

**MILWAUKEE SCHOOL OF ENGINEERING  
B.S. COMPUTER ENGINEERING  
INDUSTRY ADVISORY COMMITTEE  
Friday, May 22, 2015**

## **Attendees**

### **Industry Members**

Mr. Ryan Barnett – Rockwell Collins  
Mr. Jason Buttron – Plexus  
Mr. Kelly Hanaway – QuadTech  
Mr. Joe Izzo – Rockwell Automation  
Mr. Mark Keup – Cognex Corporation  
Mr. Tom Kraus – GE Healthcare  
Mr. Mark Krueger – NVIDIA  
Mr. Bill Strangeway – Johnson Controls  
Mr. Jon Ubert – QuadTech  
Mr. Jeff Zingsheim, IAC Chair – Honeywell Corporation

### **Student Representatives**

Mr. Ryan Kraemer '17  
Mr. John Krenzer '15  
Ms. Josie LoCurto '18  
Mr. Hunter Parks '18  
Mr. Brian Scharles '17

### **CE Faculty**

Dr. Eric Durant  
Dr. Adam Livingston  
Dr. Russ Meier  
Dr. Darrin Rothe

**Recorded by:** Dr. Durant

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

## **Welcome and Introductions**

The meeting was called to order at 8:30 a.m. by Mr. Zingsheim, Chair. He and Dr. Durant, Program Director, welcomed the group and introductions were made.

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

## **Approval of Minutes**

The October 17, 2014 meeting minutes were reviewed and approved.

## **Statistics and Retention**

Retention of last year's CE freshmen is good at 76% but not up to MSOE 82% average this year. Dr. Meier noted that we are unsure about the correlation between high school CS experience and retention and suggested that perhaps we should survey freshmen and correlate it with their performance and retention. We do have PLTW data and AP CS test data on our students, but that is not the whole picture. Dr. Meier noted that students who leave often report difficulty with programming sequence. Dr. Livingston and others agree. The reality is that there is some software in EE and ME, so students changing major cannot completely avoid it.

Mr. Parks said that he finds most CEs and SEs are really happy with their major. The few who switch tend to like technology to be in the background. Ms. LoCurto noted that she started at MSOE with no programming experience and the software classes were her most difficult, but she did fine in them. Entering the mindset in the first software design class was a challenge, but it has gotten easier.

The members discussed the importance of reading material in depth. Many of the unsuccessful students are not forming such habits.

Dr. Durant summarized faculty book club meetings about student learning readings and building knowledge scaffolding. The faculty are discussing whether to bring in guest speakers on this topic for students and faculty. The key consideration is how to get the message through to our 18-19 year old freshmen.

Dr. Meier noted that some students have a gaming addiction and our data show this is higher in CE and SE. The university has brought in experts to talk about this. Dr. Meier said that in other universities worldwide are also finding this.

Mr. Krenzer asked whether students assisting peers could help here. He also sees students who are addicted to video games. They tend to be more open with peer assistants, student-to-student. People who drop out in many cases have game addiction problem. Mr. Krenzer suggested that maybe peer assistants should have training on how to help students with this problem.

## **Senior Design Collaboration**

We have had great collaboration from many industrial partners, including support for projects and lab improvements from Rockwell Collins. The members discussed a few ways to collaborate through project sponsorship, engineering contact, etc., going forward.

## Senior Debriefing

Dr. Durant summarized student outcome data and all discussed student feedback given through written comments and at the debriefing meeting. Some students rated the outcome on engineering problem solving low. Mr. Krenzer noted that most labs through early junior year are pretty structured, which may contribute to lower outcome data in engineering problem solving. He did note, however, that there were significant engineering problem solving activities in CE2930, SE2890, and senior design.

## Electives

Dr. Meier explained that CE offers a wide range of electives on a 2-year cycle. These offer technical breadth to CE students.

Mr. Buttron said that the CS493 advanced digital design is great from Plexus's point of view since it is important for their engineers to be able to design register sets and peripherals.

Mr. Buttron also noted that it is great that information security will become part of the required curriculum. This is a hot area with FDA regulations, etc.

## Next Year's Electives

Dr. Meier explained that Architecture II goes into superscalar design and multicore processor. It includes both current and historical papers on the topic. Already 17 are enrolled for fall; sometimes students go onto graduate school as a result of this course.

Dr. Rothe reported that CE498 Circuit/System fabrication will run and cover prototyping after the breadboard layout to an actual circuit board. It will include component selection and considering pros and cons of different packaging. It will include EMC/EMI issues with PCB design, such as path separation. Students will get a board fabbed and assemble it. If there is time Dr. Rothe will work in 3-D printed, rapid prototyped enclosures. We will consider manufacturability, too.

Dr. Livingston will offer a new course in digital image processing, CE498B. This will be targeted to electrical and computer engineers and will require a DSP prerequisite. So, it is DSP in 2-D including filtering and line segmentation with MATLAB as the primary platform, including performance issues. Dr. Livingston is still considering a large project vs. a lab sequence. He will be developing it over the summer.

Dr. Rothe reported that current students are using the Altera DE0 with a NIOS II soft-core processor having a MIPS-like instruction set. It is a decent platform for our uses and we are going to use it for at least the F'14 freshmen. The project in embedded design 3 may change; it has been "camera in a box" for many years. Dr. Meier noted that the DE0 does not include a fixed core processor. There are some platforms, some of which are based on the Altera toolset, that also include hardcore processors like the ARM Cortex A8. If the IAC thought this were important, we could switch the platform the freshmen buy so that we could use ARM instruction set instead of MIPS/NIOS II.

Mr. Buttron noted that everything is going to ARM. At Plexus they have used a number of soft-core processors, but it is a bit of a fad. The key with a soft-core processor is that you need to load the core separately, which can make the development iteration longer. It is also better supported by compilers and emulators (cheap JTAG emulator connectors since emulators are now built into the chips themselves).

Mr. Krueger noted that at NVIDIA they use a lot of multi-core DSP/GP processor.

Mr. Kraus noted that TI OMAP is important, too. At GE they are leaning towards ARM for many of their products.

Mr. Barnett noted that at the high end of the power spectrum is Intel, etc., but ARM is best on the low to mid end.

Dr. Meier said that, hearing this, we are leaning towards something hardware for freshmen that supports ARM, but the costs are higher. We'll look into it to see if we can get the cost down for students.

## **Adjournment**

Meeting adjourned to senior design show at 11:00 a.m.