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BMES in the Community

On November 20th, BMES teamed up with another on-campus club, the University of Rochester Genocide Intervention, to help tutor local high school students from the School Without Walls. Students from various countries around the world including Bhutan, China, and Burma came to the University with their teacher Chojoy Shroeder. Here, senior Ben Freedman gave a presentation educating students on Biomedical Engineering and its applications. Ben gave wonderful examples of the impact Biomedical Engineering has on society including how robotic prosthetic arms and hip replacements improve the quality of life for thousands of people. He kept students involved throughout the presentation, asking

engineering related questions that the students jumped to answer. Later, students used an electrocardiograph to measure their heart's electrical activity and calculate their heart rate. Brian Dixon (BME '12), Brett Sternfield (BME '11), and Kelli Summers (BME '11) helped attach leads to the student's arms and taught them what the ECG was measuring. Students then tried to change their ECG trace by running around the room or holding their breath. Most students were shy to be the first to try the ECG, but soon they were anxious to be next up and appeared to be having a blast. We also gave a brief introduction to the components of the pulse wave—the P, Q, R, S and T waves corresponding to the



electrical activity in the heart (see http://en.wikipedia.org/wiki/Electrocardiography#ECG_graph_paper for more information). For those who have not taken Professor McAleavey or Seidman's class yet, you will soon learn about this signal in great detail. Overall, this was an amazing experience where the volunteers had as much fun as the students. As a joke, Brett tried to measure the electrical activity in his brain. Needless to say we could not find any. After such a positive response, BMES hopes to increase its community outreach and has already been asked to give the same presentation to a local high school science class in the spring.

-Kelli Summers '11



Pumpkin Carving Contest




At the October Engineering Social, there was a competition between all the engineering societies to see who is the best as decorating a pumpkin. Although this may seem trivial, it is a complex problem that only highly sophisticated engineers can solve because this pumpkin not only needed to be crafted with the finest of precision, but it also needed to have some depth and relevance to a particular engineering field. Had there not have been a fluke where BME was mysteriously removed from the voting polls, BME would have crushed the competition! The pictures clearly prove that we have superior pumpkin-carving craftsmanship. Thank you to Carson Casey (BME '14), Sarah Han (BME '13), Brett Sternfield (BME '11), Kelli Summers (BME'11), and Yoon Suk Yi (BME '13) for their efforts in making this a wonderful pumpkin!




Summer Internship Panel

On **Friday December 3rd, 2010**, the University of Rochester Biomedical Engineering Society will be hosting a summer internship panel for all undergraduates. A selected group of BME upperclassmen will be available to share their respective summer experiences and answer any and all question regarding summer internships. Summer internships are great ways to gain industry/research experience, form industry contacts, and they add immensely to a resume. It's strongly recommended that all who are interested in a summer internship attend this event. It will take place in **Goergen 101 at 3:30pm**. **Free pizza** will be available for all that attend. Hope to see everyone there!

An excellent resource for undergrad BMEs applying for Internships this coming summer





Be a MEntor!



Calling all graduate students, seniors, and juniors!
Mentor a BME Freshman

Current status: 40 Mentees and 40 Mentors!
Contact: Benjamin.Freedman@rochester.edu

A special thanks to all of our current mentors!

Senior Design Projects

For a few short weeks, all the talk of the biomedical engineering department was senior design projects. In every corner of Goergen, the same question was being asked, "Who's in your group?" And it wasn't only seniors asking other seniors. Juniors and sophomores have been seen asking seniors "Who's in your group?" The senior design project is clearly something every BME looks forward to. It is an experience that will be valuable for any biomedical engineer. Each of the senior design groups are looking forward to tackling exciting engineering problems in groups of four. A few groups have volunteered to discuss their projects.

Micro-needle Glucose Monitor

Members: Samantha Begin, Jasmine Carvalho, Brett Sternfield, Dan Stratz.

Company: SensiVida Medical Technologies

Problem definition:

We have been tasked to develop a minimally invasive glucose monitor using a core sensing technology invented by SensiVida. The glucose sensing technology utilizes a micro-needle to penetrate the skin painlessly and sample interstitial fluid. From this sample, they can calculate an interstitial glucose concentration using a combination of chemical assays and image processing. Our challenge is to design a monitor that packages this technology in a way best able to lower the barrier for regular glucose testing. By eliminating the pain and hopefully the inconvenience of glucose testing, we will try to increase a patient's willingness to frequently test their glucose levels, leading to better diabetes management.



