

ME Bulletin

News for
Mechanical
Engineering Majors

Vol. 46, No. 1

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Fall, 2008

Dr. Brereton Wins Teaching Award 5

New Study Abroad Program in Peru 7

Stress & Strain Research 8

Microfluid Transport Phenomena 10



COVER STORY: See page 4

PHOTO PROVIDED BY JEFF GROSSMAN, CAPITAL AREA CAREER CENTER

Roy Bailiff, ME department technician, receives the Certified Welding Inspector (CWI) award from the American Welding Society Central Michigan Chapter. See story on page 4.

Academic Advising

• *ME Freshmen and Sophomores* are advised by **Carmellia Davis-King** in the Freshman/Sophomore Advising Office. To schedule an appointment, please call 355-6616 x 1, or go to 1410 EB.

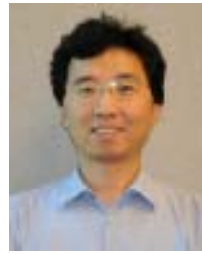
• *ME Juniors and Seniors and juniors-to-be with a 3.0 or higher GPA* are advised by **Gaile Griffore**. To schedule an appointment, please call 355-3338, or go to 2560 EB.

IAH/ISS Diversity Requirement

Many courses in the Arts and Humanities area and in the Social, Behavioral, and Economic Sciences area, emphasize national diversity (designated "N" at the end of the course title), or international and multicultural diversity (designated "I" at the end of the course title). Some emphasize both national diversity, and international and multicultural diversity (designated "D" at the end of the course title).

Students must include at least one "N" course and one "I" course in their Integrative Studies programs. A "D" course may meet either an "N" or an "I" requirement, but not both.

Department News



Dr. Soonsung Hong has joined the ME faculty as an assistant professor. After receiving his Ph.D. from Brown University in 2003, Dr. Hong was a postdoctoral scholar

at Cal Tech for three years and a research scientist at Sandia National Laboratories for another two years. His research will center around the development of the self-diagnostic composite structures thrust area. Dr. Hong used to enjoy playing golf and electronic/board/card games. But, spending time with his 18-month old son has become his number one hobby at this point.



Dr. Arjun Tekalur has joined the ME department as an assistant professor. Dr. Tekalur received his Ph.D. from the University of Rhode Island in 2007. He comes to us from

CalTech where he was pursuing post-doctoral research. His research at MSU will focus on will focus on the biomimetics thrust area.



Dr. Xinran Xiao has joined the ME department as an associate professor. She received her Ph.D. from the Free University of Brussels in Belgium in 1987. She comes to

us from the General Motors R & D Center where she worked for nine years. Her teaching experience includes several years at Concordia University in Montreal. Dr. Xiao will concentrate her research in structural integrity thrust. Dr. Xiao's hobbies have changed over the time, but she still loves cross country skiing, playing the piano, and flower arranging.



Dr. Laura Genik has joined the ME department as a teaching specialist. After receiving her Ph.D. from Michigan State University in 1998, she joined the ME faculty at the

University of Portland. More recently, she has taught ME courses at both Wayne State University and MSU. Dr. Genik will focus on teaching undergraduate courses in a variety of areas for our department. This semester she is teaching ME 222-Me-

ME Bulletin

The *ME Bulletin* is published twice a year (fall & spring) 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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In This Issue

Academic Advising, Diversity Requirement, Department News	2
Curriculum News, Student News	3
Associate Chair's Corner by Dr. Somerton, COVER STORY	4
Graduate School by Dr. Feeny, December Graduates	5
Dr. Brereton Receives Teaching Award	6
Study Abroad in Peru or Aachen, Scholarships	7
Stress & Strain Research by Dr. Pence	8
Tutoring	9
Microfluidic Transport Phenomena by Dr. Priezjev	10
Solar Car Team, The Center's Top Ten	11
Craig Gunn's Column, Dean's List, Summer Job Tips	12
ASME, Pi Tau Sigma	13
SAE Baja, SAE Formula	14
Spring Semester Senior Electives	15
Calendar of Upcoming Events	16

chanics of Deformable Solids and 412-Heat Transfer Laboratory. Dr. Genik and her husband, Douglas Gatrell, (BSCE '91, MSEN '93) spend their non-engineering time with their children Emily, 6, and Mitchell, 4. Both are enjoying being back in the MSU community. When free time exists, Dr. Genik can be found in her sewing room or catching up on Jeopardy.

Dr. Manoochehr Koochesfahani has assumed the duties of Associate Dean of Research and Graduate Studies for the College of Engineering. He replaces **Dr. Ronald Rosenberg**, an ME professor who has held the position since 2002. Dr. Koochesfahani received his Ph.D. from the California Institute of Technology in 1984 and came to MSU in 1987. His research interests include turbulent mixing, unsteady aerodynamics, turbulent shear flow control, and optical diagnostics. He has taught graduate and undergraduate courses in fluid mechanics, and he was in charge of the ME 332 lab for many years.

Dr. Brian Feeny has been appointed to the position of ME Associate Chairperson for the Graduate Program, including admissions, advising, and a special focus on the recruitment of top graduate students. He joined the ME faculty at MSU in 1992, and he is a teacher and researcher in the areas of dynamics and vibrations. As graduate advisor, Dr. Feeny replaces **Dr. Clark Radcliffe**, who has served in that position since 2005.

Dr. Gary Cloud, ME professor, has won the prestigious Sports Car Club of America (SCCA) Carroll Smith Mentor's Cup for the most dedicated team advisor in Formula SAE. Since he began advising the Formula SAE Team, Dr. Cloud's contributions have been immeasurable, and were recognized by the SCCA and the Society of Automotive Engineers at the competition that weekend.

Dr. Dahsin Liu was elected to be a Fellow of the American Society for Composites (ASC) at their 23rd Technical Conference in September.

Dr. Eann Patterson, ME professor and department chair, has been selected by the MSU Office of the Provost as one of twelve Fellows for the 2008-09 Executive Leadership Academy (ELA). These Fellows are in current leadership roles across the University in a variety of support and academic units.

Dr. Craig Somerton and Gaile Griffore, ME Advisor, traveled to the UK in July to investigate possible new study abroad opportunities for ME majors at the University of Edinburgh in Scotland and the University of Bath in England. These new opportunities are expected to meet the requirements of the Global Engineering Concentration.

