Emily Duszynski, Kyle Koepf, Jonathan Luckhardt, and Joshua Thomet display their autonomous window washing robot “Winboni” which won the World Championship at the ASME International Mechanical Engineering Congress & Exposition on November 2! This makes MSU the first two-time design champion! Read more on page 2.
From class project to world champions, that’s the journey four mechanical engineering students took this past year. Emily Duszynski, Kyle Koepf, Jonathan Luckhardt, and Joshua Thomet began their design of an autonomous window washing robot as a class assignment for ME 471-Mechanical Design II during the fall semester of 2007. As has been the tradition, the fall ME 471 class uses the ASME Student Design Contest for its design, build, and compete project for the semester. The basic problem description provided by ASME reads: "Design, build, and demonstrate a robot which will wash a residential double-hung sash window autonomously, that is, without human intervention beyond placing the robot on the lowest window pane and turning it on, or under remote control of an operator “inside” the “building.” This device should be able to clean both the inside and the outside of a double-hung sash window, but this contest will be based on cleaning the outside of the window. A large scoring bonus will be given to those teams who are successful in completing any substantial part of this operation autonomously.

After much brainstorming and considerable time in the shop, the team produced “Winboni” as their final design. The robot was so named for the way it would clean a window in the same way a Zamboni cleans the ice at a hockey rink. Winboni is a tiny, square robot (5 inches long, 5 inches wide, and 2 inches tall) that runs on AA batteries. It attaches itself to the window with a suction fan and moves across the window with powered wheels to scrub it clean with felt pads. A microprocessor is programmed to autonomously control its operation.

First up for the team was the Design Day competition, where it performed well, but finished second. However, Professor Craig W. Somerton, ASME faculty advisor, invited the top three Design Day finishers to attend the ASME District B Student Professional Development Conference held in Pittsburgh on April 5, 2008. Graduate student Andrew Siefert was asked by Professor Somerton to serve as team coach. Andrew met weekly with the team for the four months prior to the District competition to help them prepare for the competition. During this time period Professor Clark Radcliffe provided mechatronics consulting to the team.

Competing against teams from Carnegie-Mellon, the University of Toronto, and the University of Cincinnati, the MSU team wiped the competition clean. The win allowed the team to advance to the World Competition. They continued MSU’s domination of this event, by winning 9 of the last 11 district/regional competitions (with two 2nd place finishes).

All that was left in the journey was to win the World Championship at the ASME International Mechanical Engineering Congress & Exposition in Boston held November 2, 2009. Following a flawless run at the world competition, Winboni reigned supreme over 2nd place finisher Hong Kong Polytechnic University and 3rd place finisher Colorado State University. MSU Mechanical Engineering Design Teams have now won this event twice, making MSU the first two-time design champion.

In addition to the acclamations from winning a world championship, the learning experience of such a project is enormous. As team member Emily Duszynski put it, “This project is just a miniature example of things you could run into in the real world, where you have to figure out how to organize things and manage your project while learning how to deal with problems you’re not expecting.” It would seem that this team was the best in the world in dealing with the unexpected. The department is truly proud of their accomplishment. Congratulations!


Department News

Mr. Craig Gunn, ME Director of Communications, has been promoted to Senior Academic Specialist. He was also presented with the prestigious University Distinguished Staff Award at a ceremony on February 3.

As director of the communication program in MSU’s Department of Mechanical Engineering, Mr. Gunn understands that new students need to feel secure before they can study effectively. He makes them feel welcome at MSU by volunteering, as a long-time member of the University Activities Board, to help organize and conduct activities from bowling to bingo. Mr. Gunn challenges engineering students to improve their oral and written communication skills. Beyond the classroom, he has influenced his field through work on university-wide committees and workshops, and through his work with the Cooperative Education Division (CED) of the American Society for Engineering Education. He is widely known and respected in the organization through his presentations at annual meetings, his service on the CED’s board of directors, and his work as editor of the newsletter. Mr. Gunn has published essays in journals and textbooks. The course he created, “Technical Communication for Engineers,” rounds out his communications expertise/service-centered career. He is admired across campus and throughout the engineering communications field.

After receiving his M.A. in English from Michigan State in 1982, Mr. Gunn began working for the ME department while completing the coursework for his Ph.D. In 1992 he joined the ME department as an academic specialist to direct the department’s communication program. His hobbies and interests include reading and writing, yard work and landscaping, bicycling, and snow skiing.

