllers

We are investigating a method to design the optimal classification of dynamics and corresponding optimal robust controllers, which is formulated as a nonconvex optimization problem. We have developed a systematic way to obtain suboptimal solutions numerically for this problem. This new technique has been used to obtain a set of track-following controllers for hard disk drives. This algorithm can be also applied to designing multiple switching controllers for light vehicle dynamics subject to large changes in load configurations. We are collaborating on this project with **Dr. Nagamune** from the University of British Columbia, Vancouver, B.C. Canada.

Evolution of the whole human body structure (Interdisciplinary Project)

In Collaboration with **Dr. Baek** and **Dr. Reid-Bush** in mechanical engineering, we are currently investigating the development of a novel computational technique which can simulate the time evolution of the whole human body structure from the given initial posture. We will identify statistical time series models for the everyday loads generated from walking, driving, typing, sitting and exercises based on the experimentally measured data of such movements. Then the corresponding time series are to be incorporated in the finite element method for the growth and remodeling of muscles and soft tissues of interests.

With the successfully developed computational package, we can be able to predict the degeneration and/or improvements of the posture that consists of muscles and bones for particular everyday load configurations.

Think About Graduate School by Clark J. Radcliffe, Assoc. Chair for Graduate Programs

Can I afford to go to graduate school? Yes, you can. Most of our ME graduate students have a teaching or research assistantship. A typical assistantship pays health care, tuition and salary worth about \$30,000 per year or more. Teaching assistants help faculty teach courses while research assistants work for faculty on funded research projects.

Why go to graduate school? There are two immediate answers to this question. First, graduate degrees permit you to control and shape your engineering career in ways that are impossible without them. Graduate degrees help you develop the expertise that uniquely qualifies you for those special professional positions that every engineer looks forward to.

Does graduate school make sense economically? The salaries paid to engineers rises dramatically with

degree level. EngineerSalary.com says expected salary for an inexperienced "ME-Analytical" with a B.S. is \$56,000. Salary rises to about \$75,000 with a M.S. and \$95,000 with a Ph.D. Of course, experience raises also raises salary but *no single qualification raises salary faster than a graduate degree.*

Joining us for a graduate degree. We have a new Energy and Automotive Research Laboratory (EARL) opening this fall and have received word of funding for two new research centers: one funded by the U.S. Air Force in computational fluid mechanics and one funded by the U.S. Army in composite vehicle design. Currently mechanical engineering at Michigan State University has about 120 graduate students evenly split between M.S. and Ph.D. students. The new research centers will substantially increase that number over the

next two to three years. This is an opportunity for new students to participate in new and exciting emerging technology.

When can I start? Students start any semester. Most of our graduate students start fall semester, but many students start spring semester. A few start summer semester. If you a finishing your BS degree with less than a full load, you can *dual enroll* for a semester and earn credit towards a BS and MS in the same semester.

Come see us for details. To learn more, contact the Graduate Secretary **Aida Montalvo** <megradad@egr.msu.edu> or myself in the Mechanical Engineering Graduate Program Office 2318EB, 355-5220.

MSU Baja Team SAE

SAE The Baja SAE team has completely changed this year. The team is under new leadership, and with that, new ideas on designs.

Last month the team made the trek up to Michigan Technological University for their Winter Baja race. Of the thirteen teams and twenty cars that competed, MSU took 8th and 9th in the endurance race and 2nd in the big air competition, not to mention many stories to go along with the trip. The team will be taking two cars to Florida, South Dakota and New York.

This year's new car, as mentioned before, will be drastically different from those that were designed in previous years. The goal of this year is to create the lightest car possible and thus achieve a faster more nimble race car. All of this has to be done without compromising structural rigidity and strength.

For more information on the MSU Baja SAE team or to see pictures and video of past years' cars, you can visit our brand new website at www.egr.msu.edu/baja. The team is looking forward to competing this year and hopes to better their current standing of third in the nation. Submitted by Jacob Schulz, Co-Captain.



