

# ME Bulletin

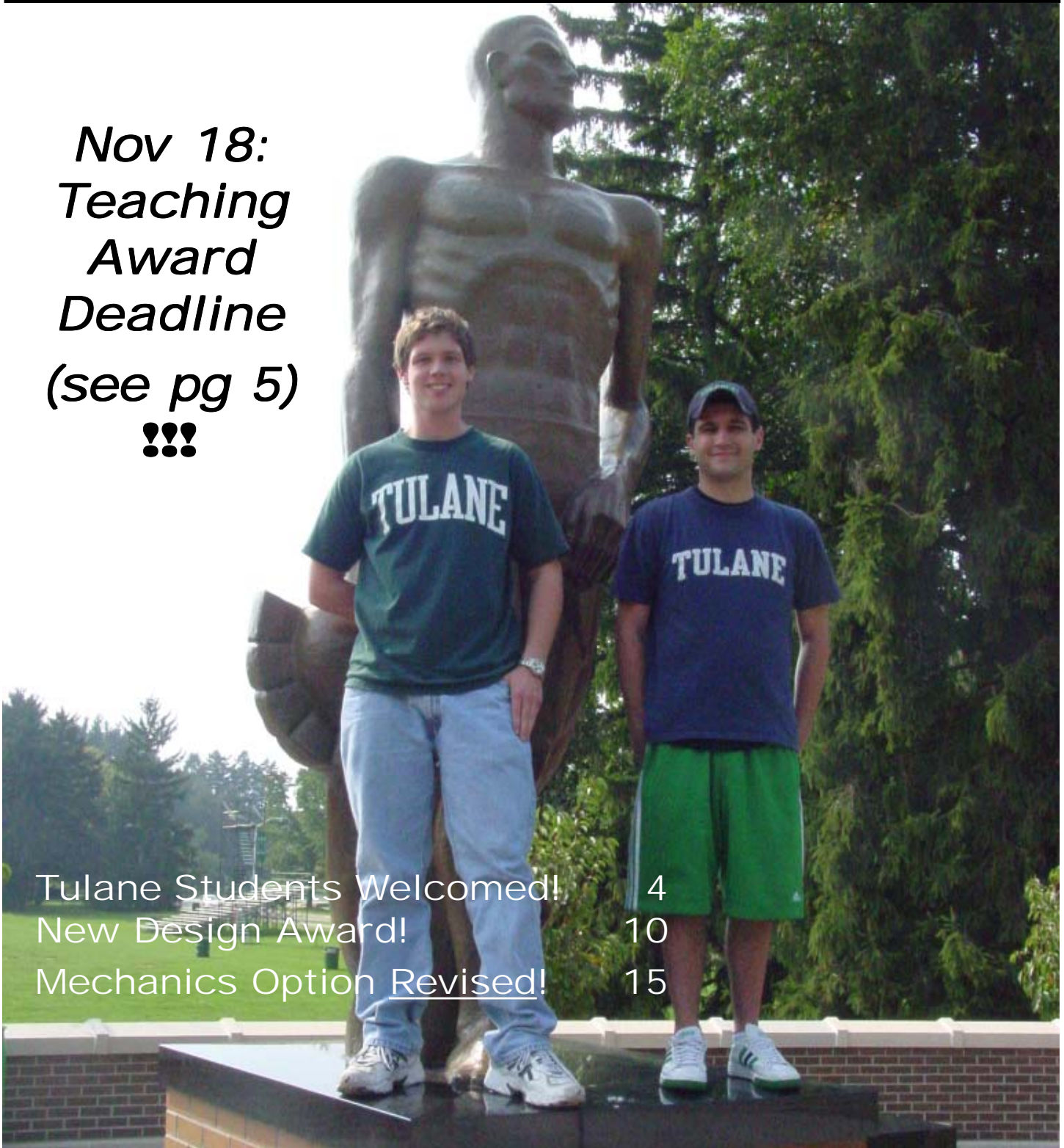
News for  
Mechanical  
Engineering Majors

Vol. 43, No. 1

ME Advising Office • 2560 EB • 355-3338

Fall, 2005

**Nov 18:  
Teaching  
Award  
Deadline  
(see pg 5)  
!!!**



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*In the wake of Hurricane Katrina, Tulane University in New Orleans had to close for fall semester, and two Tulane students, Stephen Casey (ME Senior) and Steven Johnson (ME Junior), are spending Fall 2005 at MSU. Turn to page 4 and read their stories!*

Department & College News



**Professor Nikolai Priezjev** has joined the faculty as an assistant professor. He received his Ph.D. from Brown University in 2002. Dr. Priezjev conducts research in the area of transport phenomena in micro- and nano- fluidic systems. In his spare time he enjoys playing tennis and chess. Read more about his research on page 8.



**Professor Clark Radcliffe** has been appointed to the position of Associate Chair for the Graduate Program. He is also the recipient of the 2005 Withrow Teaching Excellence Award. Read more on page 5.



**Professor Tom Wolff**, Associate Dean for Undergraduate Studies and Associate Professor in the Dept. of Civil Engineering,

is serving as a consultant to the Army Corps of Engineers on levee design and risk assessment as a result of the damage done by Hurricane Katrina.

**Joseph Klewicki** (B.S. '83, Ph.D. '89) was the recipient of the ME Distin-

A Word From the Chair

A belated welcome to the 2005-06 academic year. If this is your first experience of the Department of Mechanical Engineering then I hope that you have found us a warm and friendly community of scholars. I use the word 'scholar' in its broadest sense:



DEREK HALLFORD

**Scholar** *n* **1** someone who attends a school or studies under a teacher; a pupil **2a** someone who has done advanced study in a special field **b** a learned person **3** the holder of a scholarship (extract from *Longman Dictionary of the English Language, 1984*)

If you are returning to the Department then I would like to encourage you to consider enrolling for further study through a Masters or PhD. You can move from definition #1 above to #2 and we can arrange for some of you satisfy #3 in the process. If you are interested please talk to our new Associate Chair for Graduate Studies, **Professor Clark Radcliffe**. Submitted by Professor Eann Patterson, ME Chairperson.



guished Alumni Award for 2005. He was honored during the College of Engineering commencement ceremony last May.

**The MSU Board of Trustees** has approved a \$10 million re-locaton, expansion and construction of the Energy and Automotive Research Laboratory facility addition to the Research Complex Engineering (RCE). The new facility, which will house more than 29,000 square feet of space, will include labs for powertrain and energy research, as well as two new engine test cells with a shared control room, faculty and graduate student offices and conference rooms.

Groundbreaking will be held in November with completion schedule for 2007.

**The MSU College of Engineering** has been ranked 5th in the nation as a top engineering graduate school for Hispanics, according to information released Monday, September 19, by *Hispanic Business* magazine. *Hispanic Business* magazine reports on cultural trends and institutions important to the U.S. Hispanic community. Since 1998, they have been compiling the list of top business and law schools for Hispanic graduate students. This is the first year that engineering schools have been included.

ME Bulletin

The *ME Bulletin* is published once each semester for sophomores, juniors, seniors, faculty, and staff of the Department of Mechanical Engineering. Photographs were taken by Craig Gunn unless noted otherwise.

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## Curriculum News

### Academic Advising:

• *ME freshmen and Sophomores* are advised by **Amy Radford** in the Freshman/Sophomore Advising Office. To schedule an appointment, please call 355-6616 x 1, or go to 1415 EB.

• *ME Juniors and Seniors* are advised by **Gaile Griffiore**. To schedule an appointment, please call 355-3338, or go to 2560 EB.

**Co-op Students:** Before you leave for your Spring 2006 co-op rotation, please be sure to discuss your schedule for next Fall 2006 / Spring 2007 with your academic advisor.

**Engineering Mechanics Option** requirements have changed. See page 14 for information.

**ME 180–Engineering Graphic Communications** will be offered next summer during the Second Session.

**ME 481–ME Design Projects** now requires department approval before you can enroll, and you must take this course during your last semester (or spring for August graduates). To obtain approval, please schedule an appointment with Gaile to finalize your long-term schedule. To make an appointment, you can either call 355-3338 or stop by 2560 EB and ask Bobbie to add you to the calendar.