Dr. Scott Kiefer has joined the ME department as a teaching specialist. He comes to us from Tri-State University in Angola, Indiana where he taught mechanical engineering courses. Prior to that he taught courses for the University of Puerto Rico at Mayaguez and North Carolina State University. He has also worked for Caterpillar, Inc. and Hutchinson Technology Inc. Dr. Kiefer will focus on teaching undergraduate courses in a variety of areas for our department. This semester he is teaching ME 222-Mechanics of Deformable Solids and ME 451-Control Systems. Dr. Kiefer spends most of his time away from MSU playing with his two children Catie (age 3) and Will (almost 1). He also enjoys singing barbershop style music and working on small construction projects around the house.

Curriculum News

- **Study Abroad**: The ME department sponsors or co-sponsors study abroad programs in several countries. Read about programs in Germany, Scotland, and Peru on pages 5 and 6. Here are three other ME-sponsored programs and the faculty in charge: France (Bénard), Korea (Choi), and Taiwan (Liu).

- **CSE Minor**: The CSE department now offers a minor in Computer Science. Information can be found at: [http://www.cse.msu.edu/minor/](http://www.cse.msu.edu/minor/)

- **BME Option**: This option has been replaced by the Biomechanical Concentration, which requires BS 111 (not BS 110), BE 445, ECE 445, and MSE 425 have been added to the list of choices.

- **ME 280—Engineering Graphic Communications**: Students who matriculated at MSU prior to Fall 2008, and who need to take ME 280, will need a prerequisite override. [The prerequisites for ME 280 are (EGR 100), (EGR 102 or concurrently), and (MTH 116 or concurrently)]. To request the override, go to the ME Override form, available [on the ME Override site override at: [http://www.egr.msu.edu/me/undergrad](http://www.egr.msu.edu/me/undergrad)]. Instructor: Bob Chalou.

- **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 481—ME Design Projects**: ME ME department approval is required before enrolling in ME 481. To obtain approval, submit the ME 481 Enrollment Approval Form located in the Forms/Handouts link on the ME undergraduate website. ME 481 must be taken during your last semester (or 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 Honors Section**: ME 280H is available to Honors College students until April 17. After that, students with a 3.5+ GPAs are eligible and may request overrides for open seats.

- 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 1410 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 mem

Cont’d on pg 13
“Get Involved - Participate in a Student Organization!”

Leadership, organizational skills, communication skills, and people skills are all attributes that companies prize in an individual as much as his/her technical skills. Though our design program addresses these valued non-technical skills, another avenue exists for students to develop and practice these skills: participation in our student organizations. We have terrific student groups in the department, and they are always looking for members to get involved. If you are into racing and cars, you can help the Formula SAE, SAE Baja, or Solar Car teams build an advanced vehicle for international competitions. ASME provides an opportunity to learn about the mechanical engineering profession from practicing mechanical engineers. Pi Tau Sigma provides recognition for our top academic students. A key element to participating in any of these student organizations is the networking that occurs between student members, between student members and alumni, between student members and industrial sponsors, and between student members and professors.

It is one thing to be a member and another to be an active member, perhaps serving as an officer. If you list membership in a student organization on your resume, you must have something interesting to say when a recruiter asks you about it. Over the years several recruiters have expressed disappointment when a student answers that they are just a member of the organization. Even if you are serving as an officer with a relatively low work load, say secretary, you need to look for opportunities to make an impact. I remember the treasurer of one of our student groups who got the idea of running a leadership workshop. This student took on the responsibility of organizing such a workshop and pulled off an incredible event. The student gained the respect of students, faculty, and industrial representatives through her accomplishments.

Finally, as I look back on my own career, I realize the impact that serving as Tau Beta Pi president at UCLA has had. Many of the skills I have today originated from this leadership experience. There is much to be gained through the participation in a student organization and I encourage you to get involved.

Special Overrides

- **Transfer Prerequisite Override Requests**: If you plan to take the prerequisite for an ME course at another institution this summer, you must submit a Transfer Override Form, so that you can receive a prerequisite override and enroll in the next course in the sequence. The form can be found at: [http://www.egr.msu.edu/me/undergrad/forms](http://www.egr.msu.edu/me/undergrad/forms).

- **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, submit 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.

- **ISS 3xx Overrides**: Students who transferred their first ISS course need to obtain a prerequisite override before enrolling in ISS 3xx. To obtain the override, call 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.

**URGENT!!!**

**Enroll by April 3 for your Summer Classes!!!**

The summer enrollments as of April 3 will determine whether there are enough students to offer an ME course.

- **LOW SUMMER ENROLLMENTS COULD MEAN CANCELED COURSES!**

- **IT IS IN YOU OWN BEST INTEREST TO ENROLL FOR SUMMER BY APRIL 3!!!**

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; 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. In addition several online Integrative Studies Courses will be offered.

Enrollment for summer begins on March 16, and your enrollment access date can be found in StuInfo.

