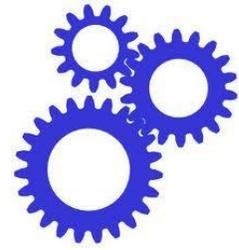




ME NEWS

APRIL 2014

2013-2014 ME Division Chair: J-D Yoder, Ph.D.



A note from the editor:

Division Leadership. As the summer annual conference approaches, it is time to start looking at nominations for officers in the division for next year. All of these positions are confirmed by vote at the annual **Business Meeting**. There are several vacancies – please attend the business meeting and nominate quality replacement officers! A summary is also available at the website.

- 1) The Secretary/Treasurer position is elected at the Business Meeting. For continuity, and by tradition, the division has operated such that officers rotate up annually in the leadership positions. The Secretary/Treasurer becomes the Program Chair-elect. The Program Chair-elect becomes the Program Chair. The Program Chair becomes the Chair and the Chair becomes the Past Chair.
- 2) It's time for a new ME Division News Editor/Webmaster. That's right – you can replace me as the eyes of the division, and strengthen the communication across the ME Division!
- 3) The Awards Selection Committee has 3 elected members, and also includes the past three winners of the award. Normally one of the current members of the Awards Committee (Amir Karimi or Raghu Echempati) becomes the Chair of this Committee. We then elect a replacement member for the remaining vacancy.
- 4) We have a Member-at-Large vacancy.
- 5) We have a Nominating Committee vacancy.

Newsletter Contributions. We're always looking for great articles for this newsletter, similar in style and length to the type you see within this version. Feel free to submit great articles anytime even though the newsletter is produced only in the fall and spring. Just email your articles directly to me or any of the Division officers (listed on page 6). The ME Division website is also a good place to find current events and lists of important contacts and dates. If you have details you

Dear ASEE Mechanical Engineering Division Members:

Hello, I hope you are all planning to attend the ASEE National Conference in Indianapolis this June. We have a full program of mechanical engineering division sessions. I'd like to encourage you all to attend the Mechanical Engineering Convivium, always one of the highlights of the meeting. I'd also encourage you to attend the Roe Award luncheon. If you would like to get involved with the Mechanical Engineering Division, we would be glad to have you join us for the division business meeting Wednesday at 8:45. Please take a few minutes to read over the newsletter to see the interesting things our members are doing in engineering education. If you have any questions about getting involved in the division, please don't hesitate to contact me at j-yoder@onu.edu. Hope to see you in Indianapolis!

Best regards,

J-D Yoder

Ohio Northern University

2013-14 Division chair, ASEE ME Division

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Suggestions, feedback, and contributions for future editions may be sent to the Editor, Michael Benson, email: michael.benson@usma.edu

like the entire division to see, send them to me as well. The focus of the website continues to remain centered on key events that culminate this year in Indianapolis, IN at the annual ASEE meeting, though there are other items as well, including faculty openings. The division website location has not changed, though its content is routinely updated: <http://mechanical.asee.org/>. We look forward to serving the division and meeting your mechanical engineering educational needs.

Freehand Sketching For Engineers

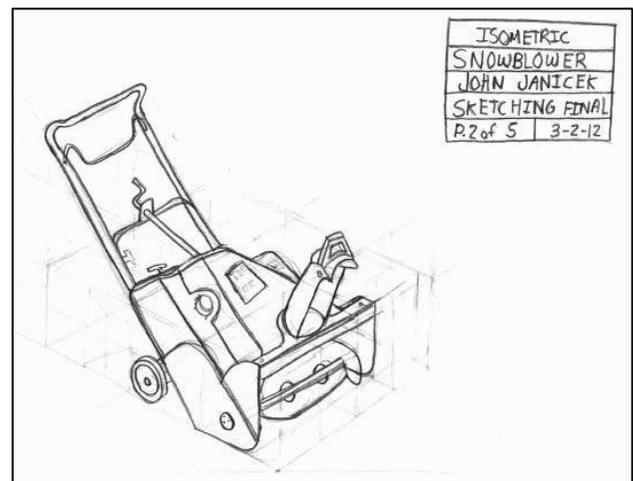
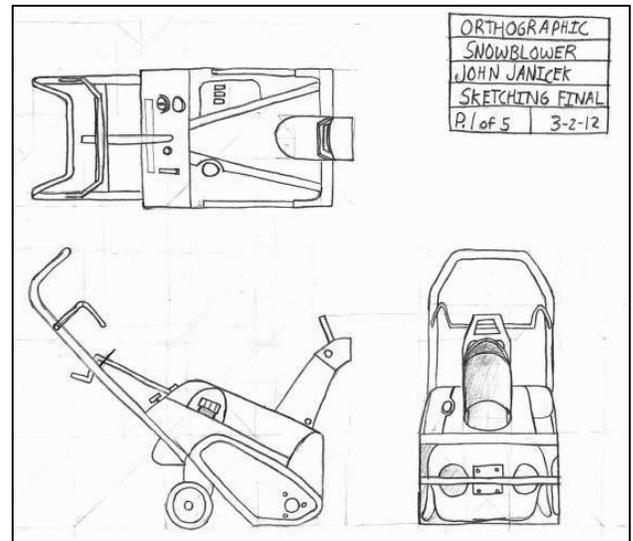
When I started my academic career at Marquette University in 1991, our College of Engineering had a large room with the oak drafting tables along with mechanical drafting equipment. Within a couple years, the drafting tables were replaced with large CRT CAD stations as the prevailing thought was that CAD would replace mechanical drawing for the design process.

