Last spring a student team in Dr. Bush’s senior elective, ME 497-Biomechanical Design, designed a clever device that can convert from a chair to a table (see inset photos). They dubbed it the Chaible, and with help from Spartan Innovations, they are pursuing a patent. Turn to page 3 and read about their amazing experience!
This fall term marks the inauguration of two new and exciting opportunities for ME students. The first one is the ME Learning Center, located in 1239 EB.

The ME Learning Center is a tutoring and mentoring center to assist ME undergraduate students in targeted courses, namely ME 201, 222 and 361. The center is staffed by our most talented upper level undergraduate students. These mentors hold sessions throughout the week and on weekends to strengthen the students’ understanding of key concepts, assist with challenging homework problems, and prepare students for exams. If you are currently taking or plan to take one of these courses, be sure to make use of the assistance provided by the ME Learning Center. If you have already managed to work through these courses and achieved a high level of understanding (and a grade of 3.5 or better), please consider serving as a mentor during a future semester.

Have you ever had a great idea for a new product or service and thought to yourself, “I should start a company”? If so, you might be an entrepreneur. To encourage the growing entrepreneurial culture across the MSU campus, the Mechanical Engineering Department is proud to introduce Invent ME, a new entrepreneurial competition aimed at helping students and student groups move closer to commercialization of their ideas. All applicants and teams must be ME centered, but your team may (and eventually should) contain members from other disciplines. Selected teams will receive a modest amount of initial funding ($500) to work on the business plan and to develop prototypes, and will also receive support from the Hatch: http://www.cityofeastlansing.com/hatch/. Then in the spring semester, there will be a more significant business plan competition, where the winning teams will receive a larger prize to be used toward commercialization. To find out more, please come to the informational meeting to be held on: Tuesday, October 22, 6:00 pm, 1345 Engineering Building. Free pizza and pop provided.

This semester we have a record number of students involved in design projects, and that means the machine shop and the IPL will be more crowded than ever. You will do yourself, your design team and everyone else a big favor by getting your work done early instead of waiting until the last minute to complete key manufacturing steps. It also helps to be fully prepared prior to entering the shop. In other words, do your brainstorming, planning, analyses and drawings before going to the shop to make your parts.

You know that I cannot end this column without mentioning safety. If safety is not your number one priority, then don’t even think about entering the machine shop or the IPL. First get your mind and your equipment right, and then you can enter. Also, please remind your colleagues to be as safe as possible at all times. To encourage students to look out for the safety of one another, this semester we will institute a new protocol. If anyone in the shop or the IPL violates a major safety rule (e.g., no safety glasses, wearing open toe shoes, etc.), then everyone else in the room at that time will perform 25 pushups. Peer pressure can be a wonderful thing.

Academic Advising

1) ME Juniors and Seniors are advised by Gaile Griffere. For an appointment, call 355-3338, or go to 2560 EB.

2) Sophomores with a 3.0 GPA who will be juniors at the end of this semester are advised by Gaile Griffere. For an appointment, call 355-3338, or go to 2560 EB.

3) Sophomores who do not fit the criteria in number 2 above are advised by Carmellia Davis-King. To schedule an appointment, call 355-6616 x 2.

4) ME Freshmen are advised in W-8 Wilson Hall on a walk-in basis only.

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COVER STORY

From Concept to Reality: The Chaible!
by Steven Gerdeman, ME Senior

Biomechanical engineering is one of the most crucial forms of engineering found in the world today. It encompasses every product and design that interacts with anything living, whether it’s a human or another organism. A basic course that introduces mechanical engineers to this field of study is ME 497-Biomechanical Design, taught by Dr. Tamara Reid-Bush.

What makes the class unique is its structure. Half of the class is composed of students who are from the College of Engineering, while the other half of the class comes from the Department of Marketing. This adds a dynamic that many engineering and marketing students may not experience in a traditional course. In addition, the entire semester is dedicated to producing a product that fulfills a need. However, unlike other classes that specify the need to be filled, this project is completely open ended.

My brainstorming strategy included thinking about my typical college day, trying to find places where my quality of life could improve. When I thought about the layout of my apartment, I noticed a vital piece missing: when I had guests over, I didn’t have enough seating! A few of my visitors had to consistently sit on the floor instead of on the futon or the chair. In addition, many of the tables in my living room go largely unused, simply taking up space rather than having a function.

This issue inspired me to conceptualize the Chaible, a mix between a chair and a table. During daily use, the Chaible would act as an end table. However, whenever the need for additional seating outweighs the need for end tables, the Chaible would be converted into a chair. After proposing the idea to my group mates, we began designing a prototype to showcase the idea for the first check-point in the class. Utilizing simple mechanisms, a rotating system for the back of the chair was developed. This allows for half of the table to fold up and for the chair legs to deploy.

The rest of the semester was spent constructing and testing various prototypes for our idea. Various surveys were conducted in order to find what features were most appealing to our potential customers. We implemented as many of these features into our design as possible before the final presentation. Nervous, not sure how the audience would react to our product, we gave our sales pitch to the class.

Their reaction was greater than my group could ever imagine. Our design was voted the best of the day and our professor, Dr. Tamara Reid-Bush, recommended patenting the product through Spartan Innovations.