If you decide to take the prerequisite for an ME course at another institution this summer, please follow the Special Override instructions (see article on the left).
Global Engineering Concentration: Scotland by Gaile Griffore & Craig Somerton

The ME department has established a new study abroad program at the University of Edinburgh in Scotland. The program is classified as an “exchange program” and consequently, University of Edinburgh students will be traveling to MSU to study with us. Hopefully, we will begin to see some of them next fall. The program will begin next spring for Michigan State students.

Founded in 1582 the University of Edinburgh is one of Europe’s finest universities with a great tradition of producing outstanding scholars.

Aachen (cont’d)

Daily life in the student-oriented city of Aachen is very pleasant. Daily living costs such as food and entertainment are comparable to, if not cheaper than, those in East Lansing. There’s plenty of history. Aachen was one of Charlemagne's capitol and the cathedral at the city center dates from 800 A.D. Students’ housing is pre-arranged and included in the program cost. The MSU students are placed in private rooms in the dorms where they are integrated with other German and international students. The research hosts and German students are very comfortable in English, as well as is much of Germany’s population. The people are friendly and accommodating; Aachen makes a great environment for international students.

In all, this program offers independent research in a nurturing environment with plenty of European culture exploration opportunities.

Students interested in the 2010 or 2011 programs are invited to contact Prof. J. Foss (foss@egr.msu.edu).

NOTE: Sara will finish her B.S.M.E. degree this May, and Ryan is now in the ME graduate program. Both participated in the Summer 2008 Aachen program.
Horace Mann (1796 – 1859), the great American education reformer, wrote “Be ashamed to die until you have won some victory for humanity.” This compelling string of words resonated with the administration of Antioch College in Yellow Springs, Ohio and they adopted the sentence as the school’s motto. At Harvard University, the Social Enterprise Club is currently the most popular student club on campus. This implies that a large percentage of gifted students at this elite school possess a voracious appetite to serve people living in a state of poverty rather than the barons of Wall Street. In November 2008, the publication, Business Week, published an article devoted to the Millennial Generation at U.S. business schools and their commitment to jobs that permit graduates to make a positive difference on planet Earth ... such as green businesses, sustainability, renewable energy, environmental issues, social enterprises, micro-finance loans in Africa, running a food bank in a developing country or developing affordable housing.

As a member of the Millennial Generation, do you feel the same? Do you possess that same yearning to make a difference now? Have you been swept away by this tsunami of social enterprise that’s currently flooding the nation? Do you wish to help the world’s poor, but you are uncertain how? Have you ever contemplated learning about yourself ... yes, YOU ... while transforming the lives of poor under-represented people? Why not fold into your course schedule a brand new semester-long humanitarian program in Peru next summer where you will work with indigenous people that earn about two U.S. dollars each day? Why not offer impoverished people the gift of engineering knowledge to set them free? Why not create a superior quality of life for them? Why not make a difference, NOW?!

This new innovative program of community development, spearheaded by a plant physiologist and myself, is dedicated to transforming MSU’s undergraduates into global citizens and real U.S. ambassadors. It is cosponsored by seven MSU colleges, and it requires interdisciplinary teams of students to collaborate with NGOs (nongovernmental organizations) on development projects that will make a profound difference to the lives of the indigenous peoples of the Peruvian Andes. The MSU colleges are Agriculture & Natural Resources, Arts & Letters, Engineering, Osteopathic Medicine, Social Science, the James Madison College and the Residential College of Arts & Humanities.

During the Summer 2009 program, the following projects are being offered:

1. Educational programs for child/adolescent workers and social services for poor parents in the town of Huamachuco.

2. Education and social service programs with the Colegio Santa Ana (a private Catholic Secondary School and a Special Needs School in the town of Huamachuco).


4. Needs assessment, identification, and enterprise development of alternative solar-based technologies that would be culturally acceptable and affordable for the highland peoples of Sanchez Carrion.

5. Feasibility study and development of a project plan for the production of mini-tubers of virus free potato varieties with commercial potential in Sanchez Carrion.

6. Development of an alpaca breeding strategy for improving wool quality and a long-term plan to increase the herd size for the benefit of small scale farmers in the Province of Sanchez Carrion.

7. Mesa de Concertacion para la Lucha Contra la Pobresa (Committee of Agreement for the Fight Against Poverty), Sanchez Carrion.

This semester-long summer program of approximately 13 credits will begin in Cusco, near Machu Picchu, where students will attend five weeks of ISS classes in Andean culture and also classes in conversational Spanish at a language institute. Language competency will be enhanced further by daily interactions with each student’s host family and during the execution of the six week long community development project. These faculty-supervised projects will classify as MSU directed studies.

I look forward to chatting with you about this life-changing opportunity for you to learn about the real you! Make a difference now! Viva Peru!