**ME 491/601–Technical Communications** (2 credits) is on the spring schedule. Instructor: **Craig Gunn**, ME Director of Communications. To enroll, obtain an override from Craig Gunn. *IMPORTANT: This course is an Other Elective. It is not a Senior Elective.*

**Class Standing.** ME juniors and seniors can obtain this information in 2560 EB. Sophomores should go to 1415 EB. Be prepared to show your MSU I.D. Sorry, this information cannot be given over the phone.

**Job Search Advice:** **Jim Novak** from Career Services & Placement is available to answer questions about job

## Associate Chair's Corner by Professor Craig W. Somerton



How do courses get scheduled? I believe that there may be some student interest in the answer to this question. This activity falls under my responsibilities as Associate Chair for the Undergraduate Program, so I am the person to answer it.

Every September the department receives a request from the Registrar to submit Fall, Spring, and Summer semester schedules for the next year by early October. Note how far in advance we are doing this scheduling. For example, this October **Gaile** and I submitted the schedules for Summer 2005, Fall 2006, and (believe or not) Spring 2007.

Scheduling is an activity that Gaile and I do together. We normally spend about three hours going through the grids (Gaile's spreadsheets of the ME course schedule) looking at enrollment trends, and reviewing any student or faculty comments we have received. We always start with the current year's schedule and work from there. We have to make sure that courses are not scheduled in conflict with other courses students may be taking. For example, we would avoid scheduling ME 410 and ME 471 at the same time. Several years ago the department decided that it would schedule its courses on a MWF basis, leaving Tuesday and Thursday for labs. But there are only seven class periods during the day, so it becomes a real jigsaw puzzle. Hence, there have to be some 8:00 a.m. classes and 4:10 p.m. classes.

Once Gaile and I are convinced that we have the optimal design solution, it is submitted to the administration, where classrooms are assigned. The department has just a little input on what classrooms should be assigned, and although we always request that our classes be held in the Engineering Building, it doesn't always work out well for us. When the administration tries to solve their jigsaw puzzle of schedules for 100+ programs, we sometimes end up with classes in Olds Hall, McDonel Hall, or Ernst Bessey Hall. Occasionally, we try to move these classes back closer to our building, and while Gaile and her secretary Bobbie are wizards on the classroom assignment system, sometimes it just can't be done. Another issue that makes this particularly challenging is that there are only two classrooms in the Engineering Building that have capacities over 70 students and these rooms are booked from 8 a.m. to 8 p.m.

I hope you now have a better idea how your courses get up on the web when you enroll in March-April. My door is almost always open and I thoroughly enjoy talking to students. So, please feel free to stop by my office (2439 EB), whether it's just to say hello or to ask a question about the program or discuss a problem.



searching. To schedule an appointment, go to <http://www.csp.msu.edu>, click on Student, scroll down to "Meet with a career advisor," and sign up. Or, call 355-9510 x 335. *IMPORTANT: Jim Novak does NOT take walk-ins.*

**Prerequisites.** The ME department expects all students, *including members of the Honors College*, to observe all course prerequisite requirements. If

you have a question about prerequisites, contact the ME Advising Office.

## Scholarships

Applications for the 2006-07 College of Engineering Scholarships will be available at the beginning of spring semester in 1415 EB. Students with a 3.5+ GPA are encouraged to apply. Deadline: March 17.

## COVER STORY: Tulane Students, Steve Casey &amp; Steve Johnson, Tell Their Stories!

**From Steve Casey:**

Steve Casey

There is no other city in America like New Orleans. Its variety of music, architecture, historical influences, ethnicity, and walks of life combine to form a culture richer than almost any in the world. Tulane University, my "home" university, has been a part of that culture since 1835 when it was known as the Medical University of Louisiana. Since then it has become one of the top institutions of learning in the United States, with about 8,000 undergraduate and 4,000 graduate students.

Due to the devastation of Hurricane Katrina, Tulane was unable to open this semester. This led me to enroll at Michigan State, where I'm working to satisfy the Tulane senior Mechanical Engineering (ME) curriculum with MSU classes. This isn't easy, (the two programs certainly have their differences), but has been going well so far.

The schools themselves are quite different too. For example, walking from one end of Tulane's campus to the other takes 15 minutes. I know all the professors in my department, and I know every student in my senior ME class. There are dorms, apartments, computer labs, and design shops dedicated to upper-class students (not to mention the palm trees and other tropical plants that adorn the campus). Its location, directly in the center of Uptown and just a streetcar ride away from downtown (and the Bourbon Street everyone seems to know), makes for a unique and I believe unparalleled college experience.

Every year since I enrolled, Tulane has been evacuated for hurricanes. My first year I took the opportunity to visit Baton Rouge. Last year I went to Memphis. Consequently, until two months ago hurricanes didn't worry me much.

However, what happened this year was not unexpected. You can't

hold off Mother Nature indefinitely, and the fact that this has been known for years makes the mismanagement of the relief effort astounding to me. New Orleans is below sea level, protected by levees (which were controversial even before Katrina), and before my freshman year the book *Rising Tide*, about the Mississippi River flood of 1927, was required reading. Every student at Tulane knew what would eventually happen, similar to the way everyone on the California fault line knows there will eventually be an earthquake. Unfortunately, prior knowledge hasn't detracted from the damage.

I should mention that MSU has been exceptional in welcoming the displaced New Orleans students. All money paid to Tulane and other New Orleans schools (Xavier and UNO) is still inaccessible, and under the circumstances MSU has been very generous, offering (for example) free books, free bicycles, and free gift bags.

I am happy to say that Tulane intends to re-open in January. At that time I plan to be part of the resurgence of New Orleans, where recovery is slowly taking place, thanks in no small part to the support of communities like MSU. *Submitted by Steve Casey.*

**From Steve Johnson:**

Steve Johnson

I am Steven Johnson, an ME junior from New Orleans' Tulane University. After Hurricane Katrina caused serious damage to the city and the university, Michigan State allowed me to come to East Lansing and attend classes. I was raised in the Lansing area, and graduated from Lansing Eastern High School.

The Tulane semester was scheduled to start on a Wednesday, but the weekend before, the city of New Orleans issued a mandatory evacuation. My roommates had returned to town the Friday before, and we celebrated in typical New Orleans fash-

ion, partying until the not so early hours of the morning. The next morning I awoke to friends calling and asking what I was going to do about the hurricane that I knew nothing about. New Orleans formerly had a happy go lucky attitude regarding hurricanes. Last school year, school was cancelled for a week because of Hurricane Ivan, although in the end it veered away and caused no damage to New Orleans. The general feeling was that this was just going to be another close call. My roommates got together and drove to a friend's house in Lake Charles, Louisiana. The only things I brought with me were my car, cell phone, and a backpack full of clothes. For the next week I was glued to the television with about twenty other students, watching in horror as the events played out on the news. After about a week it was apparent that we would not be going back to New Orleans anytime soon, so I drove with one friend back to Michigan and started classes at MSU the following week.

Tulane and MSU are statistically very different Universities. Tulane has approximately eight thousand undergraduates, and a campus that only takes a fifteen minute walk to get through. I considered going to MSU but the size was too daunting, and I thought I wanted to get away from home. While the size of the campus is still a negative for me, especially on the long cold walks to class, the engineering school offers a sense of community that I thought I would be missing. The MSU community has been exceedingly accommodating and welcoming. I was able to enroll, in all my required classes in just one morning; the bookstore loaned me textbooks free of charge; and students have befriended me in all my classes. MSU also has a few things to offer that Tulane lacks. I have been able to attend most of the home football games, and the tailgating and huge student attendance is something you can only get at a larger school. *Submitted by Steve Johnson.*

## Professor Radcliffe Receives the Teaching Award



HARLEY J. SEELEY

**Professor Clark Radcliffe** received the 2005 Withrow Teaching Excellence Award last April. He was presented with an inscribed plaque, a medallion to wear at commencement ceremonies, and a small stipend.

A committee consisting of the last three faculty award winners, plus student representatives from ASME, SAE, and Pi Tau Sigma, made the selection after reviewing and discussing nomination forms submitted by ME juniors and seniors.