Spartan Innovations was extremely helpful in explaining the entire patenting process. They listed out every step needed to file a patent, from the trademark process to setting up a Limited Liability Company (LLC). In addition, they invited the team to The Hatching, a competition for new ideas formed in the Lansing community. Each team was given 5 minutes to give a presentation showcasing their idea to the judges. After every team had presented, the judges announced the winner: The Chaible!

Everything following the competition has been a dream. As the winners of the month, all lawyer fees associated with setting up an LLC have been covered. Looking forward, our team is preparing for the second Hatching competition in December. We hope to win in order to cover all of the additional costs in patenting our design.

What started simply as an idea has grown into something that no one in my group had ever imagined. The future of the product is even more of a mystery.

IAH/ISS Diversity Requirement

Many courses in Arts and Humanities and in Social, Behavioral, and Economic Sciences, 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.
Professor Brian Thompson received the 2013 Withrow Teaching Excellence 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 student representatives from ASME, SAE, and Pi Tau Sigma makes the selection after reviewing nominations from ME juniors and seniors.

Professor Brian S. Thompson, professor of mechanical engineering, has for more than 30 years been a stalwart educator, inspiration, and role model to engineering students at Michigan State University. Anyone who has had even a brief contact with Dr. Thompson realizes that he is very fond of the “words of titans.” It is appropriate, therefore, to consider the words of Winston Churchill, when describing Dr. Thompson’s ethos. “Never give in, never give in, never, never, never— in nothing, great or small, large or petty— never give in except to convictions of honour and good sense.” He is relentless in his pursuits, never giving up on his goal to educate and inspire the next generation of world leaders. Student comments such as, “Dr. Thompson has had a significant impact on my life,” and “He has made me a better man through his courses,” were common in his nomination packet. As William Butler Yeats so eloquently put it, “Education is not the filling of a pail, but the lighting of a fire.” Dr. Thompson has lit many fires indeed, and we can be sure that whatever endeavor he chooses to undertake, he will take up with an energy that will continue to light fires.

Dr. Thompson received his Ph.D. in 1976 from the University of Dundee in Scotland. During the past decade he has worked in Tanzania and Peru designing, manufacturing, and then diffusing innovative low-cost solar-thermal technologies that address inherent health and societal issues while transforming lives. His educational initiatives have included the organization and delivery of national workshops on solar box ovens in Morogoro for Tanzania’s elite, including professors, politicians, teachers, business people, and entrepreneurs. Dr. Thompson has delivered workshops across the globe in the remote Andean communities of Huamachuco and Choquizonguillo, and in remote rural health posts, offering advice on a variety of solar-thermal water heater designs for domestic use, hospitals, and schools, and on solar-thermal dehydrators that preserve horticultural produce.

In his spare time, Dr. Thomson enjoys traveling, attending concerts and the theater, jogging and watching soccer. Both this semester and next he is teaching ME 371 and 477, and next semester he will teach an additional course, ME 491/602-Humanitarian Engineering, which is a design intensive senior elective.

Dr. Leo Kempel, Acting Dean of the College of Engineering, Dr. Brian Thompson, and Dr. Alex Díaz, ME Chairperson.

Teaching Award Nomination Form:

Professor Thompson Receives the 2013 Withrow Award!

The Withrow Teaching Excellence Award Nomination Link is NOW LIVE!

Nominate your favorite prof for the 2014 Withrow Teaching Excellence Award! It’s easy! Just go to:

http://www.surveymonkey.com/s/9L7XFL8

Deadline: Friday, Nov. 15
Last spring Professor Farhad Jaberi was presented with the Withrow Senior Distinguished Scholar Award. Dr. Jaberi is well known, nationally and internationally, for his contributions in the computational modeling of turbulent combustion. He has been a major contributor in the fields of turbulent mixing and reaction, direct numerical simulation (DNS) and large eddy simulation (LES) of turbulent combustion. His early work in direct numerical or model-free simulations of fundamental flow problems identified several important physicochemical effects in turbulent mixing and reacting flows. He has been a key leader in the development of perhaps the most comprehensive method for modeling turbulent combustion – the filtered density function (FDF) methodology. His works laid the foundation for the methodology, and are very highly cited.

Most recently, he and his students have developed a class of new mathematical/computational models for detailed, large scale and realistic simulations of complicated fluid systems involving turbulent mixing, chemical reaction, and multiphase transport in complex geometries. These models are considered to be the state of art in Computational Fluid Dynamics (CFD).

Dr. Jaberi is director of the MSU Computational Fluid Dynamics (CFD) Lab, leading a team that works on fundamental and applied fluid/thermal problems, most notably on applications in aerospace and automotive industries. He has published extensively in influential journals with highly cited articles on direct numerical simulations and large eddy simulations of turbulent mixing and reacting flows. His scholarly output has been published in more than 150 manuscripts in journals, book chapters and conference proceedings. He has been the recipient of both the National Science Foundation CAREER award and the Office of Naval Research Young Investigator Program award. For his contributions to his technical society he was elevated to the grade of associate fellow of the American Institute of Aeronautics and Astronautics (AIAA).