For more information, please contact Professor B. Thompson, at thompson@cgr.msu.edu.
Fall 2008 Dean’s List

Congratulations to the following 171 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, which is updated regularly: [http://www.reg.msu.edu/ROInfo/GradHonor/D=deansList.asp](http://www.reg.msu.edu/ROInfo/GradHonor/D=deansList.asp).


63 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 4. If your name is missing, please contact me immediately [griffore@egr.msu.edu](mailto:griffore@egr.msu.edu) (Tel: 517-355-3338).—Gaile

**May Graduates**

Adam Joseph Alderman
Nicole D Arnold
Brent Cooper Augustine
Muhammad Nabeel Aslam
Daniel Johnathan Barlach
Logan James Beam
Matthew Leland Berger
Ryan Patrick Blake
Anthony David Carlo
Clifford J Carlson
Lisa Marie Chapman
Carl Anthony Coppola
Joshua Ronald Davis
Jeffrey Mark Elberling
Kyle Richard Elliott
Bryant James Ennis
Imoh S En-Idem
Allen Warner Eyler
Allision Maude Freeman
Christopher Ivan Gandy
Tyler Tucker Grab
Stephen William Griffith
Lauren Ashley Heitzer
Craig David Helewski
Joshua Lei Heyden
Zef Ivanovic
Eric Donald Jackson
Sergey Valeryevich Korobov
Kayton Philip Lenhart
Arun Kiran Mahapatra
Kenneth Eric Maisonneuve
Michael William Maurer
Kevin James McAlpine
Kevin Gerald McPhail
Ryan Patrick McPhee
Christopher Daniel Miller
Robert Orville Morris

**August Graduates**

Jenilkumar Chunilal Bhanvadia
David Robert Cain
Luan Quang Huynh
Ryan Thomas Kelly
Daniel Masterson

### The 2009 Pi Tau Sigma Spring Golf Scramble

**Open to all ME students!**

**Saturday, April 18**

**Forest Akers East Golf Course**

**Start at Noon**

Get a job or internship by playing one game of golf!

- **9 Holes, Cart, and Picnic Lunch**
- **$150 per recruiter (includes golf & lunch)**
- **$10 for MSU students & $20 for non-MSU students**
- **$15 per ME late registration fee**

Network with people from industry!

The fourth member of every team will be a recruiter from a successful engineering company. Pre-register teams of three, or register as an individual and network with new people.

**For more information or to register, please contact Chris Hunley at hunleyst@msu.edu or visit the Pi Tau Sigma website at [www.egr.msu.edu/pts](http://www.egr.msu.edu/pts).**

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**Michigan State University**

**Spring 2009 ME Bulletin**
In product design, engineers must ensure that a structure can meet the minimum load bearing requirements in the service environment over its expected life span. This task begins with determining the structural responses under the service loadings. A simple example would be to find out the maximum deflection and estimate the maximum stress and strain in a bending beam for a given service load - a typical homework problem in our ME 222 class.

For structures with simple shapes, such as a torsion shaft or a bending beam, we have equations ready to use. For more complex structural shapes, one may simplify them into elements of regular shapes which have close form solutions or empirical relationships. As the structure and the load case become complex, this approach can become rather challenging.

An alternative solution method is the numerical method. In this approach, the domain of a structure is first discretized into small subdomains. Then the response of each subdomain can be expressed by an approximated solution. Finally the equations of all subdomains are assembled in a matrix and solved together to obtain the solution for the overall structure. Of the common methods for a physical process described by differential equations (finite difference method, finite element method [FEM], element free Galerkin [EFG], etc.), FEM is the most widely used in structural analysis.

Numerical simulation has changed the landscape of engineering design. First of all, geometric complexity is no longer a constraint. With powerful computers, numerical models can represent the structures in great detail. Second, the load combination is not an issue. Once a numerical model of the structure is built, the designer can use the model to investigate structural responses to more load cases and combinations than a testing lab can produce. This enables more efficient use of materials and robust, optimal design of structures. Numerical simulation has created a new profession: computer aided engineering (CAE).

Numerical techniques provide solutions to physical processes described by differential equations. How a material behaves (how a variable varies with other variables) in a physical process is dictated by a constitutive law. For deformable solids, the basic constitutive law is the relationship between stresses and strains. An example is the Hooke’s law, which describes the behavior of a linear elastic solid. Thought simple in form, Hooke’s law is sufficient for most basic structural analysis needs. Nevertheless, some applications do require constitutive laws in more complex forms. For example, in metal forming processes (stamping, forging, extrusion etc.), materials undergo large plastic deformation. To simulate such behaviors, one needs to employ plasticity constitutive laws.