Curriculum News

M.S. in Operations & Management: The College of Business has decided to disband this program. If you had been planning to pursue this degree, please contact the ME Advising Office.

Co-op Students: Before you leave for your Spring 2009 co-op rotation, please be sure to discuss your schedule for next Fall 2009 / Spring 2010 with your academic advisor.

ME 481—ME Design Projects 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, schedule an appointment with Gaile to finalize your long-term schedule. Call 355-3338 or stop by 2560 EB to make an appointment.

ME 489—Technical Communications (2 credits) is on the spring schedule. Instructor: **Craig Gunn**, ME Director of Communications. *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 1410 EB. Be prepared to show your MSU I.D.

Job Search Advice: Jennifer Jennings from Career Services & Placement is

available to answer questions about your job search. To schedule an appointment with her, go to: <http://careernetwork.msu.edu/students/advising>

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.

Student News

Bryan E. Wagenknecht (B.S.M.E., May 2008) was given special recognition by the MSU Board of Trustees at the spring commencement ceremony. He was one of 22 students who obtained a perfect 4.0 GPA, having completed at least three-fourths of their degree at MSU.

The MSU Baja Team competed against 110 other teams outside Montreal, Quebec, for the final SAE race of the season. They finished with overall dynamic placement of 7th and 8th. In the individual events, the team placed 4th and 13th in the suspension and traction event, 15th in acceleration and 11th in the log pull.

The MSU Formula Team took 4th place overall out of 80 racing teams at the 2008 Formula SAE West competition at the Auto Club Speedway in Fontana, California. In the Endurance race, both drivers earned a 5th place finish. The team placed 1st in Design, and the head Design judge specifically cited the team's advanced powertrain development. They also received the Honda Design Award and an honorable mention from Altair Engineering for the William R. Adam Engineering Excellence Award.

Ke Zhang (Ph.D. student) has received the 2008 Zonta International Amelia Earhart Fellowship Award.

Elliott Radcliffe (M.S. student) has received the 2008 NASA Graduate Student Researcher Program Award.

Associate Chair Corner by Professor Craig W. Somerton



You will be graduating from an accredited mechanical engineering program with its accreditation granted by the Engineering Accreditation Commission of ABET, Inc. One of the important accreditation criteria deals with what are called Program Educational Objectives. ABET defines these as follows: “Program educational objectives are broad statements that describe the career and professional accomplishments that the program is preparing graduates to achieve.”¹ These objectives are the foundation upon which your curriculum is based. Several years ago the department reviewed and then revised its objectives. The current set of objectives is shown below:

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.

Certainly these are not simple statements and it took me some time to get my head around them. But I now appreciate them as worthy goals for our graduates to achieve. When the department contemplates changes to the curriculum (adding, deleting, or changing courses), I always apply the objective litmus test: will the changes enhance our students’ potential for achieving our objectives? A good example might be the current revision in the design sequence, which proposes to replace STT 351 with a new course that focuses on design tools such as finite element methods, design of experiments, and statistical engineering. My sense is that this change will increase the possibility of our graduates achieving objective 3 and 4, and so within the bounds of resources, I would support this change.

In addition to setting objectives, ABET requires programs to assess the achievement of objectives. Our department collects assessment data from two sources. We use a focus group approach to collect information for the employers of our graduates and we conduct a web based survey of three-year out alumni. So how are we doing? The data would indicate that we are doing well. Our graduates are progressing well in achieving our Program Educational Objectives. But we can always do better. That is always a goal for a continuous quality improvement process.

¹ ABET Inc, “Criteria for Accrediting Engineering Programs,” pg. 1, 2008.

COVER STORY

Roy Bailiff Receives Welding Award

In May, Roy Bailiff, ME department technician, was presented with the Certified Welding Inspector (CWI) award by the American Welding Society Central Michigan Chapter. The award recognizes his outstanding contributions to quality programs in welding and manufacturing. Roy is a past chair of the American Welding Society. He has been a leader in developing weld quality programs for the Lansing Board of Water and Light, General Motors, Robert-Sinto Corporation, Barnard Manufacturing, Spartan Chassis, Inc., Dowding Industries, Inc., Demmer Corporation, Johnson Controls, Lansing Community College and many others.

Roy has an Associate’s Degree in Welding Technology from Lansing Community College, and he took education classes at Ferris State University. His teaching experience includes West Shore Community College and Lansing Community College where he continues to teach welding courses. Roy has received countless awards, including the prestigious 2001 Gloria Stragier Award for Dedicated and Creative Service. More recently, his team won the traveling trophy in the annual CWI Quiz the Experts competition.

For 15 years, Roy has managed the Engineering Building machine shop and the Jolly Road shop where the Formula, Baja, Solar car, and concrete canoe groups construct their projects. He is also responsible for maintaining the ME department’s teaching laboratories. Roy is a teacher at heart, and seats in his course, ME 372-Machine Tool Laboratory are eagerly sought by students.

Roy’s daughter is a recent MSU alum and his son, an LCC student, plans to transfer to MSU. In his spare time, Roy enjoys working on his “fixer-upper” cottage up north in Boyne City.

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.

High 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>), 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, there's more . . .

•*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 the 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.

46 Seniors to Graduate in December!

Congratulations to all mechanical engineering December 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 9. If your name is missing, please contact me immediately (Email Gaile at <griffiore@egr.msu.edu> Tele: 517-355-3338).

Nicole D Arnold
Justin Aaron Bauer
Ryan Walter Boak
Weining Chang
Tony Michael Davis
Kevin Bradley Derrick
Emily Ann Duszynski
Christopher Owen Erwin
Douglas Edmund Gobeski
Luis Henrique M Goncalves
Adam Lawrence Grisdale
Andrew Richard Gryczan
Patrick Richard Hammer
Johannes Kyle Hertrich
Richard John Hollern
Stanley Christopher Hunley
William John Hurles
Ravi Parimal Jadia
Alexander Max Kerstein
Daejung Kim
Jacob Paul Kloss
Hani G Kobty
Joshua Adam Kowalski

Brian Andrew Kunkel
Jonathan W Luckhardt
Zachary Charles McIntyre
Brielle Alise Meadows
Justin David Milburn
Drew Clarke Mosner
Michael Stephen Priebe
Brandon Thomas Quaranto
Daniel Bradley Raphael
Bradley Allen Rutledge
Vivek Reddy Sarasam
Lauren Marie Sharp
Scott Louis Slingerland
Neal Anthony Spitzley
Zachary Paul Steffes
Ryan Edward Stull
Christopher Ryan Sweeney
Keith Odell Tenbusch
Bryce Charles Thelen
Richard James Wahl
Kipp Charles Wallace
Alexander Michael Wright
Kevin T Wright



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 megradad@egr.msu.edu.

