



Boston University College of Engineering

BTEC PROJECT HIGHLIGHT

Attachable Intraoral Camera for Dental Handpieces



Avani Sheth, Megan Lee, Isabelle Goode, Rishi Vaidya (BME '22)

A critical issue that dentists face is the ability to clearly view the inside of a patient's mouth during dental procedures while maintaining a safe distance from aerosols and keeping their back straight. Currently tools on the market allow for improved visualization of the oral cavity, but are not designed to be used concurrently with other tools dentists use to work on a tooth. Working with Dr. Roxana Hashemian, DDS, MPH (BU Dental School) and Dr. Kavon Karrobi, PhD (BME), the senior design team developed a working prototype for an intraoral camera to be used while dentists prepare teeth for restoration. We were able to program an Arduino to power various LEDs on the device for caries detection and developed a GUI using MATLAB's app designer. Finally, testing of the prototype took place in the BTEC's Biosensors & Instrumentation suite, where Dr. Hashemian was able to simulate using the device firsthand. BTEC made it possible for us to fabricate a fully functioning prototype and gather meaningful test data to inform the next stages of device development.

BTEC Advisory Board Members:



ThermoFisher
SCIENTIFIC



Medtronic



DRAPER



upcoming events

BTEC x BMES Design

Competition Kickoff

Thurs., Sept. 29, 2022

6 pm, BTEC 201



SWE at SILab

Sat., Oct. 1, 2022

2 pm, SILab



SWE at BTEC

Wed., Oct. 12, 2022

6 pm, BTEC 201



Women Entrepreneurship

Week Event

Thurs., Oct. 20, 2022

Sponsored by Innovate@BU & BTEC

Dean's Imagineering

Competition Kickoff

Fri., Oct. 21, 2022

4:30 pm, SILab

Catapult Competition

Launch

Sat., Nov. 19, 2022

12 pm, SILab



SILAB PROJECT HIGHLIGHT

Speakers by Alec Rocca (Mech E '25)

Working as a SILab Advisor, Alec prototyped various speaker designs as an initial step in designing future SILab workshops and a possible competition. He designed two speakers of increasing technical complexity. First, he created a simple speaker from scratch in SILab using a 3D printed case and a breadboard circuit. Next, Alec used various shop tools including the NC mill, miter saw, and planer in SILab to build a custom housing for a bluetooth speaker he assembled.



BTEC TECHNOLOGY HIGHLIGHT

EVOS™ M7000 Microscope

High resolution microscopy enables a variety of biological and clinical imaging applications, from identifying subcellular structures to characterizing disease induced microscopic changes in clinical specimens. The EVOS™ M7000 Imaging system is able to perform brightfield, phase contrast, and multi-channel fluorescence imaging of samples. The technology can produce confocal-like microscopy images of samples through the collection and subsequent processing of images at different z-planes.



SILAB ADVISOR HIGHLIGHT

Johnathan Muhvich (BME '23)

Johnathan has been working at SILab since 2019, his freshman year, and as Assistant Manager since Fall 2020. His passion for making new and exciting things goes back to his roots in Minnesota where he loved building with his dad. At SILab, he has learned a wealth of new skills, from the basics of soldering to more advanced milling techniques. Johnathan has utilized these skills in research projects including at the Nia Lab, where he has developed his own novel ventilation unit. Learning in a hands-on environment has been the key to his success.



PAST EVENT HIGHLIGHTS

Engineering Materials in 3D Workshop

In July, BTEC and SIlab held a 2-day workshop to introduce students to SolidWorks 3D modeling, 3D printing, and 3D bioprinting. The workshop was attended by over 20 students, undergraduate and graduate. It included a mini design challenge in which participants had an opportunity to put their newly learned skills to the test. Yiming Yu (Mech E '24), Claire Cropper (ECE '24), and Danika Heaney (REU Chemistry '23) took first prize! One student remarked "I feel like when I have a project in mind in the future, I could go to BTEC and get the support to pursue the project."



First Inspiration in Research in Engineering

The Calculus Project aims to increase the success of BIPOC and low-income students in advanced mathematics. As part of that project, the First Inspiration in Research in Engineering (FIRE) program was hosted in BTEC in July by BU ENG's Technology Innovation Scholars Program. 20 high school students gained exposure to engineering by working on projects involving biotechnology, robotics, 3D printing, synthetic biology, and microfluidics. Students acquired hands-on skills in collecting and analyzing data, forming conclusions, and working with various tools and techniques in BTEC. This was all made possible by a generous donation from AMETEK.

Additional Spring/Summer Outreach

In April, students from the Upward Bound Math Science program were introduced to BTEC and career paths in BME through a lecture by Dr. Joseph-McCarthy. They also learned the fundamentals of pulse oximetry through a hands-on activity led by Dr. Karrobi. This was part of a larger multi-day event aimed at inspiring future engineering undergraduates.

In July, a group of students from the REU (Research Experiences for Undergraduates) in Chemistry also visited BTEC. Several members of the group later attended the BTEC-SIlab Engineering Materials in 3D workshop!



Diane Joseph-McCarthy, Executive Director BTEC
Kavon Karrobi, BTEC Manager
Katie Kelso, SIlab Manager
For more information, email: btec@bu.edu