A solid may undergo deformation due to other stimuli as well, and the corresponding constitutive laws have to include these effects. An example would be thermo-mechanical behaviors. Most solids will develop thermal stresses when subjected to temperature gradients. To describe this behavior, the constitutive laws must consider the thermal expansion and the temperature dependence of
the material properties. Other stimuli, such as light, electrical potential, and magnetic fields, can also induce shape change or deformation of certain materials, the so-called functional materials. As new materials are being invented constantly, the quest for better constitutive laws is never-ending.

To describe material behavior mathematically, one needs to know how a material behaves under a given stimulus and the physics behind it. Therefore, experimentation is a prerequisite in constitutive modeling. Besides basic material testing as we do in ME 222 labs, we also develop new testing methods and work continuously on the improvement of experimental techniques. One area that needs development is the techniques to measure material constitutive behavior at high strain rates.

One of our ongoing projects responds to the need for crashworthiness simulations of polymer composites. Everyone prefers a car with a five star rating in crash tests. To improve the safety performance, full vehicle crush simulations are performed routinely in automotive design. Fiber reinforced polymer composites offer much higher energy absorption as compared to metals of equal mass. Replacing metals with composites lightens the structures and hence helps to improve fuel efficiency. However, it is much more challenging to represent the crush behavior of composites. Under axial crush load, metal tubes deform into multiple folds whereas composite tubes tear or break into debris, as shown in Figure 1. It will be difficult to include primary composite structures in a vehicle in today’s design environment until we have sufficient confidence in our ability to simulate this behavior. Hopefully, in the future we will be able to simulate composites as we do for metals. (See Figure 2)

Graduate School in Mechanical Engineering
by Professor Brian Feeny, Assoc. Chair for Graduate Programs

Did you ever think about going to graduate school? There are some good reasons to consider getting an advanced degree.

Higher salary. Engineers with advanced degrees earn more money than those with BS degrees only. According to the Bureau of Labor and Statistics Occupational Outlook Handbook ([http://www.bls.gov/oco/](http://www.bls.gov/oco/)), the entry pay for an MS in mechanical engineering is about $9000 more than that of a BS. So an MS pays for itself in a few years. Not only that, but you can . . .

Get paid to attend grad school. That’s right--many of our grad students qualify for teaching or research assistantships. An assistantship covers a student’s tuition, health care, and a salary, which together may have a value of about $30,000 per year.

Job quality. On the whole, the engineers with advanced degrees have more interesting and creative jobs. An advanced degree puts an engineer in positions of greater leadership, and therefore enables an engineer to have more say in his or her responsibilities. Thus, an advanced degree is an effective way to propel an engineer into a flourishing career.

Grad school is fun. The graduate school experience is a bit different than that of the BS degree. There is a little less emphasis on lectures and exams, although those are still a strong part of the program. But a graduate student also has a chance to do some teaching and research. Most MS students, and all doctoral students, do a thesis, whereby the student is involved in a long term project to investigate a bit of the unknown, and discover how things work, or how to make things work. Student researchers are members of teams, perhaps in laboratories, building relationships with their fellow graduate students and their faculty advisors. It usually turns out to be a very meaningful time in a person’s life, and the research product, especially a thesis, is something to be proud of.

Prepare now for graduate school. Graduate school is a scholarly activity, and to get admitted and to earn an assistantship, it is important to show evidence of scholarly potential. So do your best with your coursework, and get good grades. Get connected. As you develop interest in certain technical areas, identify faculty who do research in those areas, and talk to them. Become a member of a research group. Seek independent studies or paid undergraduate research projects. Look out for the summer internship program, and apply.

Applications for graduate school can be made at any time. Although there are stated deadlines, we do take last-minute applications from our MSU undergraduates. The sooner you apply, however, the better your chances of getting an assistantship.

For more information, see the Graduate Secretary, Aida Montalvo in the ME Graduate Program Office (2418 EB), or email her at megadad@egr.msu.edu.

Academic Advising

1) ME Freshmen & Most Sophomores are advised by Carmellia Davis-King. 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. 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 2009.)
When you ponder the world of communication, I think we all have a blind spot for certain activities that we feel are best left on the back burner or ignored completely. These might include a current resume, the ins and outs of creating a thank you letter, or the proper way to construct professional email. All of these get placed in the category of "If I need them, I’ll get around to them! or "Who really cares!" They are filed along with you on Facebook in a Speedo looking slightly drunk, until someone who WAS going to offer you a high paying job won’t return your calls and you start to panic. All of these are part of your life as a communicator, a communicator who presents in both the positive and the negative realms.

We could go on and on in regard to all these different forms of communication, but it is important to stop and look at one specific area where we as humans of the year 2009 are exceptionally pathetic. Reading and Following Instructions by Craig Gunn, ME Director of Communications

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by boldly going where everyone has gone before and saying, “What? Do you think I’m STUPID? An idiot could figure out how to do this!” Generally, we discover that we are idiots because we couldn’t get the project done and/or have destroyed whatever it was that we were attempting to assemble. After we have spent countless hours in frustration, some kind soul provides us with assistance and reads the instructions and allows us to complete the task.