Dr. Jaberi has had a strong impact on the ME curriculum through his participation and leadership in undergraduate curriculum and graduate studies committees. He introduced very popular computational fluid dynamic courses at both the undergraduate and the graduate levels. He is an excellent mentor of undergraduate students involved in research, working with them often in independent studies, summer research, as professors, and in honors and connector faculty programs.

As one colleague wrote, “Professor Jaberi is a one-of-a-kind professor. He is a dream come true for department heads/chairs, colleagues, and students. This is because he is a first-rate teacher, researcher, scholar, and a wonderful collaborator; and he has enormous passion and energy for his work. Professor Jaberi’s work is extremely rigorous, thoughtful, insightful, and of the highest quality. He publishes only in the best journals, and his reputation among his peers is outstanding. I expect many more wonderful things to come from him. There is no question that Professor Jaberi is a distinguished scholar of the highest caliber.”
Teaching Award Nomination Form:

Dr. Neil Wright, who had served in as associate chairperson for the ME Department News Urbana-Champaign in 2007. Most recently, he was an NRC research associate at the U.S. Naval Research Laboratory, working on Si nanowire-based chemical sensors and solar cells and a research scientist at Cbana Labs Inc. He will start his research career at MSU emphasizing (i) continuing to develop scalable and inexpensive patterning techniques and nanomanufacturing platforms for assembling various nanomaterials, (ii) manufacturing portable/wearable gas sensing systems for military and consumer applications, and (iii) synthesizing and testing high-temperature, regenerative sorbents that help to remove sulfur-containing or other catalyst-poisoning impurities in gasified syngas feedstock. Jung came to the East Lansing area with his wife, Grace Hong, who also joins MSU as an assistant professor in the Department of Statistics and Probability, and 3rd-grade daughter Hannah. He likes to play any ball games including tennis, soccer, and basketball, and enjoys watching movies and documentaries.

Dr. Ahmed Naguib has been promoted from associate to full professor.

Dr. George Zhu has been promoted from associate to full professor.

Dr. Tonghun Lee has accepted a position as an associate professor at the University of Illinois at Urbana-Champaign.

Dr. Nikolai Priezjev has accepted a position as an assistant professor at Wright State University in Dayton, Ohio.

Ms. Mary Pease left last December to take a position with the College of Engineering associate dean’s office in 1415 EB. Mary had served as ME undergraduate secretary since 2007.

Ms. Jayme Bisard, our new ME undergraduate secretary, joined the department last March. Jayme and her husband have a daughter who is 5 years old. In addition to spending time with her family, she enjoys baking and running 5 K’s.

Curriculum News

Increase in Admission GPA: Beginning with applications for Summer 2014, the combination GPA required for ME will increase from 3.0 to 3.1. The combination GPA is an average of the cumulative and technical GPAs. All other engineering majors will be required to achieve a 2.9 combination GPA for admission.

New Specialization: The Dept. of Chemical Engineering and Materials Science has approved a new specialization in Beverage Science and Technology. Information and a list of course requirements can be found at: https://www.reg.msu.edu/AcademicPrograms/ProgramDetail.asp?Program=5378

Co-op Students: Before you leave for your Spring 2014 co-op rotation, please be sure to discuss your sched-
DEAN’S LIST
Congratulations to these 282 ME majors who made the Dean’s List after Spring and Summer 2013. To be on the Dean’s List, you must have a semester GPA of 3.5 or better. This list is from September 18.
For updates, go to: http://www.reg.msu.edu/ROInfo/GradHonor/DeansList.asp.

SPRING 2013:

SUMMER 2013: Nicholas Chase, Megan D’Mello, Joshua Gann, Xue Jiang, Grant Ridley, Thomas Stevenson, Haoyu Wang, Yaojing Yang.

Back (cont’d from pg 5)
taught both graduate and undergraduate courses, and is held in high esteem as a mentor of students at all levels. He has mentored five Ph.D. candidates and multiple M.S. students, and has advised more than 20 undergraduate students who have worked in various capacities in his lab. Several have published the results of their work in undergraduate research publications. He has also been a key contributor to outreach programs by introducing pre-college students to biomedical engineering and promoting science, technology, engineering and math (STEM) among high school students and their teachers.
A current graduate student noted, “Under his tutelage and supervision, I now have a deeper appreciation for scientific learning and have further asserted my interest in being a professor. He is my role model not only as a professional but also as a good human being who positively impacts all who come in contact with him. I truly hope that I will affect my students in my professional life as profoundly as he has affected mine.”

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.
Nanomaterials, natural or manufactured objects smaller than 100 nm in at least one dimension, have received considerable attention in a wide spectrum of research areas and industrial sectors. They possess unique physical/chemical properties (unobservable in their bulk counterparts) due to their high surface area to volume ratio and quantum-mechanical effects. Examples of nanomaterials span from carbon nanotubes, organic and inorganic nanowires, and various nanoparticles to graphene flakes. Some of these nanomaterials can be found in our everyday lives – computers, mobile phones, sunscreen lotion, and tennis rackets, to name a few. New nanomaterials and nanostructures are being developed everywhere in the world, and controlling their properties presents great promise with respect to new scientific understanding and novel engineering and biomedical applications. Of equal importance to the synthesis of nanomaterials is the technology to place them into desired locations and orientations as either individual entities or ensembles.