Professor Brereton Receives 2008 Withrow Award!

Professor Giles Brereton received the 2008 Withrow Teaching Award last spring at a special awards luncheon and ceremony. He was presented with an inscribed plaque, a medallion to wear at commencement ceremonies, and a small stipend. Each year a committee consisting of the last three faculty award winners, plus student representatives from ASME, SAE, and Pi Tau Sigma, makes the selection after reviewing nominations from ME juniors and seniors.

Dr. Brereton received his Ph.D. from Stanford University in 1987 and was an assistant professor at the University of Michigan for seven years. He spent the next two years here as a visiting professor and joined our department officially in 1996.

Dr. Brereton's research focuses on the fundamental aspects of nonsteady and multi-phase thermal-fluid sciences. The applications towards which these fundamentals are directed include flow metering, turbulence and its modeling, oxygenation of patients, and internal combustion engines and their exhaust-gas emissions.

Dr. Brereton has a quality that engenders both respect and admiration from his students. "He really takes his time teaching and explains everything very well so that everyone understands the material," commented more than one student. Other students praised Dr. Brereton for his courses being "very organized, with office and help room hours being very helpful." Educating future mechanical engineers has given him the opportunity to put his own stamp on teaching in the College of Engineering, making his courses "extremely engaging and fun." "He makes sure that students understand the theory behind the application, which is most important," said one student, and "He is an excellent teacher who has a bright mind and a good way of transferring knowledge to his students," said another. "Dr. Giles Brereton is a professor who really "is amazing!"



HARLEY SEELEY

Dr. Brereton (right) is presented with the 2008 Withrow Teaching Excellence Award by Dr. Tom Wolff, Associate Dean for Undergraduate Studies.

Dr. Brereton is teaching ME 201, section 001 this semester, and he is scheduled to teach ME 814, a graduate-level course, during Spring 2009.

In his spare time, Dr. Brereton enjoys fly fishing, classical music and opera, and watching the deleted scenes from "The Office."

Withrow Teaching Excellence Award

NOMINATION LINK

IS NOW LIVE!

Nominate your favorite prof for the
2009 Withrow Teaching Excellence
Award! It's easy! Just go to:

<https://stuedms.msu.edu/withrow.php>

Deadline: Friday, Nov. 21

Community Engagement and Interdisciplinary Study of Global Issues in the Peruvian Andes

by Professor Brian Thompson

Are you prospecting for a life-changing experience? Have you ever contemplated learning about yourself, while transforming the lives of poor and under-represented people? Do you want to stretch your environmental bubble until there is plastic deformation and permanent set? You do?(!) In that case why not make a difference now, by joining a vibrant eclectic group of committed students working in the Peruvian Andes on a study abroad program with a twist? That twist is the opportunity to deliver the gift of knowledge that makes people free!

This innovative new program to transform undergraduates into global citizens will be launched by five MSU colleges on campus. It requires interdisciplinary teams of students to collaborate with NGOs (nongovernmental organizations) on development projects that will make a profound difference to the quality of life of the indigenous peoples of the Peruvian Andes. The MSU colleges are Agriculture & Natural Resources, Arts & Letters, Engineering, Social Science and the James Madison College. Typical projects include the utilization of alternative energy sources, developing ecotourism, creating support services for abused women, refining alpaca management, marketing artesian products, teaching children with special needs, and enhancing crop production.

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

I look forward to chatting about this wonderful 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@egr.msu.edu



PHOTO PROVIDED BY PROFESSOR THOMPSON

Often referred to as "The Lost City of the Incas," Machu Picchu probably is the most familiar symbol of the Inca Empire.

Aachen Germany – A Substantive Experience

Mechanical engineering at MSU has provided, since 1983, the opportunity for our students to carry out research projects – in addition to gaining credits toward graduation – at a premier European research university: The RWTH-Aachen. The 2009 program will begin in mid-May and finish at the end of July with our students completing 5 credits of ME 490-Independent Study and 4 credits of GRM 102 or higher. In preparation, the students will have carried out a 1-credit ME 490 at MSU (Spring 2009) and they will have completed GRM 101 (at a minimum).

This program is structured to include opportunities for European travel (3-day weekends) and contacts with German colleagues at their host institutes plus the dormitory living accommodations. The latter offers private rooms with shared cooking areas.

The opportunities to gain substantive international experience (in this era of multinational corporations) and to greatly expand one's cultural awareness – industrial and cultural tours are included in the experience – offer a unique opportunity to our adventurous students.

Contact **Prof. John Foss** (foss@egr.msu.edu) for more information. It is our intent to finalize the 2009 group participants before this early November 2008 visit in order to Aachen to establish the individual ME 490 projects.

Scholarships

The 2009-10 College of Engineering Scholarship application will be available on the College of Engineering website in November. When it is ready to use, the College will send out an email announcement with the link. The deadline for submitting your application will be Friday, February 27.

Stress and Strain Research in Engineering

by Professor Tom Pence



KURT STEPNIITZ

The research that is being done by my students and me concerns figuring out the relation between stress and strain in highly deformable solids,

such as rubbers, elastomeric polymers, shape memory alloys, and soft biological tissue. Allow me to provide some background. All mechanical engineering students, no matter where they go to college, have a class similar to our ME 222, in which they study methods for predicting stress and strain in deformable solids. This is necessary for the successful design of structures, vehicles, and mechanisms in order to meet performance requirements and ensure against material failure. The methods learned in classes like ME 222 usually begin by making clear what is meant by the very different concepts of stress and strain, the former having something to do with force and the latter having something to do with deformation. Even so, mechanical engineers describe them with similar mathematical concepts, whereupon symmetric matrices quickly enter the picture. This in turn rapidly leads to a distinction between shearing quantities (those off the matrix diagonal) and normal quantities (those on the matrix diagonal). Stepping back from the math for a moment, a number of good questions now arise, such as: Do materials fail when the stress gets too big or when the strain gets too big? Does stress “cause” strain or is it the other way around? In attempting to answer such questions, one is naturally led to a broader question along the lines of, “What is the relation between stress and strain?”