PHOTO PROVIDED BY JACOB SCHULZ, CO-CAPTAIN

American Society of Mechanical Engineers



ASME offers many events throughout the year. You can expect presentations from many companies in various engineering disciplines including Shell, General Electric, Stryker Medical, Caterpillar, and many more. Some of this year's upcoming events and presentations include:

- Shell Oil Company–**March 22; 6:00pm, 2400EB**
- Graduating Senior Speaker Panel for Freshman & Sophomores–**March 27; Time/Room TBA.**
- Relay for Life – **April 20-21**

The final event, "The Gathering" (TG), will be held on **April 20** at **Dr. Somerton's** house. TG is an excellent time to get to know your fellow engineers on a social level while also getting the opportunity to meet various faculty members!

Membership

Joining ASME is easy and beneficial! As a member, students may attend all ASME events including meetings and the annual ASME conference. ASME members are also eligible for some of the many scholarships available. Joining ASME is a great way to get involved in the school and community. ASME will also provide you with the competitive edge employers seek, giving you a step ahead on the competition when it comes to finding a job. As a member, you will get to know recruiters from various companies and gain many valuable contacts in industry.

Applications are available outside the ASME office, room 2328K EB. Please remember to fill out the national application *and* the MSU chapter application.

Elections

Are you looking to become more involved? ASME currently has 3 officer positions available for next year. Becoming an officer is a great way to make your voice heard and have a huge impact in ME at MSU! If interested in becoming an officer contact our faculty advisor, Dr. Somerton <somerton@egr.msu.edu>.

Community Service

ASME is also an active member in the community. In the past ASME has held First Lego League Competitions, volunteered at Ronald McDonald House, and much more. Today ASME is still committed to serving the community. Currently, members are taking time to speak to students at local schools about the benefits of engineering. We will also be participating in this year's Relay for Life, an event in which we were the leading fundraising team in the past!

Benefits of ASME

Aside from the free subscription to *ASME Mechanical Engineering* magazine and access to various scholarships, joining ASME will provide you with the opportunity to network with potential employers. The benefits of becoming a member are endless and will undoubtedly have a large impact on your career!

CONTACT US

Visit www.egr.msu.edu/asme or contact Dr. Somerton for details on joining! Submitted by Dan Isaac, Newsletter Editor.

Pi Tau Sigma



Pi Tau Sigma, the Mechanical Engineering honor society, is very excited about this semester. We have gotten off to a great start. The semester was kicked off with a wing-filled night at Buffalo Wild Wings. We have helped our community by preparing dinner at the Ronald McDonald House and by participating in the Science, Engineering, and Technology Day as the "Ask ME" team.

We are looking forward to the many remaining events this semester. We will help fight cancer by walking in the Relay for Life on April 20-21. See the Pi Tau Sigma website to sign up to participate or to donate online! We will be holding Senior Elective night on April 5th. This is an excellent time to finalize your schedule for next year by listening to the students' point of view on all the ME senior elective classes. We will also have members speak to children at Design Day on April 27th in the Union.

Our biggest event each semester, the Golf Scramble, which is open to all mechanical engineering students, tees off on April 14th. There will be recruiters attending and it will be a great opportunity to network for full-time and co-op and intern positions for next year. For more information about any of our events, please check out our website at www.egr.msu.edu/pts. We hope to see you at our upcoming events! *Submitted by Gerard Westover, Secretary*

The 2007 Pi Tau Sigma Spring Golf Scramble



Open to all ME students!
Saturday, April 14, 2006
Forest Akers East Golf Course
Time TBA



*Network with people from industry!
 Get a job or internship by playing one game of golf!*

The fourth member of every team will be from a successful engineering company. Companies attending include Dow Chemical and Shell Oil Company!

9 Holes, Cart, and Picnic Lunch: Price TBA

Pre-register teams of three, or register as an individual and network with new people. For more information or to register, please contact Matt Winkley at <winkley@msu.edu> or visit the Pi Tau Sigma website at www.egr.msu.edu/pts/

All teams must register and pay by April 9, 2007 at 5 p.m.