Here enters nanomanufacturing. Nanomanufacturing entails the scalable, reliable, and cost-effective manufacturing of nanoscale materials, structures, devices, and systems. Two basic approaches to nanomanufacturing have been pursued: top-down and bottom-up. The top-down approach is like what a sculptor would use – gradually removing from a starting material and making a desired shape – except that it is difficult to use the conventional machining tools to cut, drill, or join nanomaterials. Instead we borrow technologies from the microelectronics and MEMS (microelectromechanical systems) industries. Photolithography is the dominant top-down patterning process and can reliably produce nanostructures as small as 22 nm over a 300 mm substrate (you can google Intel’s 22 nm node to learn its latest technology used for the most recent CPU chips). Features smaller than 5 nm have been reproducibly generated using another advanced lithographic tool called electron beam lithography.

On the other hand, the bottom-up approach is analogous to building a brick house (in a spontaneous way). It uses the chemical properties of single molecules or nanomaterials, rendering them to self-organize or self-assemble into some useful structure. Self-assembly is ubiquitous in nature from atomic to astronomical scale, including atoms forming molecules, molecules crystallizing and aggregating into a larger cluster, surfactants forming micrometer-size micelles, lipids forming the cell membranes, and even planets and stars forming galaxies.

Each approach, however, has its own problem. Intel invested $3 billion to build its high-volume 45-nm manufacturing factory in 2007, and a significant portion of the investment has to do with the photolithography and related equipment. Many other top-down approaches such as electron beam lithography are serial processes – too slow to be mass manufacturable. Meanwhile, bottom-up approaches like molecular self-assembly and supramolecular chemistry have the potential to produce devices in parallel and much cheaper than top-down approaches. However, as the size and complexity of the desired assembly increases, bottom-up approaches may become overwhelmed.

In the Nanomaterials, Nanomanufacturing, and Nanodevice (n3) Laboratory, we are interested in combining these two approaches. Our goal is to
build nanomanufacturing platforms that meet the following criteria: (i) high fidelity and controllability (orientation, quantity, alignment, etc), (ii) highly parallel, large scale and low-cost, and (iii) less environmental impact and energy efficient process.

One approach we take is a filtration-assisted guided assembly that can place a variety of nanomaterials (including nanotubes, nanowires, and nanoparticles) with high accuracy, high throughput, and low cost. A key idea is to pattern a porous membrane (or filter paper) with a polymer layer; allowing nanomaterials to be deposited only onto the open windows of the filter membrane (see Figure 1a). If an opening geometry is slit-like, the strength of the flow field during filtration will help nanotubes and nanowires to form a network with a different degree of alignment, which is difficult to achieve with other nanomanufacturing processes. The feasibility of the filtration-assisted self-assembly concept was demonstrated with carbon nanotubes and latex nanoparticles assembled on nanoporous alumina membranes (see Figure 1b and 1c). The patterned nanomaterials on the filter paper can be picked up by a stamp and later transferred to plastic substrates as well as solid-state surfaces. Note that vacuum filtration is routinely performed in many chemistry laboratories, and its setup cost can be below $100!

Another hybrid approach we pursue in our lab is the combination of nanosphere lithography and metal-assisted chemical etching to fabricate well-separated silicon nanowire arrays with good periodicity (see Figure 2). Nanosphere lithography is a bottom-up method to render monodispersed colloidal nanospheres to self-assemble into two-dimensional colloidal crystals. Once the size of the nanospheres is reduced in a plasma etcher, a gold film is deposited with nanospheres as a mask and then nanospheres are removed in a solvent, forming a gold film with an array of tiny holes. The gold film catalyzes the electrochemical reaction to remove underlying silicon substrate. In the end, this combined method produces a highly ordered array of vertically-aligned silicon nanowires, which shows interesting optical properties. Again our approach to fabricating the silicon nanowire array is extremely cheaper than the typical top-down approaches. Using these hybrid nanomanufacturing technologies, we plan to develop an electronic nose, wearable sensors, and plasmonic photocatalysts for myriad energy and environmental applications.

**Undergraduate Research Positions Available!**

The Department of Mechanical Engineering (n3) Laboratory has multiple positions for undergraduate student researchers.

**Undergraduate students in any science and engineering program, who are highly motivated and have some laboratory experience, are strongly encouraged to apply.**

*Students are expected to work on (i) micro-/nanofabrication, (ii) chemical synthesis, (iii) material characterizations, (iv) Labview programming, and/or (v) electronic measurements and device testing.*

**Competitive hourly rate for student employment will be provided. You can visit [www.msu.edu/~jyeom](http://www.msu.edu/~jyeom) for more information on ongoing research projects in our lab.**

**Candidates who are interested in a position may send resumes (including key science/engineering coursework and research-related activities, if any) to Dr. Junghoon Yeom at jyeom@msu.edu.**

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**Figure 2:** (a) Size reduction of latex nanosphere array, (b) 90% reduced nanosphere array by ICP-RIE, (c) perforated gold film of 10 nm in thickness, (d-e) an ordered, sparse array of silicon nanowires with the average wire diameter of 55 nm and pitch of 490 nm.
62 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 10. If your name is missing, please contact me immediately (Email Gaile at <grifore@egr.msu.edu> Tele: 517-355-3338).