So what IS the relation between stress and strain? The answer is “It depends,” which is a funny answer to a seemingly straight forward question. After all, you would not want to

answer the question, “What is the relation between force and acceleration?” with “It depends.” (Fun experiment: try giving that answer on an exam in our ME 361 class; you will soon learn a lot about alternative majors!) Returning to the stress – strain question, a more complete answer is that, “It depends on the material.” Some solids can be highly stressed such that there is no permanent deformation when the stress is released; while other solids, for the same amount of stress loading, show a great deal of permanent deformation. The former are usually said to

“DO MATERIALS FAIL WHEN THE STRESS GETS TOO BIG OR WHEN THE STRAIN GETS TOO BIG? DOES STRESS ‘CAUSE’ STRAIN OR IS IT THE OTHER WAY AROUND?”

have an elastic stress-strain response and the latter are usually said to have a plastic stress-strain response. Furthermore, even if the stress-strain response is elastic in the sense that there is no permanent deformation upon unloading, there is still the possibility that the actual stress-strain relation is quite complicated, given the previously mentioned fact that both stress and strain are naturally described by matrices. The stress-strain relation can therefore be viewed as an equation between matrices, and so the associated mathematics can become quite complicated if you do not like math too much (However if you do like math then you say that the mathematics has “rich possibilities.”)

In ME 222 we start to study these issues for elastic materials under the special case in which the matrix equation relating stress to strain is linear; meaning, for example, that if you double all the stresses then you double all the strains. This is a pretty

good assumption for about 85% of engineering solids in typical situations, for example, a steel cantilever beam supporting a reasonable amount of weight. However, if the beam is not made of steel, or if the weight becomes excessive even with a steel beam, then there is no guarantee that the stress-strain relation remains linear. Rubbery materials in particular often soften after first behaving in a linear fashion. When this is the case, it is necessary to develop methods and theories that go beyond those we learn in ME 222.

Such theories and methods have “rich possibilities” for interesting research that is mathematical in nature. This research is also important because it is increasingly the case that structures, vehicles, or mechanisms will employ materials that are stressed beyond their linear elastic range or employ materials that are not even linearly elastic to begin with. My graduate students and I are actively engaged in researching such theories and methods. Let me give you a couple examples of our research in this area.

A shape memory alloy (SMA) is one example of a material for which the stress-strain relation cannot be described in terms of a simple linear relation. SMAs are metals for which certain combinations of stress and temperature trigger an abrupt shearing in the alloy’s atomic packing arrangement. Furthermore, this shift can be reversed either by unloading the stress or by raising the temperature (in this sense it is very different from ductile plastic metals). Because of the underlying grain structure of the SMA, it turns out that the atomic scale shearing often translates at the engineering scale into sudden jumps in all of the strain components. Strain jumps on the order of 5 to 10% can suddenly occur with very little change in stress; this allows the ma-

terial to effectively absorb large strain hits. Many of you may have had eyeglasses or sunglasses with SMA frames, where the strain absorption capability in both bending and torsion allows the material to take quite a bit of abuse. Our group has been involved in developing the mathematical relations between the stress (a matrix), the strain (a matrix), and the temperature (a scalar) in SMA materials. It is unlikely that you will find these relations in your ME 222 book any time soon. But you can now find them in certain finite element codes, which, as you know, is how the stress analysis equations are first approximated and then solved when the engineering design goes beyond the simple textbook examples.

Other than eyeglass frames, for what type of situation might one design with SMA materials and so have need for these analysis techniques? One such area is vibration isolation and energy absorption. Here our group has been cooperating with civil engineers at the University of Rome in the design of large SMA cable winding devices that can be strategically placed in structures for the absorption of seismic energy during earthquakes. Another area in which the ability to describe the stress-strain-temperature relation in SMA materials is crucial for accurate engineering design is in certain biomedical devices. Here, for example, devices can be fabricated or otherwise prepared at below body temperatures where the SMA is highly malleable. The device is then surgically inserted in the body and subsequently deployed. This deployment may proceed either rapidly, by releasing a constraint of some kind, or else slowly, by simply letting the SMA device warm up to body temperature. SMA arterial stents operate in this fashion and the design of the more complicated SMA stents requires accurate knowledge of the stress-strain behavior. This is a par-

ticularly delicate issue in certain stent grafting procedures that require multiple overlapping stents such as when an aneurysm occurs at a branching artery.

A second class of materials for which accurate stress-strain relations need to be determined are gel solids that can change the amount of absorbed liquid depending on the temperature and the solvent chemistry (e.g., the pH). The swelling strain associated with such absorption can be on the order of several hundred percent (think absorbent baby diapers). For such huge strains the notion of matrix strain that you learned in ME 222 is flawed in that it gives a nonzero strain for large rigid body

“It is necessary to develop methods and theories that go beyond those we learn in ME 222.”

rotations. In particular, the ME 222 matrix strain is formulated so that the order in which deformations are performed does not matter. The problem with this approach can be seen if you hold a book in front of you and rotate it 90° first about one axis and then about another axis. You will observe that the final book orientation depends on the order in which these operations are performed. For smaller rotations this is a negligible effect, as can be observed by repeating the experiment for say a 5° set of rotations. You may have already had an inkling of this problem in your ME 222 class when confronted with the $\sin q = \tan q = q$ type of approximation that is often invoked when discussing shear strains. The upshot is that for very large strains one should work with a more carefully crafted notion of matrix strain. Like many blunt instruments, the strain we use in ME 222 does a good enough job most of the time, but for certain materials, such as large strain hydrogels, it is just not up to the task. In a similar

fashion, one must take additional care with respect to the notion of stress. Here again you may have had an inkling of this form ME 222 where the distinction between “true stress” and “engineering stress” is typically mentioned but not developed in much detail since differences in these two types of stress only become significant when the strain is large.