Dr. Clark Radcliffe has been at Michigan State University since 1980. He has experience as an engineer in the aerospace industry and served as an engineering officer on a 210' ship in the United States Coast Guard. He served a tour as an engineering instructor at the U.S. Coast Guard

## Tutoring

•The Diversity Programs Office offers free tutors until the end of November. For more information, go to the following link:

<http://www.egr.msu.edu/egr/departments/dpo/academicassistance/glc/index.php>

•Graduate students in mechanical engineering can be contacted through the ME Advising Office. These tutors charge a fee, which you can negotiate with them. To find a graduate student tutor, send an email message to Gaile Griffore ([griffore@egr.msu.edu](mailto:griffore@egr.msu.edu)).

Academy, and in 1980 he received his Ph.D. from the University of California for his work in the dynamics and control of circular saw vibration. He has served as an associate technical editor of two professional journals, chair of the ASME Dynamic Systems and Control Division, and as a member of the Systems and Control Operating Board of ASME. He has been recognised as a Fellow of ASME.

Dr. Radcliffe's research and teaching interests are in the area of dynamic systems and control with specific interests in the interfaces between mechanical, electrical and computer systems. Particular applications include automotive noise control, structural dynamics and electro-mechanical system design. His research has been funded by the National Science Foundation, the major automotive companies, and the Department of Defense.

Dr. Radcliffe has a particular quality that is both respected and admired by students—being available for counsel and friendship. Education does not end as he walks out the door; rather, education is an integral part of the way he draws students into the excitement of mechanical engineering. As one student put it, "He cares about our lives as well as our studies."

Professor Radcliffe and his wife Arlene have three children, Nate, Isa, and Elliott, all of whom are MSU grads or current students. In his spare time, Dr. Radcliffe enjoys fishing and building log cabins.

## Nominate a Prof for the 2006 Teaching Award!

ME Juniors and seniors have until **Friday, November 18** to nominate an ME faculty member for the next Withrow Teaching Excellence Award. The nomination form is located at:

<http://www.egr.msu.edu/egrprograms/bachelorswithrow.php>

The selection committee will include student representatives from ASME, SAE, and Pi Tau Sigma, and the winner will be announced in April.

Prior to 1991, ME was the only department in the College of Engineering with an annual teaching award, which was called the ME Outstanding Faculty Award. Here is a list of past recipients, including those who transferred to ME from the MSM department in 2001:

1984	Ronald Rosenberg
1985	Charles St. Clair
1986	Merle Potter
1987	Craig Somerton
1988	Ronald Rosenberg
1989	Charles St. Clair
1990	Alan Haddow
1991	Manooch Koochesfahani Thomas Pence (MSM)
1992	Craig Somerton Gary Cloud (MSM)
1993	John McGrath
1994	Alan Haddow Dahlin Liu (MSM)
1995	Brian Feeny
1996	John Foss Robert Hubbard (MSM)
1997	Alex Díaz
1998	Craig Somerton
1999	Indrek Wichman
2000	Ronald Rosenberg Patrick Kwon (MSM)
2001	Alan Haddow
2002	Farhang Pourboghrat
2003	Craig Somerton
2004	Gary Cloud
2005	Clark Radcliffe

## MSU Students in Aachen, Germany

The exchange program that allows up to 10 MSU ME students to take MSU-credit classes (GRM 102 and ME 410) and to carry out research work (ME 490) at the RWTH-Aachen will celebrate its 23rd year in 2006. Seven ME seniors will experience this historic (Charlemagne – 800 A.D.) and student-oriented western-most city in Germany during the mid-January to end of April time period. The RWTH-Aachen (short for Rheinisch-Westfälischen Technischen Hochschule-Aachen) is one of the premier technical universities in Europe. A good analogy is to consider it to be “their MIT.”

Our students’ 490 projects will be in the Aerodynamics Institute, the Automotive Institute, the Helmholtz Institute for Biomedical Engineering, and the Plastics Processing Institute. They will have private sleeping rooms in the RWTH dorms and their institute projects will provide the opportunity to “get to know” the German colleagues of that institute, as well as their instructors for Heat Transfer and the GRM 102 language course.

The weekly schedule includes cultural tours and tours of technical interest interspersed within the semester. Their 12-credit academic schedule is set for Monday through Thursday, allowing time for our students to “expand like a gas” throughout Europe during the long weekends.

Our corporate sponsor: ZF Industries of Friedrichshafen, Germany and Northville, MI, have provided two ZF Scholar positions for 2006. Our agreement is that 1-3 ZF Scholars per year will be identified. Summer employment in Germany or Michigan is provided through this scholarship.

Returning students are the ones who are most knowledgeable about this unique experience. Email contact with them can be made through **Prof. J. Foss** at [foss@egr.msu.edu](mailto:foss@egr.msu.edu).

Interested persons are invited to first discuss their academic schedule planning with **Ms. Gaile Griffore**. Prof. Foss can be contacted for further information regarding the program structure. *Submitted by Professor John Foss.*

## Program Update – Study Abroad Program in Russia

Mechanical Engineering students have a great opportunity to study abroad in Russia during Summer 2006! This continuing University-wide program offers classes from a variety of disciplines. Most relevant to ME majors are the fundamental engineering courses *CE 221 – Statics* and *ME 361 – Dynamics*, as well as the statistics course *STT 351 – Statistics for Engineers*. In addition to these established technical learning opportunities, students will also have the opportunity to take important courses in mathematics. In particular, *MTH 234 – Multivariable Calculus*, *MTH 309 – Linear Algebra I*, *MTH 320 – Analysis I*, and *MTH 340 – Ordinary Differential Equations I*, will be offered and taught in 2006 based upon student demand.

Starting in Summer 2005, and continuing this coming year in 2006, students also will have an opportunity to spend the entire summer in Russia and complete an engineering internship. CEE senior **Sean M. Fitzgerald**, who participated in this aspect of the program in 2005, commented:

*“I learned many useful skills that they do not teach in the university and wrote a technical report that I can submit to information technology contests, and also be proud of for years to come. Overall this was a wonderful experience.”*

As in previous years, there is more to the program than just engineering study. Students also have multiple options to fulfill their IAH graduation requirements. Two popular choices are *IAH 221(C) – Russian Language and Culture* and *IAH 221(C) – World War II – The Eastern Front*. The

latter course is dedicated to the critical role that Russia played in the evolution and conclusion of World War II. Last summer the course was offered for the first time and was a tremendous success. Indeed in 2005, Materials Science senior **Bradley Hall** traveled to Russia for the second time and wrote of the course:

*“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. Considering the significant and heartrending history presented in the context of the course, I would strongly recommend IAH 221C (World War II – The Eastern Front).”*

Another innovation in this growing program (started in 2005) is the unique opportunity for students to visit Prague, the capital of Czech Republic and one of the most beautiful cities of Eastern Europe. Expanding on this travel “add-on” component of the program, the option of visiting beautiful Kiev, the capital city of Ukraine, will be offered to students.

Enrollment in the program last summer (2005) reached 59 students – including two students from Mechanical Engineering, and representing all but one department in the College of Engineering. So far this year, more than 100 students have expressed an interest in participating during Summer 2006. To learn more about these prospects contact **Elena Y Selezneva** in CEE ([seleznev@msu.edu](mailto:seleznev@msu.edu)), **Dr. Craig Somerton** ([somerton@egr.msu.edu](mailto:somerton@egr.msu.edu)) in ME, or **Ms. Gaile Griffore** ([griffore@egr.msu.edu](mailto:griffore@egr.msu.edu)) in ME as soon as possible. Additional information about the program is available online through the program web-site at <http://www.msuabroadinrussia.com/> where you can download a PowerPoint presentation with numerous pictures from previous trips as well as register on this site to receive news and updates. Information is also available through **Dr. Mason’s** website at <http://www.albion.edu/mathcs/dmason/russia.htm>.

## 76 Seniors to Graduate in December!

Congratulations to all mechanical engineering graduates! On behalf of the ME 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 October 13. If your name is missing, please contact me immediately (Email: [griffore@egr.msu.edu](mailto:griffore@egr.msu.edu) / Tele: 517-355-3338).