Yeldar Abitayev  
Scott Andrew Bachor  
Ann Elizabeth Barrett  
Alexander Raymond Benson  
Ante Josip Beslic  
Andrew Richard Bloch  
Benjamin Kremen Bosworth  
Amanda Katherine Boyd  
Stephanie Michelle Bury  
Daphne Zhi Cai  
John Joseph Casuccio  
Renée Lauren Chabon  
Riley Rene Chapdelaine  
Joel Cosner  
Harrison Paul Cummings  
Eric Anthony Darin  
Jacob Patrick Davenport  
Benjamin Robert Dean  
Benjamin Mark Dewys  
Daniel Christopher Dokter  
Peter Takashi Dolce  
Alexander Ellis Dutch  
Peter John Engstrom  
Kathleen Anne Fitzsimons  
Chad Joseph Floria  
Steven Alan Gerdeman  
Tyler Michael Haley  
William Raymond Hanley  
Nicholas James Hansen  
Stefan Eric Hebert  
Jennifer Ann Henige  
Chad Michael Houlihan  
Rami A Janoudi  
John Herman Jess  
Andrew David Kaye  
Daniel Nelson Kenny  
Aerin Lee Klump  
Mariah Elizabeth Krebs  
Sarah Elizabeth Kurtz  
Adam Joseph Lang  
Jared Michael Lee  
Adam Michael Leenheer  
William Tyler Lindstrom  
Angela Jeanne Marinich  
Michael James Marshall  
Scott Andersen McCarver  
Zakary Shaw McLennan  
Garrett Lee McMannan  
Craig August Miller  
Trevor James Nil  
Katie Nicole Renaud  
Tyler Steven Rumler  
Michael David Rykerkerk  
Stephen Joseph Sommerlot  
Christopher Michael Stanos  
Jason Lee Thelen  
Austin James Tokarski  
Spencer Jon Turner  
Megan Elizabeth Wallace  
Xiangyu Wang  
Yanfeng Wu  
Nicholas Brent Zhu

Tutoring

• The ME Learning Center, located in 1239 EB, has mentors for ME 201, 222, and 361. The hours for Fall 2013 are:
  - Sunday 5-7 p.m.
  - Monday 2-4 p.m. & 5-7 p.m.
  - Tuesday 10 a.m - Noon & 5-7 p.m.
  - Wednesday 2-4 p.m.
  - Thursday 10 a.m.-Noon & 5-7 p.m.
  - Friday and Saturday-Closed

• The Guided Learning Center (GLC), located in 1108 EB, offers free drop in tutoring in math up to differential equations and science courses (chemistry, physics, etc.) plus many core engineering courses. To request assistance, go to: http://www.egr.msu.edu/egr/departments/dpo/academicassistance/glc/index.html

• The Cornerstone & Residential Experience (CoRe) program provides tutoring in G24 Wonders Hall on Sunday through Thursday from 6 - 10 pm. This is a “drop-in” setting, aimed at the most common first and second year engineering courses (MTH 116, 132, 133, 234, 235; PHY 183 & 184: and CSE 231). Their website can be found at: http://www.egr.msu.edu/core/residential/tutoring

• 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 <grifore@egr.msu.edu>

Teaching Award Nomination Form:

The Center for Spartan Engineering by Kyle Liechty, Co-op/Intern Coordinator

Located in 1340 Engineering Building across from Sparty’s, The Center for Spartan Engineering is the ultimate resource for engineers seeking guidance on resumes, interviewing preparation, major career events, and experiential education opportunities. In addition to the everyday consultation activities that take place in The Center, the staff and career peers are active in hosting a variety of career development workshops and collaborating with employers for ASK Sessions, Information Sessions, and promotions throughout the school year.

The importance of having quality work experiences while in college is desirable, not just for students, but for prospective employers as well. Companies are actively recruiting engineers as early as their freshman year for internship and co-op opportunities, enabling students to gain the essential skills and knowledge needed to obtain a full-time job following college.

While many students are involved in the traditional summer internship, a growing number of employers have expressed interest in hiring Spartans as co-ops. A co-op is traditionally a longer, rotational work experience that allows student engineers to gain a more complete view of the production process, through the design and development of projects over the course of the experiential program. Being lengthier than the summer internship, many students opt to work during the fall or spring semester and balance degree requirements against the work term.

To avoid the concern of losing financial aid or healthcare benefits while taking a semester off class or having a reduced credit load, any student who registers for EGR 393 will be considered a full-time student, no matter
how many other credits are being taken. This one credit course is designed to provide structure for engineering students’ learning in an industry or research based work experience. All students who are registered automatically receive a scholarship that covers a significant portion of the cost of this one credit tuition and associated fees.

With hundreds of students potentially applying for the same position, it is essential to make a lasting impact from the very first handshake. The Center always has an open door to engineering students and would be happy to provide you with the resources needed to rock that initial employer introduction and get an internship or co-op that offers a great company.

