

**MILWAUKEE SCHOOL OF ENGINEERING  
B.S. COMPUTER ENGINEERING  
INDUSTRY ADVISORY COMMITTEE  
Friday, October 13, 2017**

## Attendees

### Industry Members

Mr. Ryan Barnett, Rockwell Collins  
Mr. Lon Bushweiler, Plexus  
Mr. Paul Faby, Panasonic Automotive  
Mr. Charles Fastner, Direct Supply  
Mr. Elyse Hobson, JCI  
Mr. Tom Klein, Panasonic Automotive  
Mr. Tom Kraus, GE Healthcare  
Mr. Mark Krueger, NVIDIA  
Mr. Ryan Speiser, NVIDIA  
Mr. Greg Treichel, RW Baird  
Mr. Jon Ubert, Sharp Packaging Systems  
Mr. Jeff Zingsheim, IAC Chair, SysLogic

### Student Representatives

Mr. Sam Aspinwall '20  
Mr. Thomas Burbach '21  
Mr. Jaden DeFields '21  
Ms. Josie LoCurto '18

### CE Faculty

Dr. Eric Durant, Program Director  
Dr. Russ Meier  
Dr. Darrin Rothe

**Recorded by:** Dr. Durant

**Meeting called to order at approximately 8:30 a.m.**

Note: All items on the agenda were discussed, but several informational items are not repeated in these minutes.

## Welcome and Introductions

IAC Chair Mr. Zingsheim welcomed the members and, with CE Program Director Dr. Durant, thanked Mr. Fastner for hosting the meeting at the Direct Supply Engineering Center located within the MSOE campus and for arranging a post-meeting tour.

## Approval of Minutes

The May 26, 2017 meeting minutes were approved.

## Discussion of student and faculty diversity

CE is fairly low on both gender and racial diversity. The committee discussed the GE Girls initiative led by Dr. Imas from the biomedical engineering program.

Mr. Kraus noted that this is a big push for GE; they do high school outreach in many ways, talk to high schools, talks about what females do at GE in a wide variety of engineering disciplines, working to build interest in first robotics, etc.

Mr. Treichel oversees Baird's internship program; one of their challenges is diversity of their talent pool, but the recruiting pipeline is not very diverse, so they are especially working in the internship pipeline and considering how diverse the populations are at the colleges. Within United Way there is an IT United group that has a relationship with MPS; they have shadow programs where groups of students get to shadow in the workplace and see what IT people do.

Dr. Rothe noted the whole first day at PLTW teacher training was a discussion of encouraging diversity in the high school classroom.

## Discussion of new curriculum and electives

The new curriculum is now in its third year. "Leading project teams" and new "Signals and systems" courses are the key changes. There have been some student and faculty concerns with the teams course in this first year of offerings for CEs, but the program director is in contact with faculty and students and we are adapting. Having a 3-credit class, many of the alumni present agree, is better than the old curriculum, which had two, 1-credit classes.

Dr. Rothe reported on EE/CE4100 "Embedded systems fabrication. He gave an overview of new maker space made possible by an alumni donation. Currently, the 42 enrolled in this course have access to the space; it will eventually be open to all EECs students who go through a training program.

An IAC member asked whether the new required CS4920 security class, first required for seniors in the coming academic year, covers embedded issues, including keys, secure boot, MAC, TLS, and authentication. The members from Panasonic suggested that an important focus here is on software quality since bugs are the driver of security issues. Dr. Durant noted that this is touched on in our course, but is also the main topic of Dr. Schilling's elective class.

Mr. Speiser noted that knowing about threat models and moving between security domains is important. At NVIDIA they are also looking at using SPARK (constrained language based on Ada, does compile-time security checks). Additionally, it would be good for students to be familiar with some of the NIST security standards such as 800-182 – these could inform the class a lot. This also relates to safety, so engineers need to know about fault detection and fault avoidance – understanding all failure modes – from cache memory, to security, to the power supply. For example, one approach is reducing failure points by removing components. It was noted that

the automotive landscape is changing rapidly; with so many microcontrollers, understanding of the failure modes will become even more critical as we move to autonomous cars.

