Biofeedback for Learning and Teaching Enhancement

Graduate student project, supervised by Dr. Chris Bouwmeester PEng

Target Student

I am seeking a student who is interested in pursuing research in biomedical engineering and exploring the nexus of education and engineering practice. Preference will be given to students with a background biomedical engineering or physiology and a passion for active learning pedagogies.

Brief Project Description

The goal of this project is to create and test devices that can measure the psychophysiological response of many students participating in active learning. I need low-cost, easy to use, mobile sensors that can be given to a wide range of students in technology enhanced active learning (TEAL) rooms to measure their physiological response to learning activities. To realize this project, you will have full access to the IBBME design studio.

Expected Learning Outcomes

You will be expected to:

- Create and adapt devices capable of measuring many different vital signals
- Create real time biofeedback metrics and tools to allow information on mood and stress to be communicated to instructors and individual students
- Study the response of students in large and small active learning environments compared to traditional passive lecture settings

Expected Research Outcomes

Through this project you will be contributing to pedagogical research that aims to explore new ways of learning and improve the undergraduate student experience. You will study the physiological response of students to determine their levels of engagement and stress to inform best teaching practices and create ways of using biofeedback to enhance learning. Successful completion of the project will enable you to author and present conference publications (CEEA, ASEE, etc.) and publish manuscripts in leading engineering education, biomedical engineering, and/or psychophysiology journals. Translation to broader audiences (e.g., outreach programs, K-12) will also be encouraged.

Required Skills

- Programming experience (Python, Matlab, etc.)
- Experience with electrical hardware (e.g., Arduino) and sensors that measure physiologic signals
- Experience with light fabrication (hand tools, soldering, etc.)
- Desire to build prototypes and utilize a maker space to rapidly create new designs
- Public speaking in front of diverse audiences
- Ability to learn new subjects that are outside of your training quickly (e.g., psychology of learning)
- Independence, initiative, and grit

Application Details

Please use this application form.

Updated: October 18, 2019