Email: careers@egr.msu.edu  
Phone: 517-355-5163

Study Abroad at the University of Edinburgh by Gaile Gifford & Craig Somerton

Founded in 1582 the University of Edinburgh is one of Europe’s finest universities with a great tradition of producing outstanding scholars, including such giants as Charles Darwin and Sir Arthur Conan Doyle. In engineering, there is William John Macquorn Rankine, who proposed both the Rankine cycle (primary in the operation of steam power plants) and the Rankine temperature scale (the absolute scale used in English units).

The mechanical engineering facilities are very modern, allowing the faculty and students to pursue research topics varying from wave energy to micro-fabrication.

The city of Edinburgh, whose downtown is a short bus ride from the university’s engineering buildings, is listed as a World Heritage Site. In addition, for students seeking leisure activities the city has a terrific nightlife with many activities for young adults.

You will be able to take courses that fulfill your entire Senior Elective requirement (i.e., 12 credits of Senior Electives, including the 3-credit design intensive course). For more information, contact Gaile Gifford, ME Advisor, 2560 EB, 517-355-3338 (gifford@egr.msu.edu)

ME Study Abroad: RWTH-Aachen, Germany 2014 by Dr. John Foss with contributions by Evan McCune, Charlie Ferriera and Paul Snyder

MSU/ME students with a 3.0 GPA or higher have the amazing opportunity to: 1) live in Aachen, Germany (mid-May to end of July 2014), 2) carry out 5 credits independent study plus 4 credits German language study as credits for their MSU degree, and 3) travel in Europe with courses and lab schedules that include 3-day weekends. Also, with thanks to the North American Rockwell Endowment, substantial scholarship funds are available to the students in this program.

The independent study experience gives students the opportunity to participate in a project that meets their interests at the RWTH-Aachen, a premier European university. Project opportunities include tissue engineering, composite design, fluid flow analysis, automotive topics, plus many more. (It is useful to think of the RWTH as a university on the scale of MIT). The city center – a blend of a historic European city and a vibrant college town – reflects the history of Aachen as one of the Charlemagne capitals (800 AD), and the superb rail system allows our students to easily reach destinations of their choosing. Participants of last year’s program utilized 3-day weekends to travel to Berlin, Heidelberg, Köln, Paris, Amsterdam, Bruges, Barcelona, Milan, Rome, London and more!

Former students are the best sources of information for this program; they can be reached through Prof. J. Foss, Program Director. The 2014 organizational meeting will be held soon after the publication of this issue of the ME Bulletin. Make contact at foss@msu.edu or 355-3337. It is intended that the 2014 group will be formed by the end of Fall 2013.

In the words of a former participant: “Please don’t hesitate to talk to former students! They are more than willing to share experiences and information about the program. This is an opportunity you don’t want to miss.

Pi Tau Sigma

Members of the Tau Epsilon chapter of Pi Tau Sigma, the international mechanical engineering honor society, started the semester off right with our traditional “Wing Night” at Buffalo Wild Wings on October 15. We invited all eligible members to join us and learn more about our organization.

We are volunteering with local school districts and the Ronald McDonald House this semester as part of our outreach efforts.

We will be hosting a Mechanical Engineering Senior Elective presentation on Wednesday, November 13 at 7:00 pm in 1145 Engineering Building. This event aims to inform students about their ME senior elective options and give them a chance to ask questions from those who have already taken the courses. This will be both fun and informative.

Later in the semester, we will meet up for nachos at Harrison Roadhouse, an exciting new social tradition. Finally, we will hold an initiation in November to induct new members into our chapter, followed by a complimentary dinner. For more information on Pi Tau Sigma or any of our events, please visit our website at www.egr.msu.edu/pts. Submitted by David Crouse, President.

http://www.surveymonkey.com/s/9L7XFL8 (Deadline: Nov 15)
Teaching Award Nomination Form:

Technical Presentation Skills by Craig Gunn, Director of Communications

It is that time of the semester when everyone starts to plan and give presentations in many of their classes. Here are a few things to consider when preparing for your time in front of an audience. You might also consider these things when starting your job search and talking to employers.

Assess your skills

Take a look at yourself and the way that you could be described as a speaker. Do you avoid any chance to speak, do you resist but go if you have to, do you accept but with reservations, or do you seek out those chances to present. Only when you understand your own qualities can you move forward into the realms of public speaking.

Dealing with anxiety

One of the best ways to fight the problems of anxiety is to simply make sure that you are prepared. You are the expert of the moment, so be that expert. Knowing the material can mean the difference between a sigh of satisfaction and a whimper of defeat.

Visualize what is going to happen when you present the material. What does the room look like, how will your audience act, what kind of questions do you expect. Being ready is being prepared.

Practice your presentation. Do it standing up and speaking the words. Visualize the people in front of you. Move your eyes and practice with your body language.

Breathe. Spend some time talking and breathing. We do it naturally until it comes to speaking engagements.

Focus on relaxing. Talk to yourself. Give yourself the confidence to take the moment in stride.

Release the tension. Move the shoulders. Exercise your jaws. Stretch your arms and legs. Clench and release the fist.

Move. Don’t stand in one spot, especially for long presentations. A few steps will prevent you from becoming a statue and will loosen the tension.