## Student Comments and Following Discussion

Mr. Burbach said that he is very excited about the maker space and being able to actually make designs we come up with.

Mr. Aspinwall agreed that the maker space sets MSOE apart, but it is a pretty small area. He is concerned how it will work for a class-size lab; Dr. Rothe briefly explained how students in the class use the lab at various times and he does not expect this to be a problem. Mr. Aspinwall estimated that there are about 8 soldering stations and about 12 seats but that the size of the physical space is his main concern. If it were bigger, MSOE might be able to do instruction in there. This would be in addition to the original goal of having it as an asynchronous space. It was noted that it might be interesting to see usage statistics based on card access logs. Members agreed that spaces for groups to work together are where some of the best learning happens.

Mr. Speiser asked the student members, “Do you feel you’re getting the information you need to know if you’re in the right field and making the right career choices?” Ms. LoCurto responded affirmatively, discussing the variety of classes that have labs. Mr. DeFields concurred, adding that starting with hardware and software helps with this.

Mr. Faby asked Ms. LoCurto what made her choose the particular internship she started with. Ms. LoCurto responded that it was one of the first offers she received, she liked the values of the company, and thought it was good company overall.

Mr. Fastner noted that Direct Supply has been looking closely at AI in many areas and applying it to many problems. Mr. Aspinwall explained that students touched on this when he took computer architecture. He said that students are aware of it, even if it does not come up much outside of the electives. Ms. Hobson noted that she took the neural networks when she was a student and it was a good build-up to a NN application of the student’s choice.

Mr. Speiser gave an update on NVIDIA’s interaction with MSOE on AI. It was last December that Mr. Dwight Diercks, Mr. Speiser, and Mr. Nicholas (Nick) Haemel from NVIDIA met with Dr. Taylor and others at MSOE. They discussed how to make MSOE more widely known in this area. One area is program offerings. Another is integrating it throughout engineering, making sure engineers know how it works and can know when to use. NVIDIA did a training session on this at MSOE in the spring that was open to MSOE faculty, students, and local industry. Mr. Kraus noted that NVIDIA’s annual conference now is about 90% focused on AI and deep learning, compared with perhaps 5-10% 5-10 years ago. There is a wide-open future here across the industry. Mr. Faster would like to see something in the applications area; how do you manage the data, train the system, defined the problem, etc. He noted that it is not necessary to go all the way into the deep learning math. Ms. Hobson agreed, adding that the focus needs to be on

applications appropriate to an undergraduate curriculum with an appropriate, limited amount of the foundational theory. The key questions are:

- What problems can be solved with AI?
- What are some of the pitfalls of AI?
- How do I need to think of the problem differently within an AI context?

Mr. Fastner said that a key issue is how to implement the feedback loops correctly in a real-world system so that they actually work reliably. Mr. Zingsheim noted that indeed a strength of undergraduate programs is that they are applications-oriented. So, the goal of the system is to present people with information, not merely data. This requires that a lot more of the knowledge be built into the machine learning system. Mr. Speiser see this as a modern data analysis tool akin earlier eras of engineers needing to know how to use a spreadsheet.

Dr. Meier, advisor of MSOE's IEEE student chapter, noted that those students are putting together an event for this year and, for example, would like having three people from three companies give 15-minute presentations on AI would draw a large number of students. We could publicize this through the IEEE and ACM student groups. Mr. Kraus and others said they could find colleagues to do 15-minute presentations. Mr. Faby could also be available to talk about audio and security applications. Mr. Treichel could give a talk on automated trading and optimization.

### Adjournment to Tour

At 10:44 AM, Mr. Faster introduced our tour of Direct Supply's Engineering Center by giving an overview of Direct Supply's engineering internship program. He noted that it is hard to get interns to drive to our north Milwaukee campus. We like to keep interns throughout the year since they can get so much more done. We have had a great response to this building from both MSOE students and Marquette University.