Sameer Hassan Ashaibi  
Melanie Ann Badgley  
Steven James Barwin  
Matthew William Beacom  
Christopher Stuart Bibby  
Ryan Anthony Boertman  
Neil Jason Bokemeier  
Christopher David Bolin  
Christopher Carl Bolten  
Dylan James Caddy  
Daniel Allan Carps II  
Kristofor Carl Colpean  
Brandon Michael Dawson  
Mitchell James DeJonge  
Sebastian A Dorado  
Kevin Patrick Douglass  
Emily Nicole Driggett  
Paul Robert Elsey  
Michael Edward Fullerton  
Gregory Jon Gartland  
Michael David Godlew  
Jonathan Arthur Gould  
Michelle Anne Haddad  
Ryan Eric Hager

David Thatcher Heckel  
Rino Jaya Hilman  
Jason D Hunter  
Timothy Jon Hunter  
Dan Teodor Ionescu  
Marc Adam Issner  
Brianna Lynn Jablonski  
Robert LeRoy Johnson  
Anil Mohan Kamat  
Marc Edward Kaweck  
Eric James Keefe  
Megan Lynn Kelley  
Nicholas Carl LaPlaca  
Matthew Kyle Lassiter  
Peng X Lee  
Carl William Luyendyk  
David Henry Majeski  
Ryan Dean McCollum  
Margaret Rose McHale  
Andrew Michael McMaster  
Ashley Lynn Miller  
Viraj Anand Mokashi  
Mark Hubert Moulard  
Alexander Roy Nee  
Scott Joseph Neideck

Devin Thomas O'Connor  
Kristen Marie Papuga  
Young Ho Park  
Nicholas John Periat  
Paul Joseph Podzikowski  
Saleel Sanjeev Pradhan  
Kate Elizabeth Presnell  
Steven Michael Quinn  
Stephen Joel Michael Richert  
Ciara Marie Royal  
Erik Scott Schubert  
Matthew Russel Schwartz  
Logan Travis Scott  
Martha Emily Smith  
Michael Eugene Syrylo  
Timothy Thomas Terry  
Matthew Christopher Thurman  
Tomislav Tomovski  
Trung Quang Tran  
Jared Vermeulen  
Shawn Patrick White  
Bryan Vincent Wiedyk  
Danielle Christina Wigley  
Trevor James Winter



## Summer Job Tips

**Construct** a resume. Send it, along with a cover letter to companies in your home town or other preferred locations. Do not overlook small and medium sized companies. Be politely persistent and follow up with another letter, telephone call, or a personal visit. Type all correspondence.

**Register** with Career Services and Placement in 113 SSB. Go to the CSP website at <http://www.csp.msu.edu/>. Click on "STUDENTS," then click on "Sign up for SpartanTRAK/InterviewTRAK" and register. SpartanTRAK provides electronic want ads for internships, summer, on-campus and off-campus jobs.

InterviewTRAK allows you to sign up for on-campus interviews.

**Visit** the Career Development Center in Room 6 of the Student Services Building to use CareerSearch, a web-based data base containing thousands of employers categorized by Industry, Location, and Key Words.

**Consult** these sources: professors, relatives, friends, ME seniors, telephone books, manufacturers' directories from local chambers of commerce, *Peterson's Guide*, and the *College Placement Annual*.

**Watch** your email for summer job notices from the ME Advising Office.

## Think About Graduate School

It's Fall semester – think about graduate school. There are several reasons why you should consider the possibility. Graduate school will help your career. Graduate school is intellectually rewarding. Finally, many students qualify for financial support. The time for preparing an application is now. It is not too late for Spring semester at MSU and many Fall 2006 fellowship applications are due in November.

Graduate school enhances the quality of your professional experience. Achieving a higher level of qualifications in a technical area that you enjoy will increase your ability to find employment in that area. Graduate degree course work allows you to develop special experience for a potential employer well beyond the undergraduate level. The graduate degree thesis document is a personal record of your ability to independently attack and solve a technical problem. The opportunity to submit such documents is rare in your technical career – most of your engineering work in industry is proprietary. It is not often that you can go to an employer, lay a document on the table and say "Here is what I can do."

Graduate school allows you to learn high-level technical skills in a challenging environment among an elite group of students who have decided to go one step further in their technical education. Classes are smaller and more challenging. As an undergraduate, you learned *what* engineering methods to use and *when* they should be used. As a graduate student, you learn more about *why* methods are used and develop the skills needed to develop the *new* methods needed to advance engineering technology.

There are two basic graduate degrees: the Master of Science (MS) and the Doctor of Philosophy (Ph.D.).

# Micro- and Nano- Fluidics Research by Professor Nikolai Priezjev

The transport and manipulation of small amounts of fluids are crucial for emerging technologies. A brisk demand for micro-devices, which are used for the transportation of nanovolume liquid samples, gave rise to a new exciting field called microfluidics. This field combines various disciplines including engineering, chemistry, physics, and biology. The long range goal in modern technology is a reduction in size and the further development of microfluidic devices, which could be used for diagnoses of diseases, for the autonomous or remote detecting of biological and chemical agents, and for gene and drug delivery.

An optimal design of such devices, however, needs an understanding of the fundamental aspects of interfacial phenomena and particularly an accurate prediction of the fluid transport through tiny structures consisting of glass or silicon channels. For large surface to volume ratios, the **boundary conditions** at the liquid/solid interface become increasingly important. For example, during the last ten years there has been enormous interest in the slip behavior of fluid films at solid interfaces and, in particular, in determining what is the proper boundary condition at such interfaces.

Our research is focused on numerical simulations of simple fluids, polymers and liquid crystals that are confined to nanometer ( $1\text{nm}=10^{-9}$  meter) length scales. We use the classical **molecular dynamics** method, which is based on integration of the Newton's equations of motion for each fluid particle. Molecular simulations can provide detailed information about the local structure and statistical properties of confined fluids, which currently cannot be obtained from either theory or experiment.

A particular area where such simulations are important is the in-

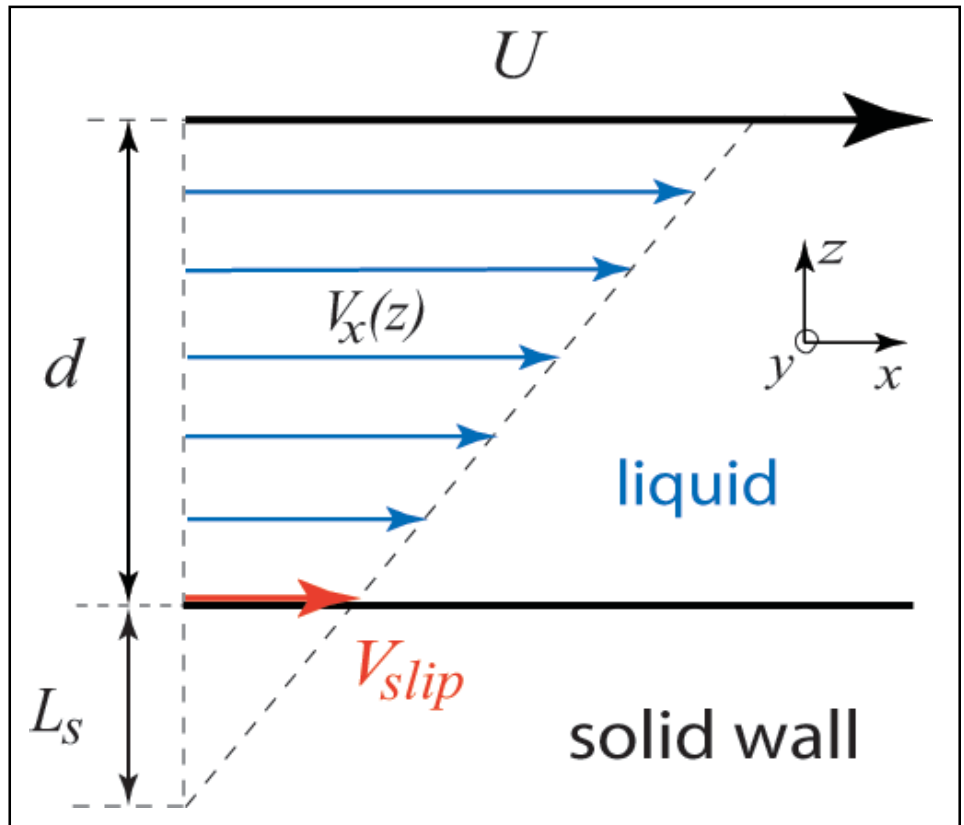


Figure 1 A schematic representation of the simple shear flow profile in the presence of slip boundary conditions at the interface. The measure of slip is the so-called slip length, which is defined as an extrapolated distance relative to the wall where the parallel velocity component vanishes.