The work being done by my group in this area uses these more carefully crafted notions of stress and strain to develop more accurate mathematical relations that describe the swelling mechanics. Here we are working with **Professor Neil Wright**, whose group is performing experiments on hydrogels under a variety of environmental conditions. The relations that we are developing for describing the material’s mechanical response are important for a variety of applications, many of which are also biomedical in nature. These include the mechanical response of biodegradable hydrogels that are used as temporary artificial tissue scaffold constructs in wound healing and the mechanical response of porous gel constructs that provide timed release of internally embedded pharmaceuticals.

Tutoring

- The Guided Learning Center (GLC), located in 1180 EB, offers free drop in tutoring in math up to differential equations and science courses (chemistry, physics, etc.), as well as many core engineering courses. To request assistance, go to:

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

[Scroll down to Request Assistance, and click on “request form.”]

- ME graduate student and Pi Tau Sigma undergraduate tutors can be contacted through the ME Advising Office. These tutors do charge a fee, which you can negotiate with them. If you are interested, email **Gaile Griffore** at <griffore@egr.msu.edu>

Investigation of Microfluidic Transport Phenomena using High Performance Computing by Ms. Sarah Payok and Professor Nikolai Priezjev



KELLY OSBORN

Rain drops on a windshield. Dew on the grass. Penicillin on the tip of a needle. We regularly see a liquid in contact with a solid, unaware that this common occurrence depends on a complicated behavior invisible to the naked eye. Yet this behavior, once understood, can be leveraged to enable improvements in biofluid mechanics, petroleum engineering, and other scientific fields.

Dr. Nikolai Priezjev studies liquid-on-solid systems, specifically the way that liquids are transported through tiny channels. Dr. Priezjev, an assistant professor in the Department of Mechanical Engineering, examines fluid transport properties at the molecular level. Called microfluidics, it is a cross-disciplinary field involving researchers in the fields of physics, biology, and chemical and mechanical engineering.

The perspectives of how a large amount of fluid behaves on a surface, and how it behaves at the molecular level, are quite different. For example, a polymeric fluid may seem to be glued in place on a hard surface, but

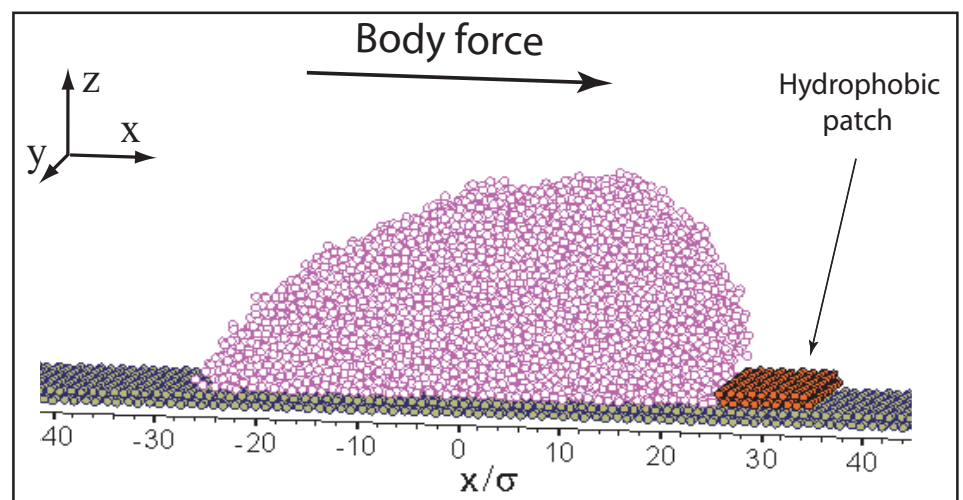
Note: This article was originally published on the High Performance Computing Center website (<http://www.hpcc.msu.edu/research/showcase/priezjev/>)

numerical experiments such as Dr. Priezjev's reveal that each polymer chain engages in a complicated maneuvering of unwrapping and tumbling, allowing the fluid to move with slip at the interface (Examples of computer animations and their descriptions are presented on his website: <http://www.egr.msu.edu/~priezjev/> [Scroll down to Research Projects]). The degree of slip depends sensitively on both the type of fluid and wall examined.

To understand the molecular motion of a fluid, Dr. Priezjev runs ex-

tensive molecular dynamics simulations. He performs these simulations through the High Performance Computing Center (HPCC) facility, calling it "a luxury that the university maintains," leaving more time for his own research without the headache of managing his own computing cluster. Experimentally, it is exceedingly difficult to extract information about the molecular motion very close to a solid boundary, so numerical simulations allow researchers to take measurements of the molecules' positions and velocities and to resolve velocity profiles at the interface. According to Dr. Priezjev, the HPCC is crucial to his research.

Dr. Priezjev has carried out research in microfluidics at MSU since 2005, but he has not always focused his studies on fluid flows. From a small scientific town outside of Moscow, he originally studied physics at the Joint Institute for Nuclear Research. It wasn't until his graduate studies at Brown University that he began to study complex fluids. He says that he likes the visual aspect of the simulations and the ability to understand what happens in a system at the molecular level, and for



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!

GRAPHIC PROVIDED DR. PRIEZJEV

several years has been interested in studying various aspects of interfacial phenomena including the motion of a contact line, slip boundary conditions, and the development of the hybrid multiscale methods for fluid flows.

The research Dr. Priezjev performs in the HPCC helps him to model fluid flow in microfluidic systems. The results of such research are relevant to the oil extrusion from porous materials, and it may help with the development of devices that will aid in disease diagnosis or drug delivery. The behavior of the tiniest drops of fluid at the surface is something that can potentially affect us all in a monumental way.

Solar Car Team



The Michigan State University Solar Car

Team is a registered student organization dedicated to the research, design, construction, and testing of a solar powered vehicle. We are currently focusing our efforts in preparation for the 2008 North American Solar Challenge (NASC 2008), "a competition to design, build, and race solar-powered cars in a cross-country event." Here are our goals:

Our team is working to build an entirely solar-electric vehicle named Brasidius. This project serves as an example of what environmentally friendly technologies are available today. It provides students the opportunities to develop teamwork skills, be self-motivated, and pursue alternative energy technologies.