Formula SAE



The Formula Racing Team has been hard at work over the past several months developing the latest MSU racecar, known simply as "9." When many students went home over winter break, the Formula team stayed and worked many long, strenuous hours to meet upcoming deadlines. However, this sacrifice paid itself off with a virtually complete chassis before Christmas and much component fabrication following the holidays.

January and February didn't allow the team to take a break. With many things still to be done on car 9 and the North American International Auto Show (NAIAS) to keep team members on their toes, the team continued to work many long hours. However, the vast exposure and excitement created by NAIAS and the thrill of spring testing rapidly approaching helped the team make the final push to have car 9 running by the first part of March. Spring Testing in the southern United States is always an exciting time for the team, as well as an important one, as setting up the new racecar and testing and training drivers is very important to having a winning entry at competition.

Please look for the Formula team at the upcoming SAE World Congress at Cobo Center in Detroit in mid-April and also at the International Formula SAE Competition, May 16-20 at Ford Proving Grounds in Romeo, MI. Any questions or requests can be made through our website, www.egr.msu.edu/fsae or via email at <fsae@egr.msu.edu>. *Submitted by Adam Zemke, Operations/Public Relations Manager*



PHOTO PROVIDED BY ADAM ZEMKE, OPERATIONS/PUBLIC RELATIONS MGR

The Electronic Age

by Craig Gunn, ME Director of Communications

Interestingly enough, when talking to a class a few weeks ago, I forgot to mention something that has come up in simple conversation and in public gatherings more and more often these days. The issue of electronic devices is starting to become a critical problem with regular people and employers. Have you been to church lately, or to a theater production, or simply to a movie at the local Cineplex? Every one of these venues has added to their openings, "Please turn off pagers, beepers, or any other electronic device and put your cell phones on vibrate."

Now for those of us who wouldn't be caught dead with anything that would embarrass us during a quiet gathering, there is no problem. But with the growing number of electronic devices that whistle, belch, play "Born to be Wild," and take on the hip hop lyrics of every word you were never to say in public; there is a need to mention that this stuff wafting out to be picked up by everyone within 100 yards is a form of communication. And, that communication may be detrimental to your employment and to your lifestyle.

Let's think about lifestyle. You take your date or are taken by your date to a romantic meal under the stars with just the right ambiance, just the right food, and just the right moment to truly be one with the person to whom you are ready to launch your new life. Ah.....!!!!

Then that cell phone blasts out #SH**g or some other such obscenity and your date rushes to answer the phone while the obscenities (Don't you just love those unique rings you can put on a phone!) keep going on way too long until he or she turns them off. What transpires after the call is answered is a lengthy conversation on topics that have no value, activities that could have waited another two months, or laughter about things of which you have no idea. The ambiance is ruined, the food cold, and the decision to run screaming from the restaurant is ripe to begin. If you think that people love to hear you, while you are having dinner with them, conversing with others over the phone you must have a peculiar set of friends (or maybe no friends at all!)

Now when it comes to employers, just think about how they must feel when your obscenity laden phone lets loose in the midst of an interview or when you have to leave the room to answer an important call from your significant other who needs to know if you fed the cat. We do need the electronic devices that we have become dependent upon, but we also have to become more aware that common sense says that both your loved one and your future employers want your undivided attention. They do not want to feel second class when it comes to your time. And for the rest of us who have to sit next to you at dinner, the last thing we want to hear are your personal conversations with your beer buddies – both male and female. Keep in mind, life is all about communication. Make it work for you and not against you.



Con'd from page 5

dedicated to the critical role that Russia played in World War II. This course has received many positive comments including the following:

"IAH 221C (World War II – The Eastern Front) is probably the most interesting and moving class I have taken while at MSU. It was a powerfully somber experience."

Another innovation in this growing program is the unique opportunity for students to visit Prague, the capital of the Czech Republic and one of the most beautiful cities of Eastern Europe.

To learn more contact **Elena Y Selezneva** in CEE <seleznev@msu.edu>, as soon as possible. Additional information about the program is available online at <http://www.egr.msu.edu/cee/programs/studyabroad.html>.