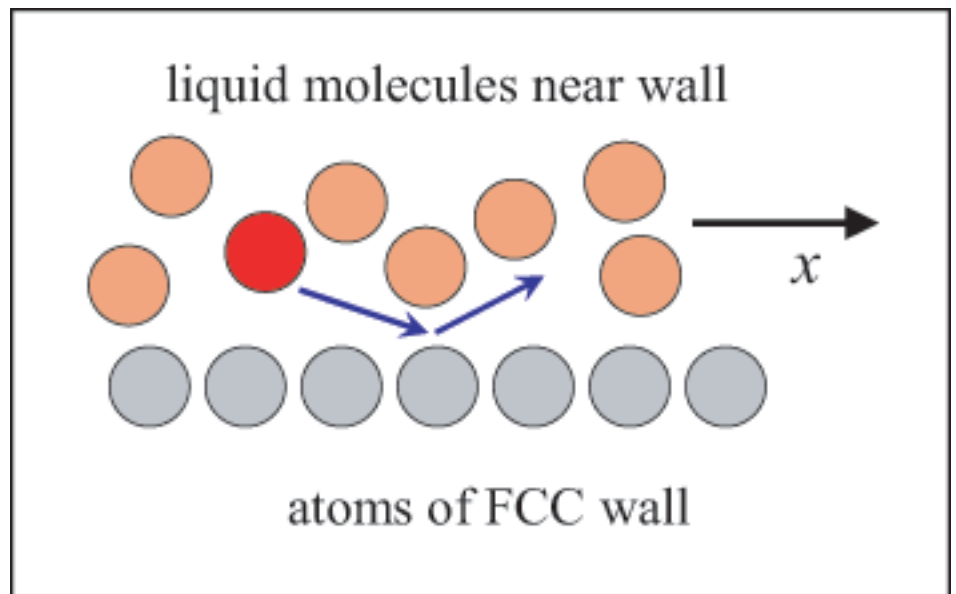


Figure 2 Molecular dynamics simulations are used to resolve the region near the interface on a molecular level. Time integration of the equations of motion provides positions, velocities, and accelerations along the trajectory for each molecule.

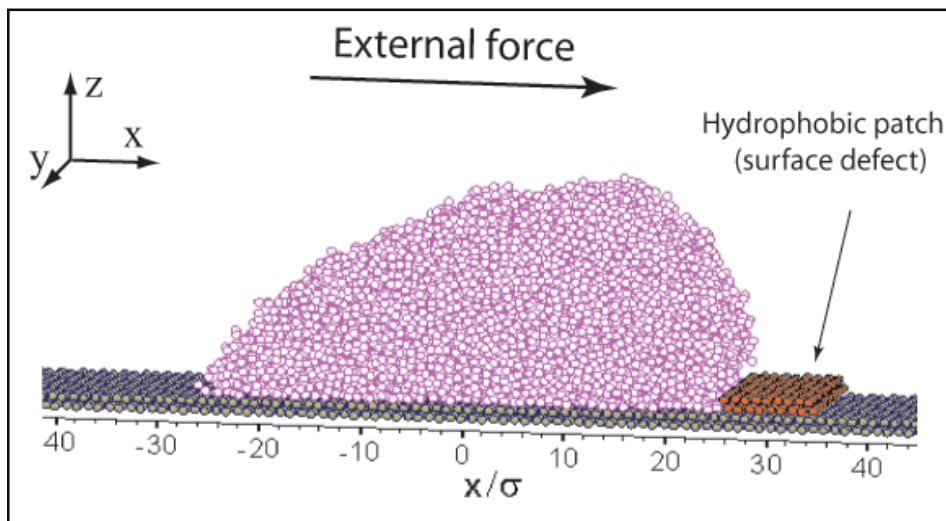


Figure 3 A typical configuration of a polymeric droplet wetting the substrate. An external force is applied to each fluid molecule in the x direction. A surface defect with thickness of only two molecular diameters is sufficient to distort significantly the equilibrium shape of the droplet and pin the contact line!

interface separating liquid and solid phases. A simple fluid shear flow can be greatly affected by the presence of slip at the interface; see Figure 1. Slip boundary conditions are very sensitive to the details of the liquid on a solid system. We use the molecular dynamics technique to resolve the structure and dynamics of fluids near the interface on a molecular level; see Figure 2. In our research, we investigate the effects of the structure of the substrate on the slip at the boundary including the influence of chemical patterning, surface roughness on multiple length scales, and nucleation of nanobubbles at hydrophobic interfaces.

Surface defects and chemical heterogeneities usually hinder the transport of small fluid droplets by pinning or slowing down the motion of contact line. An example taken from everyday life is a raindrop sticking to a car window. Under an external force, the spherical shape of the droplet becomes distorted leading to a difference between the advanced and receding contact angles. Figure 3 shows an example of the large angle difference in a small fluid droplet obtained from our numerical simulations. This study could be relevant to important practical applications, e.g. the oil extrusion from porous materials.

Currently, we are working on problems involving the contact line, including studies of the fluid droplet spreading, pinning of the contact line, and thermocapillary transport in microfluidic systems. To obtain more information about current projects, recent publications, movies and the description of simulations, please visit our web site <http://www.egr.msu.edu/~priezjev> or stop by the office 2465 EB to discuss any aspect of the current research.

## Dean's List

Congratulations to the following 163 ME department students who made the Dean's List after Spring and Summer 2005. To be on the Dean's List, you must have a semester GPA of 3.5 or better. *NOTE: These names were taken from the Registrar's official website on October 12: <http://www.reg.msu.edu/ROInfo/GradHonor/DeanList/DeanList.asp>. For updates, please consult the website.*

### SPRING 2005

Christine Abele, Jason Aerts, Elizabeth Alexander, Katherine Allen, Andrew Armstrong, Nicole Arnold, Melanie Badgley, Andrew Ball, Kayla Batchelor, Matthew Baur, Jeffrey Bazzi, Matthew

Beacom, Douglas Bingham, Jesse Black, Ryan Boak, Lindsay Bockstiegel, Neil Bokemeier, Christopher Bolin, Christopher Bolten, Agatha Bone, Ian Bone, Justin Bradford, Jerrod Braman, Adam Brannan, Bernard Brown, Bryan Burkhart, Keith Bury, Brennan Cagney, Melissa Carrier, Adam Caruso, Daniel Cassar, Lisa Chapman, Nathan Chase, Melissa Cole, Joel Cook, Logan Cook, Bryan Cooper, Michael Cooper, Scott Coulier, Jonathan Crowe, Amanda Danielson, Brandon Dawson, Timothy Degraff, Daryoosh Derakhshan, Tiffany DiPetta, Scott Dosson, Scott Doyle, Benjamin Dreher, Jill Drexler, Emily Duszynski, Kevin Dye, Daniel Eaton, Benjamin Ekola, Christopher Erwin, Michael Farrington, Patrick Fay, Michelle Foncannon, Jordan Fountain, Jason Franklin, Teresa Franklin, Nobuyuki Fujiwara, Michael Fullerton, Kalpen Gandhi, Christopher Gandy, Gregory Gartland, David Gasparovich, Daniel Gipper, Chad Glinsky, Douglas Gobeski, Blake Gower, Nicholas Griffin, Bryan Grinnell, Seth Grua, Brandon Gulker, Robert Gustafson, Michelle Haddad, Rabi Hakeem, Patrick Hammer, Matthew Hartman, Jordan Hauser, David Heckel, Daniel Hefel, Jason Hockstra, Matthew Holley, Timothy Horbal, Jeremy Horgan, Aaron Huber, Alex Huber, Richard Humphries, Jason Hunter, Timothy Hunter, Irwan, Marc Issner, Brianna Jablonski, Shantanu Joshi, Zachary Kaltz, Eric Keefe, Peter Kehbein, Megan Kelley, Steven Kelly, Justin Ketterer, Matthew Kimball, Michelle Kimball, Shawan Klann, David Klipfel, Richard Klop, Erika Kopulos, Andrew Kosinski, Eric Krajewski, Lisa Krakosky, Lindsay Kredo, Thomas Kret, Michael Kure, Nicholas Lane, Matthew Langenderfer, Nicholas Lapinski, Matthew Lassiter, Chung Lau, Jerome Leboeuf, Kyle Lehrmann, Mark Lepech, Allison Lewis, Chad Lindsly, Daniel Little, Carl Luyendyk, Jacob Lyon, Courtney Macdonell, Armon Mahajerin, Dustin Manning, Erik Marshall, Brent Martin, Matthew McCartney, Ryan McCollum, Margaret McHale, Kevin McKay, Michael McKimmy, Andrew McMaster, Ashley Miller, Christoph Miller, Kevin Miller, Nicholas Miller, Viraj Mokashi, Mohd Mokhtar, Ryan Monroe, Mark Moulard, Kyle Munro, Kimberly Nankee, Michael Nicley, Nicholas Nwabueze, Devin O'Connor, Basak Oguz, Mark Orłowski, Thomas Pabst, Ryan Patterson, Jason Peabody, Marcus Peters, Daniel Petlicki, Keith Pigeon, Steven Pisarski, Nicholas Potocki, Brian Powell, Saleel Pradhan, Kate Presnell, Jeffrey Prevost, Martin Priess, Heather Pung, John Quackenbush, Megan Raidl, Jill Randall, Joy Reichenbach, Nathan Remsburg, Nicholas Rowe, Trevor Ruckle,