Please explore our site (<http://www.egr.msu.edu/solar/>) to learn more about our team, our car, our plans, and how you can get involved!

We're looking forward to welcoming new members with the new academic year. The team draws on the expertise of a variety of majors. If you want to learn more, please email us at solar@msu.edu. *Text taken from Solar Car Team website.*

The Center's Top Ten by Jennifer Jennings, Field Career Consultant



#10 – GET good grades

Employers today will look at your GPA! If you need help in any of your classes plan to visit the Guided Learning Center in 1108 EB.

#9 – EXPERIMENT with the Engineering major that interests you

Talk with students, faculty, and advisors. Interact with student organizations and network with employers that visit campus.

#8 – OBTAIN Industry Related Experience . . . How?

- Attend career events such as: the Career Gallery in October, Diversity Fair in January and Engineering Expo in February and line up interviews/information sessions in hopes of securing an internship/co-op/full-time position
- Frequently check www.MySpartanCareer.com for postings and interview opportunities, and attend info sessions and events
- Continue networking and work with The Center for Spartan Engineering

#7 – KEEP organized and prepare for events, interviews and a job

Schedule a mock interview, have your resume critiqued, attend professional development seminars and workshops all offered by The Center.

#6 – PLAN for next semester/after graduation

- Intern/ co-op
- Join a student professional organization in your major/industry
- Be sure to prepare academically and gain valuable experiences through school projects, design competitions, involvement in organizations and employment in an internship/co-op
- Volunteer in a community/national volunteer organization travel, and/or pursue a life-long dream

#5 – KNOW the importance of out of classroom work

Employers want a well rounded student who has shown interest in his/her industry and reached out in order to gain awareness, training and an enhanced understanding. In today's market most employers will not even look at graduates who have not had industry related work experience upon graduation. NOTE: Industry related experience comes in many forms: co-op, internship, research, study abroad, volunteering/service learning, or a combination of these.

#4 – ACQUIRE skills employers want

Yes, you need the technical . . . and you will get it. But, keep in mind that employers are also looking for examples of the following: teamwork, leadership, effective communication, collaboration, problem-solving, and critical thinking.

#3 – BALANCE work and life

It is not all school/work. One of the best ways to show employers that you can time-manage, prioritize, and have a little fun is to be involved. Have interests and get involved in activities such as: clubs, organizations, sports . . . nurture your hobbies.

#2 – REALIZE that mistakes are the best experience

Mistakes happen. If you mess up, learn from them! Take the risk, it may be worth it.

#1 – ENJOY what you do . . .you may even make a living!!!

The Center for Spartan Engineering (careers@egr.msu.edu, 355-5163, www.egr.msu.edu/careers)

Professional Training Requires that Questions be Asked by Craig Gunn, ME Director of Communications



Have you ever experienced a situation where you really wanted to express your thoughts, concerns, or questions and stopped because of what you perceived might be retaliation from the person to whom you directed your words? Have you felt uncomfortable with being able to simply clarify a point because of the abuse you thought might occur? We as Americans definitely have a problem with asking questions, whether it be in groups or in situations where the questions are directed to people in power. Our perceptions of what may happen dictate our behavior and that behavior may find us closed mouthed and psychologically damaged. Holding all those concerns within our psyche may in some way result in abhorrent behavior that will eventually hurt not only us but others.

Even in our university setting, we have people who are afraid to ask questions, not because of embarrassment but because of absolute fear. They fear retaliation by faculty, staff, and fellow students who will not just laugh at them but will carry out verbal assaults or worse. No student should feel that he or she cannot ask questions that will clarify situations that are murky and unclear in his or her mind. We ask questions because we do not know something and need information so that we can continue on the path to further enlightenment. That is what education is all about. We listen, we learn, we question, we receive answers, we learn, and we question more. No one ever received a PhD without expressing a million questions and being nurtured by those who provided answers or paths to find those answers.

As many have said, "Education

ain't cheap any more!" Yes, it is expensive, and it is a privilege to be a part of the university educational system; but it is also a part of the university's responsibility to foster an environment where everyone on campus can receive answers to questions asked without fear of reprisal. And it is a responsibility we all share to ask as many questions as we can and allow questions to be asked by others. Keep that in mind because we all succeed by the number of questions asked and the answers we receive.

Dean's List

Congratulations to these 162 ME majors who made the Dean's List after Spring and Summer 2008. To be on the Dean's List, you must have a semester GPA of 3.5 or better. *This list is from September 29. For updates, go to: <http://www.reg.msu.edu/ROInfo/GradHonor/DeansList.asp>. For updates, please consult the website.*

SPRING 2008: Muamer Abdurahmanovic, Paul Allen, Michael Allon, Mohammed Alwahibi, Hassan Alzayer, Muhammad Aslam, Timothy Aspinall, Joshua Baack, Justin Bauer, Logan Beam, Eric Beatham, Jenilkumar Bhanvadia, Ryan Blake, Stephanie Bonner, Matthew Burdick, David Cain, Andrew Cawood, John Chancey, Kevin Compau, Michael Cooper, Scott Coy, Joel Darin, Nathaniel Davis, Timothy Degraff, Anthony Dellicolli, Austin Deneff, Thomas Dennis, Kevin Derrick, Tiffany Di Petta, Deanna Doan, Alexander Douglass, Michael Douglass, Dakota Easlick, Jeffrey Elberling, Ryan Emmorey, Allen Eyler, Christopher Ezop, Michael Fetter, Alan Finder, Matthew Flis, Jason Franklin, Lucas Fratta, Justin Freeman, Nathan Geib, Douglas Gobeski, Joao Goncalves, Samuel Goodsitt, Blake Gower, Patrick Hammer, Andrew Harbin, Brandon Hengesbach, Brett Hollier, Mark Holmes, Kenneth Hsu, Clarence Huff IV, Jason Humphreys, Chuck Hutton, Rachel Jacquin, Melissa James, Tyler Jaynes, Erin Johnson, Zachary Kadykowski, Spiros Kakos, Michael Karoub, David Kempf, Saad Khan, Daejung Kim, Hani Kobty, Eric Krajewski, Ashley Kulczycki, Nick Kuuttila, Jeffrey Laforge, Christopher Lange, Logan Larson, Benjamin Llewellyn, Hansen Ma, Courtney Macdonald, Arun Mahapatra, Evan Marks, Dane Marsack, David Marsh, Rachel Maurer, Kevin McPhail, Gregory Moy, Sara Murawa, Raghav Nanda, Michael O'Brien, Anwelli Okpue, Brandon Olsen, Michael Olsztyn, Amir Ouyed, David Parke, James Peers, Gregory Pelkie, Kelly Peterson, Florian Pribadi, Martin Priess, Thomas Qualman, Daniel Rabideau, Joshua