Practice eye contact. Look at the members of the audience. Find those people who will inevitably smile at you. Return the smile; it’s infectious.

Spend some time thinking about the above and presenting will be a great deal more fulfilling.

American Society of Mechanical Engineers

ASME offers many events throughout the year. This semester, we have brought representatives from many companies to discuss their industries and career opportunities. We also plan to bring in many more. If there is a company you want to see, let us know!

We also like to have fun. ASME hosts a number of social events throughout the year. So far this semester, we have hosted a Tailgate with a few of our partner organizations. We have more in the works for later this semester. Additionally, Junkyard Wars will be bigger than ever this spring so keep an eye open for more information on that. These events are a great way to get to know your fellow ME’s. We hope to see you at our next event.

ASME would also like to thank the people who have made our club possible. Dr. Shaw, our faculty advisor, has been a great contributor to our activities. We would also like to thank our generous sponsors, Whirlpool, Dow Chemical, BP, and Marathon.

It is easy and beneficial to become a member. With job placement becoming more of an issue every day, joining a student group gives you a competitive edge. To sign up, please visit the “Membership” section of our website, http://www.egr.msu.edu/asme/membership.html. The cost is only $25 per year, and free for freshmen. Submitted by Christopher Baldwin, ASME Webmaster.

Design Day

Friday, December 6, 2013
Engineering Bldg

Come and see our students lead, create, and innovate

➢ Competitions ➢ Demonstrations
➢ Presentations ➢ Awards

The MSU College of Engineering

The American Society of Mechanical Engineers
The Michigan State Baja Racing team is once again excited to start off a new season. The team has recently been recruiting and has many new interested members ready to join our design teams.

The team started off the year by traveled to Louisville, Kentucky to participate in the invitational only event, Midnight Mayhem. The team finished in 14th and 15th place overall out of 70 teams. Fabrication of the brand new 2014 vehicle began in early October. This vehicle will have a new innovative redesigned chassis, suspension, ergonomics, and powertrain setups. We are very excited to get this car up and running!

If there is anyone interested in MSU Baja Racing please contact Briita Wanhala at: baja@msu.edu

Submitted by Thomas Dionne, Chief Engineer.

2013 Rochester, New York SAE Event - MSU #38 getting some air!!

PHOTO PROVIDED BY THOMAS DIONNE

Undergraduate Program Educational Objectives
Department of Mechanical Engineering
Michigan State University

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.
Every year students on the Formula SAE Racing team work hard to design, manufacture, and test an open wheel formula style car. Last year the Formula Team took 9th place out of 120 teams in the Formula SAE Michigan Competition and they are now busy working on the 2013-2014 race car.

Formula SAE is the world’s largest engineering design competition with over 500 schools competing from around the globe. This year the team will compete in two events. The first is in May at Michigan International Speedway and the second is in June at Lincoln Airpark, Nebraska.

Students on the team gain experience in design, analysis, manufacturing, and testing. The whole car is designed in CAD and all structural components are analyzed using Finite Element Analysis (FEA) software or physical testing. Students also run Computational Fluid Dynamic (CFD) analyses, engine performance simulations, suspension kinematic simulations, composite structure analyses, and more.

The team is always looking for more members and any student at Michigan State University can join. No previous experience is needed to join the team. If you are interested in joining please contact Dan Riggs at riggsdan@msu.edu. Submitted by Kevin Viguilla, Chief Engineer.

PHOTO PROVIDED BY KEVIN VIGILLA

The Michigan State Formula Racing team brought home an impressive 9th overall finish in FSAE Michigan.
SPRING SEMESTER SENIOR ELECTIVES

