

BME Design Community Outreach Summary: West High School

BME Design 402: Probe Holder Team

Peter Kleinschmidt, Leon Corbeille, Lein Ma, Mark Reagan

Overview

Our team, (Probe Holder), completed an outreach opportunity at the PEOPLE program at West High School on April 19, 2010. The PEOPLE Program's goal is to help minority students get into UW-Madison. Part of the requirement for the program is a tutoring session in which the students are tutored by college students every day after school. Areas of tutoring include math, science, English, foreign language, and history. Mark is a math and science tutor at the after school tutoring sessions (called site) and thought that it would be a great opportunity to share information about the BME program because numerous students have expressed interest in BME and engineering in general. The PEOPLE Program is design for all high school students (9-12). There were about 20 students present at our presentation, about half of them being seniors and the other half being juniors and sophomores. The students who attend site have interests in all areas of academia and some aim to be doctors while others aim to be engineers. For the other students who don't aim to be in the sciences, we still felt it necessary to present to them in the chance that we will spark one person's interest.

We were given a 25 min slot to present at around 4:00pm (the time that most students are at site). Fifteen minutes were given to our presentation, 5 min for the demonstration, and about 5 minutes were allotted for a question and answer session.

In order to tailor the talk to all of the age groups present, we talked about what a biomedical engineer is in general and what they do after they graduate from school. One of the big topics of interest was when Peter talked about going to medical school after finishing with the BME undergraduate program. A lot of the students that Mark talks to during site want to be doctors so when they heard that BME presents a great opportunity to be accepted to medical school, you could tell that they were excited.

We also talked about the classes that one needs to take if they want to complete the BME undergraduate program. This was not discussed with specifics, only by talking about broad fields such as physics, math, and chemistry. Most of the students in the program do not like physics so the response after we mentioned that physics would be involved in the undergraduate program was disdain. Chemistry is also not well liked among the students, but a few students who have AP Chemistry were excited about this.

Talking about the design program was another large part of our talk. The students and the supervisors also in attendance seemed impressed by the fact that we make things that help people, even as college undergraduates. We thought that as we talked about the design courses and some of the projects we have built in the past, the students understood that not only are students doing engineering in BME, they also have the opportunity to influence people's lives in a positive manner. The demonstration was also very well received and the students and the supervisors were impressed with the design and how we "built it by ourselves."

In our case, the community outreach was a good opportunity for us to give back to the community and teach people about what we will be doing in the future. We believe that the outreach opportunity helps set positive images in student's minds about college and engineering and it shows that trying hard and going to college is "cool." At this time we have no suggestions on how to improve the community outreach program other than recommending schools to perform the outreach in if you aren't from Madison.

Presentation

Since the classroom did not have a projector or a screen, the presentation did not use any electronic media. Instead, an outline of the talk was written (see attachment) and distributed to the students so they could follow along and have the group's email addresses in case they had any follow up questions. The talk took approximately 15 min with an additional 5 min for the demonstration and five minutes of questions/answers. Each BME 402 team member took an equal role in describing a different aspect of biomedical engineering, in general and at the University of Wisconsin-Madison. Additionally, each member elaborated on personal experience with jobs or internships, as well as different design projects throughout the years.

Since the presentation was given in an informal setting to a group of PEOPLE scholars, the students were invited to ask questions at any time or to request further information/elaboration. Mark began the talk by introducing the field of biomedical engineering and talking about some of the post-undergraduate options that a BME will have. He included some well-known industries that commonly hire BME students, such as GE Healthcare. Next, Peter discussed medical school and talked about his internship. Leon and Lein also took some time to describe internships they have held over the years, some that were related to BME and some that were not. After the team members had described their personal experiences working, they asked if the students had any questions about finding jobs or what time of work BME are employed for. Next, Leon continued the presentation by giving a brief overview of the typical classes taken by a BME student at UW-Madison. This included general prerequisites as well as more specialized BME classes. Lein then talked about a very important part of BME: the design projects. She included some of the benefits to these projects (meeting new people, networking with faculty and industry representatives, as well as general experience working in a team) and then talked about some of her past design topics. The other team members also described a few of their design projects over the years and then asked if the students had any questions about the design aspect of BME. Peter briefly mentioned BMES (Biomedical Engineering Society) and then Mark wrapped up the presentation by talking about what the students could do to become future BME students.

Once the presentation was completed, the BME 402 team gave a brief demonstration of the current prototype for the ultrasonic probe holder device. This demonstration included the purpose and problem that led to the device, as well as a small demonstration of how it would be used by client. The team then opened up the floor to questions. Each team member contributed to answering the questions as needed, and the entire outreach took approximately 25 min.

Demonstration

Materials

- Probe Holder Device
- Human arm

Demonstration

The demonstration was given following our talk about BME design. The probe holder that we built was set on the table and Leon put his arm in the arm rests to demonstrate how it would look when the client performed the test. Leon then adjusted the gooseneck and articulating arm to show how it locks in place. While we did this, Mark and Peter narrated and described why the device is helpful to the client. We also discussed the arteries in the arm and how the probe sends a signal from the probe to the computer.

Biomedical Engineering (BME) Presentation

(Given to the PEOPLE Program) 4-19-2010

Leon Corbeille, Peter Kleinschmidt, Lein Ma, Mark Reagan
Dept. Biomedical Engineering, University of Wisconsin-Madison

1. What do BMEs do?
 - Technology interacting with humans and biology
 - Relatively young program at UW and around the world
 - a. Options after Graduation
 - i. Industry
 1. GE Healthcare, 3M, Nestle
 - ii. Research – Graduate School
 1. Stem Cells, Instrumentation, Biochemistry, Human Factors, etc.
 - iii. Medicine
 1. Public Health
 2. Hospital Service Engineer
 3. Medical Doctor
 - b. Internships
 - i. Software/Quality Engineering, Bio-Statistician, R&D Engineering
2. What do BMEs at Madison do?
 - a. Classes outside Engineering
 - i. LOTS of Chemistry, Biology and Math
 - b. Classes in Engineering
 - i. Statics, Dynamics, Circuits
 - ii. Biomechanics, Biomaterials, Bioinstrumentation
 - iii. Elective Tracks
 1. Biomechanics
 2. Bioinstrumentation
 3. Healthcare Systems/Informatics
 4. Imaging
 5. Biomaterials/Tissue Engineering
 - c. Design
 - i. All four years!
 1. The only of its kind
 - ii. Hands-on teamwork and wide exposure
 - iii. Examples
 1. Auto-Hand Sanitizer, Canine Stereotactic Frame, MRI Gradient Coils, MRI-Compatible Leg Ergometer, Stroke Augmentation Device for Hand
 2. Ultrasound Probe Holder (Demo)
 - d. BMES
 - i. Student organization, meets regularly with lots of activities
 - ii. Networking, Plant Tours, Med-School Tours
3. How to become a BME
 - a. Strong interest in Biology and Math
 - b. Study hard starting now!!!
4. Questions – About BME, College, UW Madison, Life?
 - a. Want to us ask later? Email:
 - b. Leon - corbeille@wisc.edu
 - c. Mark - reaganmj@gmail.com
 - d. Lein - lwma@wisc.edu
 - e. Peter - pkleinschmid@wisc.edu