Racalla, Michelle Raetz, Adam Rainbolt, Justin Raymond-Krochmal, Brian Rockwell, Brent Rowland, Amanda Ruhno, Bradley Rutledge, Joshua Samp, Daniel Schleh, Mackenzie Schmidt, Nicholas Schock, Lauren Sharp, Ryan Smith, Adam Sneller, Donald Snyder, Neal Spitzley, Jacob Sprague, Keith Srebinski, Zachary Steffes, Ryan Stull, Richard Sturgis, Alexander Suradja, Christopher Sweeney, Kyle Szykiel, Jin Tam, Eric Tauzer, Keith Tenbusch, Thomas Theisen, Eric Tingwall, Diana Toan, Alexander Tollis, Admir Trnjanin, Nicole Vidro, Krishna Vistarakula, Bryan Wagenknecht, Eric Waggy, Richard Wahl, Kipp Wallace, Cory Waltz, Brian Warner, Matthew Weir, Eric Wickenheiser, Blake Wilmore, Marissa Wiltz, Matthew Wolfe Jr, Alexander Wright, Kevin Wright, Jamie Yeung, Boon Yong, Jessica Yu, Jeremy Zalud, Oliver Zemanek

SUMMER 2008: Stephen Hammack, Jarreau Jackson, Daejung Kim, Ashley Kulczycki, Christopher Lange, Kyungmin Lee, Anwelli Okpue, William Pan, Donald Snyder, Oliver Zemanek

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 the Career Services Network and MySpartanCareer by going to their website at

<http://careernetwork.msu.edu/my-spartan-career-login>

Click on MySpartanCareer and register. MySpartanCareer provides electronic event updates, want ads for internships, summer, full-time, on-campus and off-campus jobs and a tracking system so you can keep it all organized. MySpartanCareer also allows you to sign up for on-campus interviews.

Visit The Center/SpartanEngineering, in 1340 EB, across from Sparty's.

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.

American Society of Mechanical Engineers



The American Society of Mechanical Engineers (ASME) is dedicated to helping students create a connection outside the classroom and get the jump start they need into the work place. ASME sponsors many events and is known for bringing in big name companies to speak. So far ASME has brought in Dow Chemical and Shell but more are sure to come. Harness Dickey & Pierce, Unisolar, and Eaton Corporation are all scheduled for the month of October. For times and locations you can visit the ASME website at www.egr.msu.edu/asme.

However, company presentations aren't the only events that ASME plans. ASME has its annual "BroomBall" and "Junk-Yard-Wars" on the first and last days of E-week in the spring. So don't be upset if you missed out on Junk-Yard-Wars last spring. New to this calendar year, AMSE is hosting tailgates at the tennis courts during big home games. And don't forget about this semester's "The Gathering" (TG) at Dr. Somerton's house. TG is scheduled for Nov. 21 on 417 Cowley Ave at 5:03pm. This is where undergrads and graduate students congregate around some of East Lansing's finest food. For specific times and dates of these events visit the website above or just keep your eyes open for flyers around the Engineering Building.

Considering joining ASME? Becoming a member of ASME is beneficial and easy to do. ASME membership links you to great career opportunities that other engineering students don't have. ASME members gain valuable teambuilding skills and provide members with the chance to network with industries and faculty. Being a member lets you have one-on-one time after company presentations to get all your questions asked as well as having the chance to slip the recruiters your resume. Having trouble catching an internship or a co-op? Joining a group such as ASME gives you a great resume builder and that competitive edge that sets you apart from the rest. One of the best benefits of joining ASME is access to over \$100,000 in scholarships that only ASME members can receive! To become a member, just visit our website mentioned above or room 2328K to pick up and submit your application. Membership is FREE for freshmen, so don't wait until next year to join. Not a freshman? Membership is only \$35 per year, with \$5 of it going towards the MSU chapter to help finance events, presentations, and the free food and drinks provided at these gatherings. There is also an ASME general meeting scheduled for after spring break where all of your questions can be answered by our E-Board members.

Besides the great connections to companies and scholarships, ASME members receive a subscription to the *Mechanical Engineering* magazine and get to attend all ASME events. Please contact one of the officers to find out company presentation dates, suggest companies that interest you, or just give your personal feedback. Want to get more out of ASME? 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 such as ASME gives students a great deal of real-world experience and looks even better on a resume. Officer elections are held in the spring semester, and these positions will need to be filled as graduating officers leave. So get involved with ASME and the College of Engineering and make the most out of your MSU education. ASME members help create new programs that benefit not only current MSU students but future MSU students as well. Visit www.egr.msu.edu/asme for further details on meetings, event times and locations, community service, membership and more. Submitted by Louis Cervone, Newsletter Editor

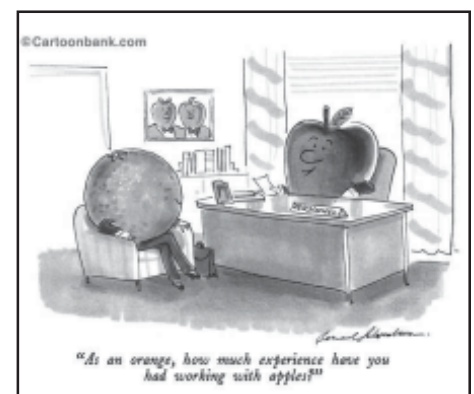
Pi Tau Sigma



Pi Tau Sigma, the mechanical engineering honor society, is very excited about this semester. We got off to a running start with an all-you-can-eat wing night at Buffalo Wild Wings. We also hosted a golf scramble where members had the opportunity to network with companies while enjoying a fun day on the course. The "Showcase of Stars" breakfast was another event Pi Tau Sigma participated in, where students had the chance to meet recruiters before the fall Career Gallery.

