

**MILWAUKEE SCHOOL OF ENGINEERING
B.S. COMPUTER ENGINEERING
INDUSTRY ADVISORY COMMITTEE
Friday, May 22, 2020**

Attendees

Industry Members

Mr. Jameel Ahmed, Johnson Controls
Mr. Lon Bushweiler, Plexus Engineering Solutions
Mr. Jim Conigliaro, Olive Branch Technology
Ms. Elyse Hobson, Molson Coors
Mr. Joe Izzo, Rockwell Automation (retired)
Mr. Keyur Khambholja, Direct Supply
Mr. Tom Kraus, GE Healthcare
Mr. Mark Krueger, NVIDIA
Mr. Nick LaBonte, Milwaukee Tool
Mr. Dave Neuman, Brady Corporation
Ms. Cyndi Przybylski, Rockwell Automation
Mr. Joel Rondeau, Cognex Corporation
Mr. Greg Treichel, Robert W. Baird & Co.
Mr. Jeff Zingsheim, IAC Chair, SysLogic

Student Representatives

Mr. Cameron Bush, MSOE '23
Mr. Jaden DeFields, MSOE '21
Mr. Jack Haek, MSOE '22
Mr. Robert Hinner, MSOE '23
Mr. Nick Scharrer, MSOE '20

MSOE Faculty and Staff

Dr. Eric Durant, Professor and Program Director
Dr. Adam Livingston, Assistant Professor
Dr. Russ Meier, Professor
Dr. Darrin Rothe, Associate Professor
Prof. Deborah Varnell, Instructor

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 to our first-ever virtual meeting, hosted on Microsoft Teams, and invited everyone present to introduce themselves.

Previous Minutes

Dr. Durant asked the members to review the previous meeting minutes, which are available on the website, and to send him any corrections or additions in the next few days.

Report on Recent Events

- Dr. Livingston reported IEEE students are active this year and this is promising for IEEEExtreme in the fall.
- Dr. Livingston reported that the CS/SE student group is quite active now and there is a group within the club that is dedicated specifically to competitive coding.
- Mr. Scharrer noted he is involved with SSE. They've coordinated tour activities with IEEE, and he is glad to be a contact.

Student Comments and Industry Discussion

Mr. Scharrer likes the variety of electives and the ability to focus on hardware or software. This has been good preparation for internships. He enjoyed the machine learning class he took as an elective. The embedded systems fabrication class was also great with the new skills learned.

Mr. DeFields noted the classes are great since the professor emphasizes reading the manual as a first step before going to the professor.

Languages: Software and HDL

Mr. DeFields also said that freshman learning Java is not ideal. There was a quarter where he had to use five different programming languages. He is using C/C++/VHDL this term as he completes the second-year curriculum.

Mr. Ahmed commented on this. It is common in industry to move between a variety of languages. AT JCI, they use C/C++/Python. Moving among languages is a great skill to develop.

It was asked which HDL the program should focus on, if any.

Mr. LaBonte said incorporating Verilog would be of interest.

Mr. Bushweiler noted that his company doesn't specify a particular HDL; it can come to customer request / engineer's preference.

Mr. DeFields had an internship at Collins Aerospace, and they used VHDL.

Dr. Durant circled back to the choice of language and laid out some issues of collaboration with other programs, efficiency, sections, benefits to students.

Ms. Hobson said they are not seeing as much Java but more C#. R/Python etc. are seen more in analytics positions.

Ms. Przybylski said she is on the test side, not the development side. All her automation tools are in Python, but she has had to learn Java since other tools are in that. So, she thinks having proficiency in at least two languages is important. The ability to look up and learn how to use these are important.

Mr. Rondeau said that back when .NET was only Windows, Java made more sense for compatibility. Now .NET core is cross-platform and runs on Linux, etc., so C# is bigger now, but it is easy to move between C# and Java.