So what does this have to do you and communication? This is very simple. Reading instructions and talking to oneself are critical forms of communication, communication with oneself. We must always make every effort to talk to and listen to the words we speak aloud or voice in our heads. Instructions are the clear example of words that get ignored, but that situation can be reversed if we choose to respect our own words and their importance in our lives. So, from now on, make an effort to read instructions and the rewards will follow.

Afraid of the Headlines Regarding the Job Market?
by Jennifer Jennings and Bernadette Friedrich

Are you afraid that upon graduation you will have to choose between working in Michigan, working in a field you love, or even getting a job in engineering at all? Well, the Center for Spartan Engineering can assist you in alleviating those fears. Let us tell you how we can do that!

As a proactive office that has career professionals trained to develop employer relations, prepare students for the workforce, and advise you on experiential education opportunities, this is what we suggest:

- Prepare a professional resume
- Register and utilize MySpartanCareer.com
- Consider what it is you love about Mechanical Engineering
  - Investigate companies that do what you like
  - Identify your skills that relate to your major and interests
  - Obtain those skills that you are lacking – they can be found in other experiences
  - Discover how to effectively communicate your passion, interests, and skills, as they relate to companies
- Explore non-traditional ways to connect with employers
- Don’t discount any company, industry, or career option. If you don’t get the response you want:
  - DON’T see it as a stop sign, but as a detour
  - DO ask for a referral, and tap into their network for additional resources

Opportunities abound in a variety of industries, locations, and areas of interest, don’t be discouraged. Many times students are paralyzed by what seems to be insurmountable obstacles. Although times are tougher, there are still opportunities that exist for all engineering students. Don’t hesitate to act on being prepared for when the market does open. We are here to help, but this requires your action in order for you to be successful.

Begin today at www.egr.msu.edu/careers or www.youtube.com/spartancareer.

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American Society of Mechanical Engineers

The American Society of Mechanical Engineers (ASME) is dedicated to helping students network outside the classroom and giving them a jump start in the workplace. ASME sponsors many events and is known for bringing in big name companies to speak. So far, ASME has brought in Dow Chemical, Shell, Harness Dickey & Pierce, Unisolar, and Eaton Corporation. If you are interested in attending the next presentation hosted by ASME, visit our website at www.egr.msu.edu/asm.

Company presentations aren’t the only events that ASME hosts. On February 12, ASME worked with elementary and middle school students at Impression 5 Science Museum. The children participated in a wind-powered car competition to help teach them the importance of renewable energy. On February 19, ASME hosted its annual Broom Ball game, and MSU students took to Munn Ice Arena in their shoes. However, ASME’s biggest event every year is “Junkyard Wars.” On February 20, five different engineering groups, including one graduate team, had one hour to build and test a wooden car that could hold at least one student and be pushed by two other team members. The teams raced for seven laps around the IM West tennis courts, where cart durability and weight were the deciding factors. Junkyard Wars is an annual event, so we look forward to seeing you there next spring. ASME and Pi Tau Sigma will be participating in Relay for Life on April 17 and 18. If you are interested or would like to donate to this event, please contact Dustin Colthorp, colthor6@msu.edu.

ASME membership links you to great career opportunities that other engineering students don’t have. Members gain valuable teambuilding skills and the chance to network with MSU faculty and outside industries. Being a member gives you the chance to speak directly with company presenters. Having trouble lining up an internship or a co-op for the summer? Joining a group like ASME is a great resume builder that sets you apart from the rest. One of the best benefits of joining ASME is access to over $100,000 in scholarship money available only to ASME members! To join ASME, just visit our website, www.egr.msu.edu/asm, or go to room 2328K in the Engineering Building to pick up an application. Membership is FREE for freshmen, so don’t wait until next year to join. Not a freshman? Membership to join the MSU chapter is only $35 per year. Questions can be answered at ASME general meetings by our E-board members. Aside from the networking opportunities and scholarships, ASME members also receive a free subscription to the Mechanical Engineering magazine.

Want to get your voice heard around the panel, other clubs and societies, or even the faculty in the College of Engineering? Then you should consider running for an officer position. Helping run a society like ASME gives students the real-world experience employers are looking for. Elections are held in the spring semester, and these positions need to be filled when graduating officers leave. So get involved with ASME and the College of Engineering and make the most out of your MSU education. Visit www.egr.msu.edu/asm for further details on meetings, event times and locations, community service, membership and more. Submitted by Louis Cervone, Newsletter Editor
Baja SAE

The MSU Baja SAE team is gearing up for their annual competitions, this year traveling to Auburn, Alabama; Milwaukee, Wisconsin; and Portland, Oregon. MSU Baja SAE races are Society of Automotive Engineers competitions that challenge teams to design, build, test, promote and race a single-person off-road vehicle. Three annual competitions test student knowledge in design, cost, sales and production events. Competitions also includes dynamic events: Acceleration, Maneuverability, Hill Climb, Sled Pull, Mud Bog, Rock Crawl and Endurance.