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Michigan State University
Department of Mechanical Engineering

BIOMECHANICAL OPTION

(16-17 Credits)

➔ For more information, see “Curriculum News” on page 6

A mechanical engineering degree with the biomechanical option prepares students for both traditional mechanical engineering as well as bioengineering. Engineers trained in biomechanical engineering find work designing, for example, prosthetics, artificial joints, automotive safety equipment, robotics for telemedicine, heart valves, left ventricle assist devices, and the whole range of medical devices. Research by biomechanical engineers includes studying the strength of bones and soft tissues, the motion of cells, the kinematics of human motion, and the flow of blood.

To complete a Bachelor of Science degree in mechanical engineering with a biomechanical option, students must complete the requirements for the B.S. degree, including the following:

- PSL 250 Introductory Physiology—4 credits (Fall and Spring)
- BS 111 Cells and Molecules—3 credits (Fall, Spring and Summer)

Plus 9 credits from the following list:

- | | |
|---|------------------------------------|
| •ME 490 Independent Study ¹ | 1-4 credits (Fall, Spring, Summer) |
| •ME 491 Selected Topics ¹ | 1-4 credits (Fall, Spring, Summer) |
| •ME 494 Biofluid Mechanics & Heat Transfer | 3 credits (Fall Only) |
| •ME 495 Tissue Mechanics | 3 credits (Spring Only) |
| •ME 497 Biomechanical Design | 3 credits (Spring Only) |
| •BME 401 Quantitative Human Biology ² | 3 credits (Spring Only) |
| •MSE 425 Biomaterials & Biocompatibility ² | 3 credits (Spring Only) |

CREDIT DISTRIBUTION: PSL 250 will be applied to the Bioscience requirement, and BS 111 will be applied to Other Electives. The nine engineering credits will be applied to the Senior Elective requirement (*not* the “design intensive” course component, however). Completion of the option will be noted on the final transcript.

¹Requires department approval.

²One of the prerequisites is (PSL 250 or concurrently).

ME Senior Electives for 2007-2008

- The following ME Senior Elective list, including instructor assignments, was accurate as of March 9, but it is subject to change. Important changes will be emailed to you with "ME Bulletin Update" on the subject line.
- Design Intensive courses have an asterisk (*) after the course number.
- Descriptions are provided for courses that are not in the catalog. All others can be found by going to <http://www.reg.msu.edu/Courses/Search.asp>
- The ME department cannot overfill a required course or section to solve a Senior Elective schedule conflict.
- Course override instructions can be found in the shaded **BOX** on page 15.

SUMMER SEMESTER

- ME 491 **Refrigeration.** Section 201 ONLY. 3(3-0). Requires Override→See GENERAL INSTRUCTIONS in box. Prereq: ME 410 or concurrently. **Description:** Refrigeration systems, including vapor-compression, absorption, and thermoelectric; the major components of refrigeration systems (heat exchangers, compressors, and expansion valves) and how to select them to achieve a specified refrigeration system performance. Practical issues, such as pressure switches, lubricants, and piping systems, will be addressed. *Mueller.*
- ME 490 **Independent Study.** 1-4 credits. Requires Override→See #1 in box. You may reenroll for a maximum of 6 credits.
- MSE 426 **Introduction to Composite Materials.** 3(3-0). Prereq: ME 222. *TBA.*