Con't on pg 16

# **NEW!** Thomas Alva Edison Scholars in Undergraduate Design

by Professor B.S. Thompson, Departmental Design Coordinator

*"Any other bright-minded fellow can accomplish just as much if he will stick like hell and remember nothing that's any good works by itself. You got to make the damn thing work."*

These words were uttered in a fit of frustration by **Thomas A. Edison**, America's most productive inventor, who has 1,093 patents to his name. He was an impresario of innovation. He was the quintessential American inventor.

Edison spent his formative years in Port Huron, Michigan, where he failed to excel at school. Nevertheless, upon entering the workforce he quickly made innovation from science and he made a science of innovation. His fertile eclectic mind was responsible for numerous diverse groups of inventions including those associated with the telegraph, the mimeograph, the incandescent light bulb, the phonograph, the telephone transmitter, an ore separator, cement manufacturing facilities, the kinoscope, alkaline batteries and of course Menlo Park, the blue print for the modern research and development laboratory. Indeed, Edison's diverse accomplishments were ultimately responsible for the creation of at least three industries: electricity-supply, musical entertainment, and motion pictures. What a laudable contribution to the human race!

The spectacular accomplishments of this creative genius and classic innovator have motivated the Design Program to initiate an award in the ME 481 course to honor this Michigianian superstar. Our objective is to encourage the adoption by our students of Edison's indefatigable indomitable spirit, his innate creativity and curiosity, and his innovative entrepreneurial prowess.

Of course you may wonder why we regard these specific human traits as being so important. Well, it's because we are convinced that practical innovation, more than anything else,

is the primary reason why America was catapulted into such a preeminent role on the international stage in recent history while other well-endowed countries failed. It's not so much our ability to invent but rather our ability to put that inventiveness to practical use. Namely, our ability to excel at the process of product development and commercialization for financial gain.

Edison excelled in this arena; at



IMAGES.GOOGLE.COM

conceptualizing a new vision, at transforming that vision into a viable product, at fulfilling the entrepreneurial role of raising money, arranging the legal rights-of-way, and at cultivating the market. He created important ideas and he transformed them into commercial realities with enormous societal impact. We applaud this multi-disciplinary philosophy and we are convinced that these human characteristics should be emulated by our students upon entering the workforce, because Michigan is currently struggling to survive in a rapidly-changing brutally-competitive global marketplace. Indeed America's longstanding worldwide supremacy is being challenged as never before.

Each semester the **T. A. Edison Undergraduate Design Award** will be presented to the best ME 481 student team. In this capstone course,

teams of four students confront contemporary open-ended design problems presented by industry partners. Thus students must function successfully in an industrial setting by adopting the traits of Alva Edison. There, teams create, fabricate, and subsequently test prototypical systems for small, medium, and large manufacturers throughout the Midwest. This activity involves them wrestling with complex "real world" issues not found on university campuses where lifestyles and motives are generally divorced from the pressing needs of society. It is this very real, practical, experience in Alva Edison's domain of invention and innovation that distinguishes our graduates from those of other universities, and why they are so highly sought after by employers.

The names of the first group of Edison Scholars shall be announced at the Awards Ceremony on Design Day by **University Distinguished Professor H. E. Fitzgerald**, the Assistant Provost for Outreach and Engagement. The winning team shall receive \$2,000 and each scholar will be presented with a unique medallion and a certificate of accomplishment. Half of this financial award is provided by a generous gift from the Shell Oil Company and the remainder is from The Leonardo da Vinci Undergraduate Design Endowment plus assorted gifts to the Design Program.

An independent panel of distinguished judges from companies unrelated to the semester's industry partners shall visit campus to review the activities of each team before and during Design Day prior to determining the winning team. In the Fall 2005 semester, the panel will comprise engineers from the General Electric Company and Pfizer Inc. plus two professors from the College of Communication Arts and Sciences.

*Cont't on next pg.*

*Cont'd from pg 10.*

With the Design Program's inception of Edison Scholars associated with the ME 481 course to complement the current group of Leonardo Scholars associated with the ME 471 course, two superstars have been strategically placed on pedestals to serve as role models for our students in the context of scholarship, character-building, service and leadership. Leonardo's talents are regarded with reverential wonder in every field that he contemplated, and his dreams of engineering marvels were often 500 years ahead of their time. He was the most versatile genius that ever lived, but he didn't venture into the business world. Edison's dreams were much more near-term and pragmatic but he shrewdly married the art of invention with the business of innovation. Herein lies the difference between them. However, Edison's crucial synergistic combination was the essential potent high-octane fuel that powered America's engine of industrial reform to the lofty pinnacle of world dominance. "Genius," wrote T.A. Edison, "is one percent inspiration and ninety-nine percent perspiration." How very true!

## Student News

The team of **Ryan Corby**, **Dan Eaton**, and **Mitch DeJonge** won the regional ASME International Student Design Competition in April. They will be competing in the international competition in November at the ASME International Congress and Exhibition in Orlando, Florida.

**Michelle Foncannon's** presentation, "Effects of Increasing Heel Stiffness in Athletic Shoes on Impulsive Loads while Running," took first place in the Engineering portion of the 2005 University Undergraduate Research and Arts Forum last spring. Michelle has also received the General Electric Women's Network scholarship.

**Teresa Franklin** received the General Motors Corporation scholarship (one year renewable).



Michelle Kimball

**Michelle Kimball** (ME Sr) has won the title of Miss Greater Grand Rapids for 2005. The title is an official preliminary pageant to the Miss America competition, and it qualifies her for the Miss Michigan pageant next June. (Two years ago, she placed second runner-up in the Miss Michigan pageant.) As Miss Greater Grand Rapids, Michelle will be working this year with the Western Michigan Crohn's & Colitis Foundation of America to raise money for research.

## A Few Thoughts on Learning by Craig Gunn

We are all in a continuous state of learning, but I think sometimes we fail to understand what learning is all about. The majority of those questioned might respond with a flat statement of, "I didn't learn anything today because class was boring and I think I slept through most of it!" Learning seems to be associated with classes and books, lectures and labs. Many people block out all the time that is spent outside of the confines of the classroom or laboratory as nothing more than the passage of time that takes place before one enters the "Halls of Learning." This thought is sometimes reinforced by glaring examples. Parents constantly ask their children, "What did you learn in school today?" as if no learning takes place in any other venue.

The University of Pittsburgh, one of the oldest in the US has a large and ponderous building called the Cathedral of Learning. It is quite impressive; but when you walk out of the cathedral, you almost feel that you

have left the aura of learning behind and you have entered the wasteland of the world.

