National Biomechanics Day 2016

The goal of National Biomechanics Day is to increase awareness and interest in the field of biomechanics among high school students and teachers. National Biomechanics Day is being organized nationally by the American Society of Biomechanics and will be the first nation-wide biomechanics event synchronized among biomechanics laboratories across the country. For National Biomechanics Day at the University of Delaware, students will rotate around to a series of interactive demonstrations and tours in and around the biomechanics labs at the Health Science Complex at the STAR Campus. Demonstrations will teach students about the field of biomechanics, what we can do with biomechanics technologies, current biomechanics research underway at the University and career options in biomechanics.

National Biomechanics Day will take place from 8:00am to 11:00am on Thursday, April 7, 2016. We will run two sessions, one from 8:00-9:30am and the other from 9:30-11:00am. Schools are invited to attend one of the sessions. Schools groups will be divided into smaller groups of 15-20 students/teachers to rotate around to the various demonstrations. The following demonstrations will be offered:

1. **Go Baby Go (Cole Galloway)**
   We will discuss and demonstrate our work in modifying toy racecars to provide mobility to children with crawling and walking problems, empowering them to be part of the action at home, in the daycare center, and on the playground.

2. **3-D Motion Analysis (Jill Higginson)**
   Students will be exposed to 3-D motion analysis and instrumented treadmill equipment commonly used in biomechanics research.

3. **Prosthetics & Orthotics (Elisa Arch)**
   Students will be introduced to how prosthetics work and how these devices are individualized for each person. We will also showcase a variety of prosthetic and orthotic devices and their different functionalities as well as how we use 3-D printing to rapidly build personalized prosthetic and orthotic devices. Students will have an opportunity to participate in the demonstration by wearing a simple orthosis to understand how these devices can alter how they walk.

4. **Robotics (Fabrizio Sergi)**
   Students will be exposed to ongoing activities and research in the Human Robotics lab, which aims to develop and use robotic technologies for human assistant and rehabilitation.

5. **Ultrasound/Imaging (Kurt Manal)**
   Students will be exposed to imaging modalities, such as ultrasound, that can be used in biomechanics to understand the structure of the musculoskeletal system and how this structure contributes to human movement.
6. **Physical Therapy/Clinical Applications of Biomechanics (Joe Zeni)**
   We will demonstrate the clinical applications of biomechanical analysis. We will show how items like your camera phone and Wii Balance Board can be used in a clinical setting to measure the way people move and provide feedback on movement patterns.

7. **Fall Prevention (Jeremy Crenshaw)**
   We will demonstrate how we use biomechanics to assess fall risk and reduce fall risk through the training of trip and slip recovery. This demonstration will include our treadmill that induces falls, motion capture technology, electromyography, and force plates.

8. **Upper Extremity Biomechanics (Jim Richards, Liz Rapp, Tyler Richardson)**
   This demo will focus on innovative methods of measuring and displaying shoulder motion. We will discuss challenges in upper extremity biomechanics and provide a visual demonstration of how the upper extremity differs from the lower extremity in biomechanical analysis. We will also provide a real-time example of one of our current approaches to capturing and displaying shoulder motion.

9. **Cytomechanics (Liyun Wang)**
   We will show how we collect 2-D confocal images to construct detailed 3-D tissue and cellular structures.

10. **Perry Initiative (Ana Ebrahimi, Amelia Lanier)**
    Students will be exposed to how engineering concepts and principles are used to design medical devices used in orthopaedic surgery. We will display tools and orthopaedic-hardware used during surgery as well as introduce a ‘case study’ of a patient with a real orthopaedic problem. Participants will be encouraged to interact with the medical devices and anatomical model bones to provide a “hands-on” demonstration.