There are many upcoming events for this semester to keep our members and initiates active. We are scheduled to volunteer at Ronald McDonald House on October 21 as an opportunity for members to give back to the community. Also, on October 26 we will be participating in an Ultimate Frisbee event with the University of Michigan's chapter.

The club is currently planning some academic events with ASME such as a possible Professional Development Nights and company information sessions. For more information about any of our events, please check out our website at www.egr.msu.edu/pts. We hope to see you at upcoming events! Submitted by Amanda Ruhno, Secretary



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PHOTO PROVIDED BY ERIC TINGWALL



PHOTO PROVIDED BY ADAM ZEMKE

SAE International

MSU Baja SAE Team Shows Off Engineering Abilities by Building Off-Road Racer

The Michigan State Baja Racing Team is gearing up for the 2008-2009 season that will challenge members to use their engineering experience to build an off-road racer. The national Baja SAE competition requires students to design, build, and race an off-road vehicle against other universities.

Michigan State Baja cars are built to endure the harsh abuse of competitions, which include maneuverability, suspension and traction, acceleration, and sled pull tests in addition to an endurance race. The team must also prove their cars with formal a report detailing cost, design and a sales pitch.

The Spartan team is looking to continue its legacy of being a top school at this year's competitions in Alabama, Oregon and Wisconsin. Last year, the team won a Stand-Alone Innovation Award for successfully racing the first-ever high-performance four-wheel-drive Baja SAE vehicle.

The team is always recruiting new members from all majors. For more information on the team, visit www.michiganstatebaja.com. Submitted by Eric Tingwall, Webmaster.

SAE International

SAE Formula

The past several months have been quite exciting for students on the Formula Racing Team. Recovering from a disappointing accident at Michigan International Speedway last May, team members spent every following weekend testing Car 51 to get ready for the California venue; Formula SAE West. The team would like to thank Gold Sponsors Goodyear Tire & Rubber and Robert Bosch Corporation for opening the doors to their proving grounds week after week to make these testing sessions possible.

All of the time preparing paid off with a fantastic event in Fontana where the team took 4th place and won the Design event. Judges extended special accolades to Powertrain Team Leaders **Andrew Gryczan** and **Eric Partlo**, stating that MSU had "by far, the most developed powertrain of any of the teams."

Following a memorable venue, team members took time for a short social vacation involving a few beach-fueled sunburns before heading to Burbank for another rendezvous with car aficionado **Jay Leno**. Jay and his head car-taker, **Bernard Juchli**, were excited to see the progress that the team had made over the past 12 months and to hear about future development.

Speaking of the future, the team is excited to announce that 2009 holds many exciting firsts, as members will debut MSU's first ethanol-powered carbon fiber monocoque racing car. This evolution would never be possible without the support of all of Car 51's sponsors, including Platinum partners: the College of Engineering, GM, George P. Johnson Co, the Center for Automotive Research, NAIAS LLC, and Demmer Corporation. Stay tuned to the team's blog and website, msuformularacing.com, throughout the season for updates. Submitted by Adam Zemke, Project Manager.



Nominate your favorite prof for the 2009 Withrow Teaching Excellence Award! Just go to:

<https://stuedms.msu.edu/withrow.php>

Deadline: Friday, Nov. 21

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. *Somerton.*
- 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 and MSE 250. PLEASE NOTE that the ME department cannot change your ME lab section in another course to fit the ME 477 schedule. *Thompson.*
- ME 478 **Product Development.** 3(3-0). Prereq: ME 361, 477, and Tier I Writing. *Thompson.*
- ME 490 **Independent Study.** 1-4 credits. Requires Override—See #1 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. **BME Option Course.** PLEASE NOTE that the ME department cannot change your ME lab section in another course to fit the ME 497 schedule. *Reid-Bush.*
- CE 422 **Applied Hydraulics.** 3(2-2). Prereqs: ME 332 and 391. *TBA*
- MSE 425 **Biomaterials & Biocompatibility.** 3(3-0). Prereq: PSL 250 or concurrently and MSE 250. **BME Option Course.** *Baumann.*
- MSE 426 **Introduction to Composite Materials.** 3(3-0). Prereq: ME 222. *Loos.*
- MSE 466 **Fracture and Failure Analysis.** 3(2-3). Prereq: ME 250. Recommended background: MSE 320 and 331. *Lukas.*



OVERRIDE INSTRUCTIONS

ME Override Form Link: <http://www.egr.msu.edu/me/undergrad/forms>

1) 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.

Undergraduate Program Educational Objectives Department of Mechanical Engineering Michigan State University

(Approved by the ME Department Faculty on 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.

Fall Semester Calendar

- November 14** 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 21** **Deadline for Withrow Teaching Award Nominations.** The nomination form is located at:
<https://stuedms.msu.edu/withrow.php>
- Nov 27-28** Thanksgiving recess
- November 21** “The Gathering” (fall social) at Dr. Somerton’s house. All ME student, faculty, and staff welcome! Sponsored by ASME.
- December 5** **Last day of classes & Design Day.**
- December 6** Undergrad Commencement Ceremony-Breslin at 2 pm. Lasts about 2 hours. No tickets required.
- Dec 8-12** Final Exams
- Dec 13-Jan 11** Semester Break
- January 16** Last day of Free Add Period for Spring 2009.
- March 1** Approximate application deadline for April FE exam
- March 16** Scheduled Computer/Telephone Enrollment period for summer semester begins. (Open enrollment begins on March 28.)
- March 28** Computer Enrollment period for fall/spring 2009-2010 begins. Your enrollment access date (the first time you can log on) will be posted on StuInfo in mid-March.

MICHIGAN STATE UNIVERSITY

*ME Advising Office
Dept of Mechanical Engineering
2560 Engineering Building
East Lansing MI 48824-1226*

The MSU College of Engineering

Design Day

Friday, December 5, 2008
MSU Union

Come and see our students
lead, create, and innovate

Activities include:

- Competitions
- Presentations
- Demonstrations
- Awards