In engineering as with many technical areas, students are asked to learn an enormous amount of material that will allow them to pursue lucrative and rewarding careers. It is easy to measure how much one has learned or not learned. You know full well what is on the tests and how well you have learned the material, but what happens when you walk down the street and encounter behavior that you have not seen before? You learn how to cope with it and "learn" how to deal with it the next time it is encountered. It is important to understand that learning takes place on street corners, in the forests, when talking to one self, and when you think about what you write. Learning, as with communication, is something that is with us from birth and stops only when we are no longer alive. So, remember to view every day as a learning experience.

## REMINDER!

**Don't forget to nominate your favorite professor for the 2006 Withrow Teaching Excellence Award!**

**<http://www.egr.msu.edu/egr/programs/bachelorswithrow.php>**

**Deadline:  
Friday,  
November 18**

SAE Formula

**SAE** For the MSU Formula Racing Team, the 2004-2005 season was one filled with hard work, anticipation, greatness and reward. Over the five days of the 2005 Formula SAE Competition, held at the Pontiac Silverdome, the MSU Formula Racing Team accomplished several noteworthy finishes with Car 24. Leaving the first day of the competition, the team was off to a fantastic start, placing 14th in the Design event, 7th in the Presentation event, and 7th in the Cost and Manufacturing event. The second day went equally well, with the team sitting in 10th place for the Skid-pad event, 15th place for the Autocross event and 43rd place in the Acceleration event. Disaster struck for the team with the final dynamic event: the Endurance. After running quick times for the first 11 laps of the event, MSU came in for the routine mid-way driver change. Judges noticed fluid leaking from Car 24's differential and disqualified MSU, creating a disappointing end to a once-possibly promising finish for the team. However, the 2005-2006 team has learned much from this experience and is determined to ensure that nothing like it happens again.

The team is off to a great start for the 2005-2006 season. Team Leaders worked hard over the summer and accomplished more dynamic testing than ever has been by any MSU Formula Racing team, allowing design decisions to be firmly backed by engineering data before anything is fabricated.

The team is well underway designing all aspects of this year's car, and is excited at the outlook for the upcoming months. In addition to showcasing cars at the team's sponsor drive, the team was a crowd favorite at the University's Sesquicentennial Parade & College of Engineering Alumni Tailgate.

For more information about the MSU Formula Racing Team, please contact **Adam Zemke**, Project Manager, at zemkeada@egr.msu.edu. *Submitted by Adam Zemke.*



PHOTO PROVIDED BY MSU FSAE

MSU Formula Racing Team at the 2005 Formula SAE World Competition - Pontiac, MI USA

Graduate School, Cont'd from pg 7

The MS degree requires 30 credits beyond a Bachelor's degree. These credits are advanced coursework. At Michigan State University, most students include 6-8 credits of thesis research. The thesis documents an individual research project that provides a "significant contribution to the state of the art." The MS degree is a popular degree in industry where many engineers pursue a night or weekend program. The Ph.D. is a degree focused on research. A research committee plans coursework and research individually for each student. The objective is completion of a research project that provides a "significant, original contribution to the state of the art." While the MS degree qualifies you for a wide range of advanced engineering positions, the Ph.D. degree qualifies engineers for leadership positions in industrial research and academic institutions.

Most engineering graduate students are financially supported in the form of fellowships and assistantships. Fellowships only require students to continue good academic work. Research and teaching assistantships require 10-20 hours per week of employment related work on a research project or instruction. Financial amounts vary but at MSU, half time assistantships pay about \$25,000 a year and include tuition and healthcare.

If you are curious and want to learn more, come to the Mechanical Engineering Graduate Program office (2418 EB) and talk to us. **Aida Montalvo** (montalai@egr.msu.edu) can give you information and make an appointment to talk to me for more details. I would be happy to see you too.

Those of you who are graduating Spring semester with less than a full load should ask Aida about applying for dual enrollment and get a head start on graduate school before you graduate. *Submitted by Clark J. Radcliffe, Professor and Associate Chair for the Graduate Program*

## Pi Tau Sigma



Pi Tau Sigma, the Mechanical Engineering honor society, is very excited about this semester. We've gotten off to a great start. The year began with three academic presentations, featuring DaimlerChrysler, Dow

Chemical, and Whirlpool where we learned about issues such as supplier quality and opportunities for mechanical engineers in the chemical industry. Our first social event was kicked off with a wing-filled night at Buffalo Wild Wings on September 27, followed by burgers at Crunchy's on October 12. We've helped our community by participating in the Aids walk on October 2. The walk was from Abbot to Hagadorn and back, and all proceeds went toward the Lansing Area AIDS Network (LAAN). Our biggest event each semester, the golf outing, open to all engineering students, teed off on October 8. If you are interested in this event for next semester, e-mail [bendertj@msu.edu](mailto:bendertj@msu.edu).

We are looking forward to the remaining events this semester. On Thursday, October 27 we will be bowling at Holiday Lanes. We will be helping our community by volunteering at the Ronald McDonald House on October 26 and the Lansing Area Rescue Mission on Saturday, November 5. We will also have members speak to the groups of junior high and high school students at Design Day on December 9 in the Union. 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 our upcoming events! Submitted by Kayla Batchelor, Secretary.

## MSU Spartan Off-road Racing



The MSU Baja team is gearing up for their annual competitions, traveling this year to Auburn, Alabama; Milwaukee, Wisconsin; and Portland, Oregon. MSU Baja is a Society of Automotive Engineers competition that challenges 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. Competition also includes dynamic events: Acceleration, Maneuverability, Hill Climb, Sled Pull, Mud Bog, Rock Crawl and Endurance.

In 2005 the team entered two vehicles in two competitions, placing 18th and 29th out of 131 teams, in Tucson, Arizona; and 16th and 47th out of 141 teams, in Troy, Ohio. Highlights of the 2005 season include a 3rd place maneuverability, 5th place sales presentation and 4th place design score.

For 2006 the team, led by seniors **Tim Locker** and **Pete Schupska**, will return to the amphibious East Competition for the first time since 1997, entering two vehicles per competition again. The 2006 vehicles will boast custom propulsion and floatation systems, a unique trans-axle driveline and a refined double A-arm suspension. With a large returning team, and a record of success, the MSU Baja Team is looking forward to another fantastic year.

More information? <http://www.egr.msu.edu/baja> Email: [lockerti@msu.edu](mailto:lockerti@msu.edu) Submitted by Tim Locker.



PHOTO PROVIDED BY MSU SAE BAJA

## ASME—American Society of Mechanical Engineers



ASME offers many events throughout the year. Along with “The Gathering”

on December 2, you can also expect speakers or presentations from companies nation wide, including Shell, Whirlpool, GM, Toyota, and many more. All with food and drinks provided free to our members.

It is easy and beneficial to become a member. As a member students may attend all ASME events, including weekly meetings. In addition all ASME members are considered for a range of different scholarships to help take the load off rising tuition bills. Joining ASME is also a great way to get involved in the school. With job placement becoming more of an issue every day, joining a student group gives you a competitive edge. Applications are available outside the ASME office, through **Nate Thulin**, in 2328K EB, and online [www.egr.msu.edu/asme](http://www.egr.msu.edu/asme). Membership is only thirty dollars and gets you into all presentations and comes with a subscription to the ASME magazine, unless you’re a freshman, then membership is free!

There are many benefits to joining ASME. ASME members receive the *ASME News* and the *Mechanical Engineering* magazine. Members also have access to student loan and scholarship programs that no other student on campus has access to. But one of the best benefits is the chance to network with industry and faculty. Joining ASME can be a great way to get contacts at many of the companies in the engineering field.

Do you want to become even more involved? Would you like your voice to be heard both within the society and college of engineering? Run for office! Many officers are graduating at the semester and we need to fill their chair positions.

Come make the most of your MSU education. Helping run an organization like ASME gives you an immense amount of real-world experience and looks great on a resume. With ASME, you can help new programs come to life that will benefit ME students. To find out how to become a part of the executive board, contact **Robert Huehl**.

The Michigan State University chapter of ASME is excited to announce that we will be hosting the regional student conference this year. On April 7 - 9 students from colleges all over the midwest will come to compete in a student design contest recognized world wide. This year teams will be creating a “Sip-and-Puff” controlled fishing rod for quad-

riplegics. Hopefully MSU can bring home another gold medal.