In 2008 the Baja team built and raced two cars at three races, Montréal, Tennessee, and Illinois. One of these cars was the first competitive 4 wheel-drive Baja car and was awarded the Navistar Standalone Creativity & Innovation Award. This award came along with a number of top 10 finishes.

For 2009 the team, led by Ken Maisonville and Matt Werner, will feature a brand new car, using an all new planetary gearing setup with intergraded differential. They will also be reconstructing the 4 wheel-drive car to best optimize its design.

If you would like more information about joining the Baja SAE race team you can visit their website at [www.michiganstatebaja.com](http://www.michiganstatebaja.com) or send an email to [michiganstatebaja@gmail.com](mailto:michiganstatebaja@gmail.com), Submitted by Ken Maisonville, Project Manager

Pi Tau Sigma

Pi Tau Sigma, the Mechanical Engineering honor society, has already been busy this semester and has many more events planned. We started off February with club participation in the Engineering Week Junkyard Wars, where student organizations raced to construct functioning devices with limited time and materials. Our much anticipated Wing Night at Buffalo Wild Wings was another great night of socializing and all-you-can-eat wings! Giving back to the community, Pi Tau Sigma volunteered at the Ronald McDonald House by making and serving food to those in need. Another service event relatively new to PTS was our cooperative work with the local Pet Co. helping to find dogs good homes.

There are still many upcoming events for this semester to keep our members and initiates active. Pi Tau Sigma will be hosting a Senior Elective Night on March 23rd which will provide a student perspective on the available Senior Elective classes. We are also scheduled to participate in the spring Relay for Life in April. Pi Tau Sigma’s biggest event of the year, the annual PTS Golf Scramble will be held on April 18th. It is a great opportunity for members and initiates to network with companies and enjoy a fun day on the green! The second MSU vs. U of M Sports Face Off is another upcoming event. On April 25th, come out and help the MSU Engineers put the wolverines in their place with a game of Ultimate Frisbee! Pi Tau Sigma has a planned a semester packed with events designed to demonstrate our core values of integrity, service, and leadership.

For more information about any of our events, please check out our website at [www.egr.msu.edu/pts](http://www.egr.msu.edu/pts). We hope to see you at upcoming events! Submitted by Amanda Ruhno, Secretary
**MSU Solar Car Team**

The MSU Solar Car Racing Team builds and races solar cars for intercollegiate competitions. This means that they are building from scratch a full-size, human-driven automobile powered entirely from solar energy. Zero stops for gas. Zero exhaust pollutants.

This June, the team will be racing in the Formula Sun Grand Prix. This is a 3-day track race where Michigan State will pit its engineering prowess against teams from Illinois State, North Western, University of Texas, and many others. The team is now in the final stages of production on their car in preparation for the race.

Participating on this team is an excellent opportunity to contribute to a team environment, take engineering beyond the classroom, learn new skills, and fight global warming. The team relies on team members with experience in mechanical engineering, electrical engineering, business operations, public relations, and more.

To find out more about the MSU Solar Car Racing Team and to learn how you can get involved, visit their website at [http://www.egr.msu.edu/solar](http://www.egr.msu.edu/solar) or stop by a weekly meeting at 7:00 pm Tuesday nights in 1234 EB.

Submitted by Rick Pocklington, Business Manager

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**SAE International Formula SAE**

Since the last newsletter, the Formula Racing Team has been busy with the manufacturing of Car 12, MSU’s 2009 Formula SAE car. Car 12, unlike the steel space-frame cars produced by the team for the past decade, is centered around a CFD-analyzed carbon fiber monocoque chassis and aerodynamic undertray.

The use of composites on Car 12 is much more prominent than on any of the MSU cars of the past. From the carbon fiber suspension control arms, to the underbody, to the steering wheel, the team has used composites extensively to reduce Car 12’s weight. At the Formula SAE competition in May, we hope to see 12 tip the scales at around 420 lbs – nearly 40 lbs less than 2008 Car 51.