Although CAD is extremely useful and is a more powerful tool for detailed design work than mechanical drawing (particularly for 3-D work), it doesn't provide an engineer with all the tools for the design process. As I have heard many times from experienced engineers, hand-drawn sketches are a more effective tool for generating ideas quickly than using CAD. Several research articles have shown the effectiveness of freehand sketches for generating ideas and concepts in the classroom^{1,2}, and ASEE promoted sketching as a design tool in the 1950s with the Grinter report³. However, the value of sketching has been downgraded during the last two decades, since the advent of CAD technology, and freehand sketching is no longer taught to undergraduates in many engineering curricula.

With the support of the our College of Engineering Dean Robert Bishop and the Mechanical Engineering Department chair, Kyuil Kim, I developed a course in 2012 to teach undergraduate engineering students how to sketch engineered products quickly and to visually communicate their form and function. Students sketch small simple objects, such as plastic pipe fittings and electrical boxes, with orthographic, isometric, and oblique views. Students sketch on blank 8 ½ x 11 in. paper with only #2 wooden pencils. No other instruments, such as rulers and triangles, are used because sketching is often done extemporaneously where only a writing instrument and surface are available. Preliminary assessment data suggests that students are able to improve their quality of sketches significantly within the 5-week duration of the course (1 credit hour)⁴.

In the class I draw the objects on paper, and the image is projected on a screen. Students then draw the object following my lead. Homework consists of at least 3 sketches per class, and a final project consists of a set of 5 drawings that convey the overall 3-D nature and some details of a product. Below is an example of a final project.

If you would like more information about this course, please contact Richard.marklin@marquette.edu. Course assessment was presented at the ASEE 2013 meeting⁴.



Orthographic and isometric drawings of a final project -- snow blower

*Contributed by Richard W. Marklin, Jr., ME
Department, Marquette University*

New Program at MTU Improves GTAs' Ability to Evaluate Undergraduate Lab Reports

A new program in Michigan Technological University's Mechanical Engineering - Engineering Mechanics Department is helping undergraduates communicate more clearly by training graduate teaching assistants to more effectively evaluate students writing in a series of three required laboratory classes.

The department's technical communications advisor, Nancy Barr, developed a series of training modules adapted from Writing Across the Curriculum faculty training sessions that teach evaluators how to provide effective feedback on writing, which is key to improving student communication. To begin, in 2012, Barr met with faculty and course coordinators to develop a set of report guidelines and a grading rubric that would meet the needs of all three engineering labs. That way, undergraduates would face similar expectations as they advanced through the major.

Finally, they incorporated their work into training sessions for the GTAs. "Most are nonnative English speakers, so asking them to evaluate native speakers' writing can be a little touchy," she said. So, they are taught to focus on how well their students have followed the report-writing guidelines and how to grade based on the rubric." The undergraduates are responsible for their own grammar and punctuation.

"It's not about crossing things out that don't make sense or simply writing question marks in the margins," Barr said. "If TAs mark a section down, they need to explain why. The focus is on content: does the undergraduate present content in a logical way that engages the reader and includes all the important information? We also teach them a little about the concept of audience. That's not something you hear much about in engineering, but all writing should be targeted to the appropriate audience. Employers want people who can communicate across disciplines and cultures."

Ranjeeth Naik, a PhD student in mechanical engineering, took the training when first offered in fall 2012. "It was the first time I'd had such a class, and I would have been glad to have it before I started TA-ing," he said. "Once you know the guidelines, the reports almost grade themselves, and it's much easier for our students to improve. It's an excellent class."