FALL SEMESTER

- ME 416* **Computer Assisted Design of Thermal Systems.** 3(4-0). Prereq: ME 410 or concurrently. *Somerton.*
- ME 422 **Introduction to Combustion.** 3(3-0). Prereq: ME 332 or concurrently. *Wichman.*
- ME 423 **Intermediate Mechanics of Deformable Solids.** 3(3-0). Prereq: ME 222. *TBA.*
- ME 425 **Experimental Mechanics.** 3(2-3). Prereq: ME 222. *Restivo.*
- ME 440 **Aerospace Engineering Fundamentals.** 3(3-0). Prereq: ME 332 or concurrently. *Engeda.*
- ME 444 **Automotive Engines.** 3(3-0). Prereq: ME 410 or concurrently. *Schock.*
- ME 456* **Mechatronic System Design.** 3(2-3). Prereq: ECE 345 plus ME 451 or concurrently. *Radcliffe.*
- ME 465* **Computer Aided Optimal Design.** 3(3-0). Prereq: ME 471 or concurrently. *Díaz.*
- ME 477 **Manufacturing Processes.** 3(3-0). Prereq: ME 222 and MSE 250. *TBA.*
- ME 490 **Independent Study.** 1-4 credits. Requires Override→See #1 in box. You may reenroll for a maximum of 6 credits.
- ME 494 **Biomechanics and Heat Transfer.** 3(3-0). Prereq: ME 410 or concurrently. **BME Option Course.** *Wright.*
- CHE 472 **Composite Materials Processing.** 3(2-3). Prereq: ME 332. *Jayaraman.*
- ECE 415 **Computer Aided Manufacturing.** 3(2-3). Requires Override→See #2 in box. Prereq: ME 451. *Xi.*
- MSE 451 **Microscopic & Diffraction of Materials.** 3(2-3). Prereq: PHY 184. Recommended background: MSE 350 & 381. For more info→See #3 in box. *Bieler or Crimp.*
- MSE 454 **Ceramic & Refractory Materials.** 3(3-0). Prereq: PHY 184. Recommended background: MSE 350 and 381. For more info→See #3 in box. *Case.*
- MSE 476 **Physical Metallurgy of Ferrous & Aluminum Alloys.** 3(3-0). Prereq: MSE 250. Recommended background: MSE 310 and 360. For more info→See #3 in box. *Crimp.*
- ME 802 **Advanced Classical Thermodynamics.** 3(3-0). Requires Override→See #4 in box. Prereq: ME 412 plus GPA of 3.5+. *TBA.*
- ME 812 **Conductive Heat Transfer.** 3(3-0). Requires Override→See #4 in box. Prereq: ME 412 plus GPA of 3.5+. *Jaberi.*
- ME 830 **Fluid Mechanics I.** 3(3-0). Requires Override→See #4 in box. Prereq: ME 332 plus GPA of 3.5+. *TBA.*
- ME 860 **Theory of Vibrations.** 3(3-0). Requires Override→See #4 in box. Prereq: ME 461 plus GPA of 3.5+. *Feeny.*

SPRING SEMESTER

- ME 417* **Design of Alternative Energy Systems.** 3(3-0). Prereq: ME 410 or concurrently. *Bénard.*
- ME 442* **Turbomachinery.** 3(3-0). Prereq: ME 332. *Mueller.*
- ME 445* **Automotive Powertrain Design.** 3(3-0). Prereq: ME 444. *Novak.*
- ME 457 **Mechatronic System Modeling and Simulation.** 3(3-0). Prereq: ME 451 or concurrently. *Rosenberg.*
- ME 464 **Intermediate Dynamics.** 3(3-0). Prereq: ME 361. *Shaw.*
- ME 475* **Computer Aided Design of Structures.** 3(2-3). Prereq: ME 471 or concurrently. *Díaz.*
- ME 477 **Manufacturing Processes.** 3(3-0). Prereq: ME 222 & MSE 250. *TBA.*
- ME 478 **Product Development.** 3(3-0). *Requires Override* ▶ See #5 in box. Prereq: ME 361, 477, and Tier I Writing. *Kwon.*
- ME 490 **Independent Study.** 1-4 credits. *Requires Override* ▶ See #1 in box. You may reenroll for a maximum of 6 credits.
- ME 495 **Tissue Mechanics.** 3(3-0). Prereq: ME 222. *BME Option Course.* *Haut.*
- ME 497 **Biomechanical Design.** 3(3-0). Prereq: None for ME majors. *BME Option Course.* *Reid-Bush.*
- BME 401 **Quantitative Human Biology.** 3(4-0). Prereqs: CEM 141 or 151, MTH 235, PHY 184, and PSL 250 or concurrently. *BME Option Course.* *Paganini.*
- CE 422 **Applied Hydraulics.** 3(2-2). Prereqs: ME 332 and 391. *Wallace.*
- MSE 425 **Biomaterials & Biocompatibility.** 3(3-0) Prereq: PSL 250 or concurrently and MSE 250. *BME Option Course.* *Baumann.*
- MSE 426 **Introduction to Composite Materials.** 3(3-0). Prereq: ME 222. *Liu.*
- MSE 466 **Fracture & Failure Analysis.** 3(2-3). Prereq: MSE 250. Recommended background: MSE 320, 331, and 381. *For more info* ▶ See #3 in box. *Lucas.*