In addition to the winter months being a high point for manufacturing, they also mark the largest outreach event that the team participates in: the North American International Auto Show. Thanks to the generosity of NAIAS LLC, EPJ Logistics, Tonic and a host of smaller display sponsors, the team was able to put on a large exhibit again in Michigan Hall. The theme for this year’s display was centered around Go Clean; the team’s environmental campaign and the ideology behind ‘greening up’ not only the final product of manufacturing, but the manufacturing itself. More information can be found at [msformularacing.com/goclean](http://msformularacing.com/goclean)

Submitted by Adam Zemke, Project Manager

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**Curriculum News (Cont’d from pg 3)**

 Haram 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.
Department of Mechanical Engineering

ME Senior Electives for 2009-2010

• The following ME Senior Elective list, including instructor assignments, was accurate as of March 6, 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](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 490 Independent Study. 1-4 credits. Requires Override ⇒ See #2 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. Lee.
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, MSE 250, and Tier I Writing. Thompson.
ME 490 Independent Study. 1-4 credits. Requires Override ⇒ See #2 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. Biomechanical Concentration Course. Wright.

ME 812 Conductive Heat Transfer. 3(3-0). Requires Override ⇒ See #5 in box. Prereq: ME 412 plus GPA of 3.5+. Wright.
ME 830 Fluid Mechanics I. 3(3-0). Requires Override ⇒ See #5 in box. Prereq: ME 332 plus GPA of 3.5+. TBA.
ME 860 Theory of Vibrations. 3(3-0). Requires Override ⇒ See #5 in box. Prereq: ME 461 plus GPA of 3.5+. TBA.
SPRING SEMESTER

ME 442# Turbomachinery. 3(3-0). Prereq: ME 332. Engeda.
ME 445# Automotive Powertrain Design. 3(3-0). Prereq: ME 444. Novak.
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. Averill.
ME 477 Manufacturing Processes. 3(3-0). Prereq: ME 222, MSE 250, and Tier I Writing. Thompson.
ME 478 Product Development. 3(3-0). Prereq: ME 477 and Tier I Writing. Thompson.
ME 490 Independent Study. 1-4 credits. Requires Override See #2 in box. You may reenroll for a maximum of 6 credits.
ME 495 Tissue Mechanics. 3(3-0). Prereq: ME 222. Biomechanical Concentration Course. Haut.
ME 497 Biomechanical Design. 3(3-0). Prereq: None for ME majors. Biomechanical Concentration Course. Reid-Bush.
BE 445 Biosensors for Medical Diagnostics. 3(3-0). (BS 111) and (CEM 141) and (ECE 345). Biomechanical Concentration Course. Alocilja.
MSE 425 Biomaterials & Biocompatibility. 3(3-0) Prereq: PSL 250 or concurrently and MSE 250. Biomechanical Concentration Course. Baumann.
MSE 466 Fracture & Failure Analysis. 3(2-3). Prereq: MSE 250 and Tier I Writing. Recommended background: MSE 320 and 331. For more info See #4 in box. Lucas.
ME 802 Advanced Classical Thermodynamics. 3(3-0). Requires Override See #5 in box. Prereq: ME 412 plus GPA of 3.5+. Genik.

OVERRIDE INSTRUCTIONS

1. General Procedure: To request an override for an ME course, complete and submit the ME Override Request Form: [http://www.egr.msu.edu/me/undergrad/forms](http://www.egr.msu.edu/me/undergrad/forms) [Click on Forms & Handouts]. Please note that the ME department cannot overfill required courses to resolve conflicts with Senior Electives, Other Electives, Integrative Studies courses and employment schedules.

2. 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, return the form to the ME Advising Office for the remaining signatures, override, and enrollment.

3. 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 [griffor@egr.msu.edu](mailto:griffor@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 first meet with Gaile to plan a long-term schedule.)

4. 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.

5. Complete the Graduate Course Override form, available in the ME Advising Office in 2560 EB. This is a paper form. NOTE: Instructor assignments for most ME graduate courses were not available at press time, but they should be available in May.

March 23: Pi Tau Sigma Event: Senior Elective Night in 1345 EB. Time TBA

April 3: Computer/Telephone enrollment begins for Fall '09 / Spring '10.

April 18: Pi Tau Sigma Event: Golf Scramble. Starts at Noon. See page 7 for info.

April 24: ASME Event: Spring Tailgate (“The Gathering”) at Dr. Somerton’s house.

May 1: Design Day in the MSU Union. See you there!

May 4-May 8: Final Exams.

May 8: University Undergraduate Student Convocation 1:00 in Breslin.

May 10: College of Engineering Undergraduate Commencement Ceremony, 1:30 p.m. in Breslin. Lasts about 2 hours.

May 18-July 2: First Summer Session.

July 6-Aug 20: Second Summer Session.

May 18-Aug 20: Full Summer Session.

August 13: First Fall 2009 Minimum Tuition & Fee payment due.

September 1: Application deadline for October FE exam.

September 2: Fall Semester classes begin.

Design Day

Friday, May 1, 2009
MSU Union

Come and see our students lead, create, and innovate

Activities include:
- Competitions
- Presentations
- Demonstrations
- Awards