SensiVida Glucose Monitor

Scissor Gait

Members: Tedi Begaj, Cailee Caldwell, Claire Chmura, and Travis Kroot

Company: Gait Correction with Unity Health (Aaron Anderson)

Problem definition:

A prevalent number of traumatic brain injuries each year lead to difficulty completing ordinary motor skills. Patients suffering from stroke, cerebral palsy, brain hemorrhage, and traumatic brain injury develop difficulty in completing a normal gait cycle. Frequently these patients experience a functional issue called "scissor gait." This occurs when the adductor muscles contract involuntarily causing the thighs to hit or knees to cross in a scissor-like movement. Almost all patients exhibit uncontrollable adductor flexion in a single leg corresponding to lesions in the upper motor neurons. Therefore, to control the scissor gait, patients must undergo physical therapy to relearn how to walk. However, it is quite laborious and time consuming for physical therapists (PT) to teach different patients proper gait. Thus, a device is needed that allows a wide range of individuals to control proper gait with minimal aid from a therapist and minimal difference between therapists.

Vascular Simulation

Members: Adam Kozak, Emily Robbins, Ryan Staube, Kelli Summers

Company: Dr. Ankur Chandra, Vascular Surgeon at Strong Memorial Hospital

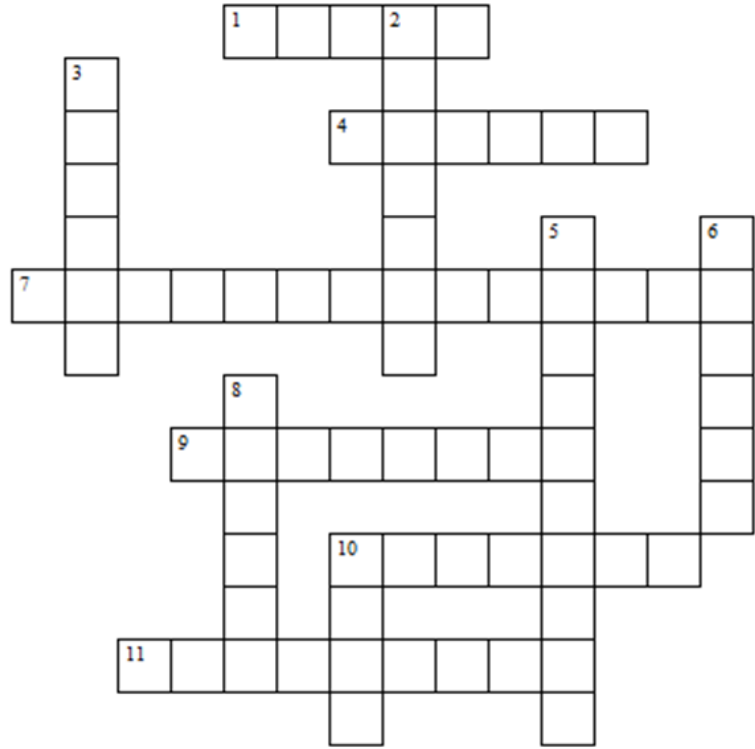
Problem definition:

Arterial disease of the lower limb causes complicated changes in vascular fluid dynamics. Consequently, predicting the effects of disease states or clinical interventions on this system presents with many challenges. There is no adaptable, physiologically accurate model of the lower limb vasculature in which pressure and flow can be easily measured. We will therefore design and construct a physical, closed loop, adjustable system based on *in vivo* parameters. Applications of the system will include modeling various vascular diseases, simulating clinical solutions, and providing a training tool for practicing physicians.



Across

- 1) BME Chair
- 4) Professor Carney's favorite baseball team
- 7) 15 dollar (bookstore) investment in good BME201 homework grades
- 9) Site of a BME's breakfast
- 10) Newest class in BME dept
- 11) BME Building Atrium



BME Graduated Cylinders



Buy 1 for \$3

.. or 2 for \$5

Cash or Flex

On Sale Dec 1st-3rd

Labeling in Wilson Commons



11-2 o'clock each day!

Proceeds go towards events for you and your fellow BMEs!

Down

- 2) The house that BME (and optics) built
- 3) AKA Dorothy Welch
- 5) McAleavey's BME101 demonstration
- 6) "Almost perfect quadriceps"
- 8) Site of most recent BMES conference
- 10) Don't forget to draw your