Mr. Ahmed agrees and added that, looking at industry-wide trends, there is a lot of talk and plans to integrate with the cloud. The two big vendors are AWS and Azure; C#, .NET, and Python are the main languages to integrate with them. Perhaps there is also some Java in AWS. On the embedded side, having C and C++ knowledge is important. Seeing one OO language on the resume is important; the knowledge should be portable. The program should consider new technologies and industry direction like this.

Mr. Treichel noted that at Baird they do a lot of .NET for Azure integration and use Python.

Mr. Izzo asked what percent of freshmen come to MSOE with a working knowledge of programming. Dr. Durant said less than half based on informal surveys and feedback from CS1011 faculty. Dr. Livingston noted that, from advising, even when they do, the quality is not as great, so the quality of our courses recommends that they do take them regardless.

Mr. Hinner noted that some of the other freshman found the sequence easy. He did not have this in high school, so it was harder at first but with work and studying it became easier. He likes that students saw both Java and VHDL.

SE and Design Practices

Mr. LaBonte said that he has seen a trend towards solid SE practices even for smaller embedded systems. Over the last ten years, he has seen a lot of single developers writing code without a lot of structure and design documentation such as use cases, etc. They are starting to see in embedded that the SE tools allow them to collaborate a lot even better even for systems like microcontrollers with 16 kB flash. On the process side, we benefit from not just good code, but considering how to write it and how to collaborate to do it. ...how to use configuration management, branching models, etc. He has not seen as much of this from CE/EE alumni. Dr. Livingston followed up, noting that he was a software developer for Red Hat before coming to MSOE, so he has been tapped to teach our SE2030 Software Tools and Practices course. In this class the faculty discuss git and the various SE practices it supports; it is often the students' first experience coding in a group. Also, CE accepts the SE process course as a technical elective, and Dr. Livingston pushes students toward this when it is appropriate to where they want to go in their career.

Mr. Izzo mentioned that last year he was looking at helping MSOE by teaching senior design. It didn't match exactly what he sees in industry, but it was very close. The steps, requirements,

design, reviews, etc., were a good match to industry process. Also, since retiring from Rockwell he has been working with some smaller companies and he's seen what Mr. LaBonte described with individual projects and having less SE process. He agrees that if they would have followed the SE process that the thought process would have slowed them down it would have helped them.

Electives

Ms. Hobson said that she is glad to see analytics and machine learning being available to the CEs. As we move into IoT, this is the next phase to bring CEs into using these tools. This is what is happening at a lot of companies now, looking at predictive maintenance, etc.

Pivot to Online-only Instruction (SARS-CoV-2 Pandemic)

Mr. Zingsheim asked a question of the student members. This goes full circle to where we opened the meeting. He would like to hear from the students how needing to work from home affected them. Did they get what they expected, what got harder and easier?

Mr. DeFields said it was a challenge. Many professors moved to pre-recorded lectures. There are studies that show you learn more when you are there. He did not think it would affect him this much, but not being there live, being able to ask a question on the spot, was a big drawback. He thinks having a follow-up discussion after watching the videos would help, but it was hard to change to that with the quick one-week transition this term. Understandably, not all the professors were prepared to do that under the circumstances. His best experience with lecture was in SE2030, the professor insisted you watch the video beforehand, then you would go into groups and the professor would hop around, ask questions, test for understanding. Having this required, live experience helped a lot.

Ms. Hobson worked how this worked with labs. Mr. DeFields said this was similar with professors being available during lab time, etc.

Mr. Scharrer thought his software labs would not be affected much, and it was true for the most part, but it is valuable to have the time in person where the professor goes over the premise and then there is time in lab to ask questions. But the hardware labs were affected more. Students did a lot more pre-work, and the professor recorded video of herself constructing circuits, doing analysis, etc. This was successful given the constraints.

Adjournment

Mr. Treichel suggested that we might consider keeping this remote option even for the in-person IAC meetings. He realizes that adds complexity but would enable broader participation when calendars are tight.

At approximately 10:33 AM the meeting was adjourned.