Naik is not alone in his enthusiasm. Based on surveys of students and TAs at end of the spring 2013 semester, the new guidelines and rubrics "are overwhelmingly appreciated," Barr said. "The undergraduates felt it saved them time and that they learned something from the feedback. It's too soon to tell if it actually improves their writing, but a full-scale assessment is planned for spring 2015."

Contributed by Bill Predebon, Michigan Technological University.

Motorsports Engineering Students Take Race Win

The students in the Motorsports Engineering program at Indiana University Purdue University Indianapolis (IUPUI) have the unique opportunity to design, build and race cars in actual motorsports competition. Late in the 2013 race season, the team took their MGB-GT sports car to Grattan Raceways, located near Grand Rapids, Michigan, for a Sports Car Club of American (SCCA) competition and they came away as the race winner. Driver Matt Kurdock, a student in the program, was extremely happy with his victory lap, and the crew greeted him in victory circle when he returned with the checkered flag. The team members, who had been forced to change the front wheel bearings just before the race, got experience in how to deal with problems when they arise in the field, or at the race track, far from their lab on campus. All members were pleased with the significant improvements that had been made to the car through dynamometer testing of the engine prior to the trip and a test day at Grattan on Friday before the race weekend. The students managed to beat their professor, who finished third in the same race. No report has been received as to how that affected their semester grades. More modifications and improvements were planned for the car over the winter

in preparation for taking the car racing again this coming summer.



IUPUI Motorsports Engineering students claimed a Sports Car Club of American race win with their racecar at Grattan Raceways in Michigan

*Contributed by Dr. Pete Hylton, Indiana University
Purdue University Indianapolis*

ASEE, ME Division Executive Committee 2013-2014

Chair: J-D Yoder, ONU

Past Chair: Sarah Leach, Purdue

Program Chair: Bruce Floersheim, USMA

Program Chair-Elect: Anca Sala, Baker College

Secretary/Treasurer: Kenneth Van Treuren, Baylor

Nominating Cmte Chair: Sarah Leach, Purdue

Awards Selection Cmte Chair: Charles Baukal

Division Editor: Michael Benson, USMA

Key Future Dates and Events:

June 15-18, 2014

ASEE Annual Conference (Indianapolis, IN)

June 14-17, 2015

ASEE Annual Conference (Seattle, WA)

ASEE 2014 Annual Conference Highlights

ME Division Program (as of 18 Apr 2014)

Session	Day	Time	Session Type	Title
	Sunday	2:15 PM to 3:45 PM	Business Mtg	ME Department Heads Meeting
Joint with Mechanics	Monday	7:00 AM to 8:30 AM	Technical 1	New Teaching Pedagogies: Methods and Assessments
	Monday	12:30 PM to 2:00 PM	Technical 2	Programming, Simulation and Dynamic Modeling
	Monday	2:15 PM to 3:45 PM	Technical 3	ME Curriculum and Assessment
	Monday	2:15 PM to 3:45 PM	Technical 4	Thermodynamics, Fluids and Heat Transfer I
Co Sponsored with Multi-Divisions	Monday	2:15 PM to 3:45 PM	Panel of Invited Speakers	Interdivisional Town Mtg
	Monday	5:30 PM to 8:00 PM	Dinner	Convivium - ticketed event
	Tuesday	7:00 AM to 8:30 AM	Technical 5	Capstone Courses and Project Based-Learning
	Tuesday	8:45 AM to 10:15 AM	Technical 6	Learning and Assessment in ME
	Tuesday	12:30 PM to 2:00 PM	Poster	Mechanical Poster Session
	Tuesday	2:15 PM to 3:45 PM	Technical 7	ME Laboratories and Undergraduate Research
	Tuesday	4:00 PM to 5:30 PM	Technical 8	Attracting, Developing and Retaining Talented ME Students
	Tuesday	5:45 PM to 7:15 PM	Technical 9	Thermodynamics, Fluids and Heat Transfer II
	Wednesday	7:00 AM to 8:30 AM	Technical 10	Manufacturing and Machine Component Design
	Wednesday	8:45 AM to 10:15 AM	Business Mtg	ME Division Business Meeting
	Wednesday	12:30 PM to 2:00 PM	Luncheon	Ralph C. Roe Award Lecture - ticketed event
Co Sponsored with Multi-Divisions	Wednesday	2:15 PM to 3:45 PM	Panel of Invited Speakers	Meeting for Incoming/Current Program Chairs & Division Chairs