### Contact Us

Visit [www.egr.msu.edu/asme](http://www.egr.msu.edu/asme) for details on meetings, events, membership and more.

*President:* Robert Huehl  
*Vice President:* Jesse Grove  
*Membership:* Nate Thulin  
*Finance:* Ryan McCollum  
*Publicity:* Wayne Steward  
*Secretary:* Nick Periat  
*Comm Relations:* Tim Hunter  
*SEC Rep:* Viraj Mokashi  
*Curric Comm:* Margaret McHale  
*Newsletter Ed:* Tim Locker  
*Conf Coord:* Andrew Stewart  
*E-Week Rep:* Kayla Batchelor  
*Webmaster:* Saleel Pradhan  
*Faculty Advisor:* Prof. Somerton

**Michigan State University  
 Department of Mechanical Engineering**

**ENGINEERING MECHANICS OPTION (Revised)**

(12 Credits)

Leonardo DaVinci reportedly described the study of mechanics as “the paradise, the Garden of Eden of mathematics, for therein it bears its fruit.” The engineering mechanics option is designed to provide undergraduate students with a more thorough understanding of analytical, computational and experimental methods for investigating the response of structures and fluids to external forces, pressures, thermal effects and other environmental loads. These skills have applications in all areas of mechanical engineering as well as in many interdisciplinary fields, and they are the key to modern mathematics-based design processes that are used by all major engineering firms. This option is also well suited for preparing students for graduate study in mechanical engineering or engineering mechanics.

To complete a Bachelor of Science degree in mechanical engineering with an engineering mechanics option, students must complete the requirements for the B.S. degree, including the following 12 credits:

- ME 423 Intermediate Mechanics of Deformable Solids—3 credits (Fall Semester)
- ME 475\* Computer Aided Design of Structures—3 credits (Spring Semester)

Plus 6 credits from the following list:

- ME 425 Experimental Mechanics 3 credits (Fall Semester)
- ME 432 Intermediate Fluid Mechanics 3 credits (Spring Semester)
- ME 464 Intermediate Dynamics 3 credits (Spring Semester)

CREDIT DISTRIBUTION: The 12 credits in the option will fulfill the Senior Elective requirement, including the “design intensive” course component. Completion of the option will be noted on the final transcript.

\*Design intensive.

## SPRING SEMESTER SENIOR ELECTIVES

►The asterisk (\*) after a course number indicates that it has been officially designated as “Design Intensive.”

- 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. *Averill.*
- ME 477 **Manufacturing Processes.** 3(3-0). *Requires Override—See #1 below.* Prereq: ME 222 and MSE 250. PLEASE NOTE that the ME department cannot change your ME lab section in another course to fit the ME 477 schedule. *Hinds.*
- ME 478 **Product Development.** 3(3-0). *Requires Override—See #1 below.* Prereq: ME 361, 477, and Tier I Writing. *Kwon.*
- ME 490 **Independent Study.** 1-4 credits. *Requires Override—See #2 Below.* You may re-enroll 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. PLEASE NOTE that the ME department cannot change your ME lab section in another course to fit the ME 497 schedule. *BME Option Course.* *Hubbard/Reid-Bush.*
- BME 401 **Quantitative Human Biology.** 3(4-0). Prereqs: CEM 141, MTH 235, PHY 184, PSL 250 or concurrently, ANTR 350 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. *Baumann.*
- MSE 426 **Introduction to Composite Materials.** 3(3-0). Prereq: ME 222. *Liu.*
- MSE 451 **Microscopic & Diffraction of Materials.** 3(2-3). Prereq: PHY 184. Recommended background: MSE 350 & 381. *Crimp.*
- ME 825 **Experimental Mechanics.** 3(2-3). *Requires Override—See #3 Below.* Prereq: ME 425 or permission of instructor plus GPA of 3.5+. *Cloud.*

## OVERRIDE INSTRUCTIONS

*ME Override Form Link: <http://www.egr.msu.edu/me/programs/ugrad/>*

- 1) Priority for ME 477 and 478 is given to students who are on record as Manufacturing Option students. To be “on record” you must meet with Gaile Griffore to plan a long-term schedule that includes the option.
- 2) ME 490–Independent Study: Find a professor who is willing to supervise your project, and discuss your plans with him/her. Complete an *ME 490/490H Enrollment Contract*, available in the ME Advising Office in 2560 EB. After you and your professor have signed it, return the form to the ME Advising Office for the remaining signatures and override.
- 3) Complete the *Graduate Course Override* form, available in the ME Advising Office in 2560 EB. This is a paper form.

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### Program Educational Objectives for the Undergraduate Program in Mechanical Engineering

#### Department of Mechanical Engineering

#### Michigan State University

*(Approved by the Department Faculty February 17, 2005)*

*Objective 1: Our graduates will be competent engineers practicing in a diverse range of activities.*

*Objective 2: Our graduates will use their mechanical engineering education as an impetus for personal & professional growth.*

*Objective 3: Our graduates will have achieved a noteworthy level of workplace responsibility through understanding their environment and capabilities, including the importance of knowledge management.*

*Objective 4: Our graduates will be independent thinkers who take ownership in identifying problems and determining effective solution strategies in a timely manner.*

**Department of Mechanical Engineering**

**Fall Semester Calendar**

- November 11** All currently enrolled students who have not enrolled by 8 p.m. in at least one course for Spring will pay a \$50 late fee.
- November 18** **Deadline for Withrow Teaching Award Nominations. The nomination form is located at:**  
<http://www.egr.msu.edu/egr/programs/bachelors/withrow.php>
- Nov 24-25** Thanksgiving recess
- December 2** **“The Gathering” (fall social) at Dr. Somerton’s house. Sponsored by ASME**
- December 9** **Last day of classes & ME Design Day.**
- December 10** Undergrad Commencement Ceremony-Breslin at 2 pm. Lasts about 2 hours. No tickets required.
- Dec 12-16** Final Exams
- Dec 19-Jan 8** Semester Break
- January 13** Last day of Free Add Period for Spring 2006.
- March 1** Approximate application deadline for April FE exam
- March 13** Computer/Telephone Enrollment period for summer semester begins
- March 17** Engineering Scholarship deadline.
- Mar 31–Apr 28** Computer Enrollment period for fall/spring 2006-2007. Your appointment date (the first time you can log on) will be posted on StuInfo in mid-March.

*Dean’s List, Cont’d from pg 9*

Matthew Ryerkerk, Mohd Salim, Vivek Sarasam, Andrew Schafer, Erik Schubert, Michael Schultz, Matthew Schwartz, Jared Sickles, Eric Skoug, Daniel Smith, Kristen Smith, Martha Smith, Anita Solitro, Benjamin Souder, Charles Spaniola, Cody Squibb, Troy Staten, Jeffrey Steele, Zachary Steffes, Wayne Steward, Nicholas Strevel, Derek Strittmatter, Dennis Suminski, Kyle Sutton, Sandip Suvedi, Christopher Sweeney, Kyle Szykiel, Jin Tam, Keith Tenbusch, Jessica Theis, Derek Thelen, Matthew Thurman, Joseph Tideswell, Eric Truskoski, Yi-Chieh Tsai, Benjamin Usher, Richard Utrup, Marco Vagani, Brendan Vidmar, Nicole Vidro, Bradley Wackerle, Bryan Wagenknecht, Jacob Wagner, Richard Wahl, Kipp Wallace, Gabrielle Weldon, Gerard Westover, Andrew White, Shawn White, Wayne Williams, Matthew Winkley, Trevor Winter, Nathan Wolf, Kraig Yeck, Chi-Hong Yung, Stephen Zygmuntowicz

**SUMMER 2005**

Mellissa Cole, Dmitriy Kats, Kyle Koepf, Matthew Langenderfer, James Lussman, Devin O’Connor, Stacie Proctor, Erik Schubert, Michael Schultz, Michael Syrylo, Bryan Wiedyk

**MICHIGAN STATE  
UNIVERSITY**

*ME Advising Office*

*Dept of Mechanical Engineering*

*2560 Engineering Building*

*East Lansing MI 48824-1226*

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