OVERRIDE INFORMATION

GENERAL INSTRUCTIONS: The ME Override Request Form is located at: <http://www.egr.msu.edu/egr/programs/bachelors/overrides.php>. Please note that the ME department cannot overfill required courses to resolve conflicts with Senior Electives, Other Electives, Integrative Studies courses and employment schedules. The following numbered instructions are referenced in the Senior Elective listings on this and the previous page:

- ① ME 490–Independent Study Enrollment Procedure: Find a professor who is willing to supervise your independent study, and discuss your plans with him/her. Complete an *ME 490/490H Enrollment Contract* (independent study form), available in the ME Advising Office in 2560 EB. After you and your professor have completed and signed both sides of the form, return it to the ME Advising Office for the remaining signatures, override, and enrollment.
- ② Six seats in ECE 415 have been allocated for MEs who are on record as Manufacturing Option students. If you are one of those students, send an email to Gaile (griffore@egr.msu.edu) and request your override. Be sure to include your PID number and mention that you are on record as a Manufacturing Option student. (To be “on record,” you must meet with Gaile to plan a long-term schedule.)
- ③ ME majors do not need to have taken the Recommended Background courses, but there will probably be a need for some additional background reading. Contact the professor for more information.
- ④ Complete the *Graduate Course Override* form, available in the ME Advising Office in 2560 EB. This is a paper form. NOTE: Instructor assignments for some ME graduate courses were not available at press time, but should be available in May.
- ⑤ ME 478 is restricted to MSE and ME majors. Priority for ME 478 is given to MEs who are on record as Manufacturing Option students. (To be “on record,” you must meet with Gaile to plan a long-term schedule.)

Spring Semester Calendar

March 12-23	Scheduled appointments for Computer / Telephone enrollment for Summer 2006. Your enrollment appointment is posted in StulInfo.
March 22	ASME Event: Shell Oil Presentation. 6 p.m. in 2400 EB.
March 27	ASME Event: Graduating Senior Speaker Panel for Freshmen & Sophomores. Time/ Room TBA.
March 30	Computer/Telephone enrollment begins for Fall '07 / Spring '08.
April 3	Pi Tau Sigma Event: Senior Elective Night at 7 p.m. Room TBA.
April 14	Pi Tau Sigma Event: Golf Scramble. Time & Price TBA.
April 20	ASME Event: Spring Tailgate ("The Gathering") at Dr. Somerton's house.
April 27	Design Day in the MSU Union. See you there!
April 30-May 4	Final Exams.
May 4	University Undergraduate Student Convocation—1:00 in Breslin.
May 6	College of Engineering Undergraduate Commencement Ceremony, 1:30 p.m. in Breslin. Lasts about 2 hours.
May 14-Jun 28	<u>First</u> Summer Session.
Jul 2-Aug 16	<u>Second</u> Summer Session.
May 14-Aug 16	<u>Full</u> Summer Session.
August 14	First Fall 2007 Minimum Tuition & Fee payment due.
August 28	Fall Semester classes begin.
September 1	Application deadline for FE exam in October.

MICHIGAN STATE UNIVERSITY

Dept of Mechanical Engineering

ME Advising Office

2560 Engineering Building

East Lansing MI 48824-1226



**College of Engineering
Design Day
Friday, April 27
MSU Union Building**

- >> Competitions
- >> Awards
- >> Presentations
- >> Live Demos



COLLEGE OF ENGINEERING | DEPARTMENT OF MECHANICAL ENGINEERING

Enjoy free food and network with industry reps. Come and enjoy an eye-opening time and maybe gain some inspiration!