- **ME 417**: Design of Alternative Energy Systems. 3(3-0). Prereq: ME 410 or concurrently. TBA.
- **ME 426**: Introduction to Composite Materials. 3(3-0). Prereq: ME 222. Loos.
- **ME 440**: Aerospace Engineering Fundamentals. 3(3-0). Prereq: ME 332 or concurrently. Engeda.
- **ME 442**: Turbomachinery. 3(3-0). Prereq: ME 332. Engeda.
- **ME 445**: Automotive Powertrain Design. 3(3-0). Prereq: ME 444. Schock.
- **ME 465**: Computer Aided Optimal Design. 3(3-0). Prereq: ME 471 or concurrently. Averill.
- **ME 477**: Manufacturing Processes. 3(3-0). Prereq: ME 222, MSE 250, and Tier I Writing. Thompson.
- **ME 478**: Product Development. 3(3-0). Prereq: ME 477 and Tier I Writing. Kwon.
- **ME 490**: Independent Study. 1-4 credits. See Override Instruction #1 below. You may reenroll for a maximum of 6 credits.
- **ME 491**: Selected Topics in Mechanical Engineering. Section 001: Intro to Computational Fluid Dynamics. See Override Instruction #2 Below. Course Description: Theory and application of finite difference and finite volume methods to selected fluid mechanics and heat transfer models including a potential flow model, a compressible flow model and an incompressible Navier-Stokes model. Prereq: ME 410. Jaberi. This course will taught with graduate students who will take the course as ME 840, and who will have different assignments. If you have questions, contact the instructor.
- **ME 491X**: Selected Topics in Mechanical Engineering. Section 602: Humanitarian Engineering: Design, Build, Test, Communicate, International Projects. See Override Instruction #2 Below. Course Description: Extensive class notes plus web-based material, and a major project requiring students to apply human-centered design methodologies to create and manufacture a sustainable solution to an authentic inter-disciplinary engineering problem in India, Guatemala, or Kenya, or elsewhere, involving people fending for themselves at the margins of life. Prereq: (ME 371) and (Senior-level standing). Thompson.
- **ME 495**: Tissue Mechanics. 3(3-0). Prereq: ME 222. Biomechanical Concentration Course. Haut.
- **ME 497**: Biomechanical Design. 3(3-0). Prereq: ME 371 or concurrently. Biomechanical Concentration Course. Reid-Bush.
- **BE 445**: Biosensors for Medical Diagnostics. 3(3-0). Prereqs: (BS 161) and (CEM 141) and (ECE 345). Biomechanical Concentration Course. Alocilja.
- **CHE 483**: Brewing and Distilled Beverage Technology. See Override Instruction #4 Below. All lectures and laboratories will take place at 2000 Merritt Road, East Lansing. Prereqs: (Age 21 or higher) and (Senior standing) and (ME 410-Heat Transfer or concurrently). Berglund.
- **ENE 422**: Applied Hydraulics. 3(2-2). Prereq: ME 332. This used to be CE 422. Mantha.
- **MSE 425**: Biomaterials & Biocompatibility. 3(3-0) See Override Instruction #3 below. Prereq: MSE 250. Recommended Background: PSL 250. Biomechanical Concentration Course. Sakamoto.
- **MSE 451**: Microscopic & Diffraction Analysis of Materials. 3(2-3). Prereq: PHY 184. Recommended background: MSE 260 & 381. For more info, see Override Instructions #3 & 5 below. Lunt.
- **ME 802**: Advanced Classical Thermodynamics. 3(3-0). See Override Instruction #5 below. Prereq: ME 412 plus GPA of 3.5+. Wichman.

**OVERWRITE INSTRUCTIONS**

1) ME 490–Independent Study Enrollment Procedure: Find a professor who is willing to supervise your independent study, and discuss your plans with him/her. Complete an ME 490/490H Enrollment Contract (independent study form), available in the ME Advising Office in 2560 EB. After you and your professor have completed and signed both sides, return the form to the ME Advising Office for the remaining signatures, override, and enrollment.

2) Complete and submit the ME Override Request Form: http://www.egr.msu.edu/me/form/me-override-request. Please note that the ME department cannot overfill required courses to resolve conflicts with Senior Electives, Other Electives, Integrative Studies courses and employment schedules.

3) ME majors do not need to have taken the Recommended Background courses, but there will probably be a need for some additional background reading. Contact the professor for more information.

4) CHE 483–To request an override, go to 2527 EB, and be prepared to show them your I.D. to prove that you are 21 or higher.

5) Complete the Graduate Course Override form, available in the ME Advising Office in 2560 EB. This is a paper form.
**Department of Mechanical Engineering**

**Fall Semester Calendar**

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
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<tbody>
<tr>
<td>October 22</td>
<td>“Invent ME” informational meeting at 6 p.m. in 1345 EB. Free pizza &amp; pop. See Dr. Averill’s article on page 2 for more information.</td>
</tr>
<tr>
<td>November 4</td>
<td>Registration for the new computer-based-FE exam begins. For more information, go to <a href="http://cbt.ncees.org/news/">http://cbt.ncees.org/news/</a></td>
</tr>
<tr>
<td>November 8</td>
<td>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.</td>
</tr>
<tr>
<td>November 13</td>
<td>Senior Elective Night, 7:00 p.m. in 1145 EB. Sponsored by Pi Tau Sigma.</td>
</tr>
<tr>
<td>November 15</td>
<td><strong>Deadline for Withrow Teaching Award Nominations. The nomination form is located at:</strong> <a href="http://www.surveymonkey.com/s/9L7XFL8">http://www.surveymonkey.com/s/9L7XFL8</a></td>
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<tbody>
<tr>
<td>November 8</td>
<td>Thanksgiving recess</td>
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<tr>
<td>November 13</td>
<td>Undergrad Commencement Ceremony-Breslin at 2 p.m. Lasts about 2 hours. No tickets required.</td>
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<tr>
<td>Dec 9-13</td>
<td>Final Exams</td>
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<tr>
<td>Dec 14-Jan 5</td>
<td>Semester Break</td>
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<tr>
<td>January 10</td>
<td>On-line Open Add Period for Spring 2014 ends at 8 p.m.</td>
</tr>
<tr>
<td>March 10</td>
<td>Scheduled Computer/Telephone Enrollment period for summer semester begins. (Open enrollment begins on March 22.)</td>
</tr>
<tr>
<td>March 28</td>
<td>Computer Enrollment period for fall/spring 2014-2015 begins. Your enrollment access date will be posted on StuInfo in mid-March.</td>
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**MICHIGAN STATE UNIVERSITY**

**ME Advising Office**  
Dept of Mechanical Engineering  
Engineering Building  
428 S. Shaw Lane, Rm 2560  
East Lansing MI 48824-1226

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