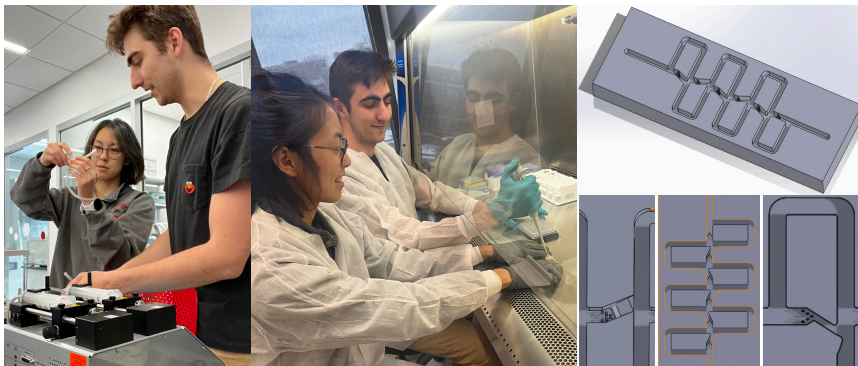




Boston University College of Engineering

## BTEC PROJECT HIGHLIGHT

### 3D Printed Monolithic Microfluidic Immunotherapy Testing Device



Patra Hsu and Benedek Gyuris (BME '23)

Since 2D models have struggled to mimic the interactions of cell architecture and oxygen gradients in the in-vivo microenvironment, a 3-D *in-vitro* tumor spheroid model is essential for the development of targeted cancer therapies. A challenge with 3D models is that they need constant perfusion of nutrients in the extracellular matrix to sustain the viability of deeper cell layers, and incorporating perfusion for 3D spheroids using conventional microfluidic device fabrication techniques is costly, complex, and low throughput. We are working with advisors from Draper Laboratories, Dr. Jeffrey Borenstein and PhD student Alex Markowski, to create a multiplexed 3D-printed microfluidic platform to improve the capture, sustainment, and imaging of murine colon carcinoma spheroids for our senior design capstone project. We are utilizing CAD, CAMSOL, and 3D resin printing to prototype different design iterations. Access to BTEC's wet lab is critical for the creation of spheroids, as well as the biological testing and validation of our microfluidic device.

#### BTEC Advisory Board Members:



## upcoming events

**BTEC**  
ENTREPRENEURSHIP  
SEMINARS

### Targeted Protein Degradation: Navigating the Challenges of Degradation Optimization

Wednesday, Feb 1<sup>st</sup> at 3:30  
Kilachand CILSE, Rm 101



Stewart Fisher  
Chief Scientific  
Officer  
C4 Therapeutics

### Lutron Lighting Innovation Competition



Saturday, Feb 18<sup>th</sup> at 12  
SILab

### Dean's Imagineering Competition

Thursday and Friday, Apr 13<sup>th</sup>  
and 14<sup>th</sup>, SILab

### BTEC x BMES Design Competition



Saturday, Apr 29<sup>th</sup>  
BTEC

# SILAB PROJECT HIGHLIGHT

## Stool by Anna Tretiakova (BME '26)

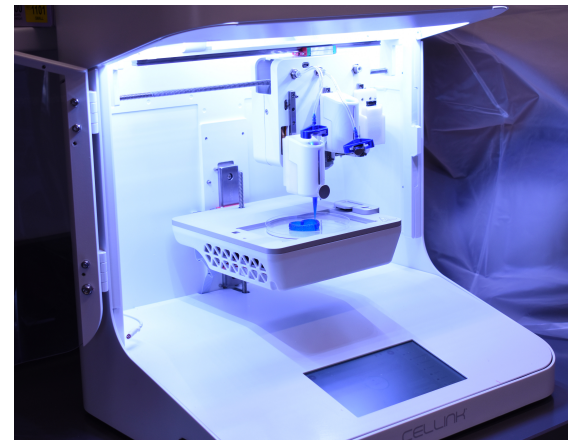
Anna began woodworking using the tools available in SILab. This stool was her second ever project! Anna selected wood from SILab stock, then used the jointer and planer to get everything flat and square so that when it came time to cut, screw, and glue the pieces into a stool, they fit together perfectly. This “ice cream sandwich” stool now gives her friends another place to sit when hanging out in the dorm.



# BTEC TECHNOLOGY HIGHLIGHT

## BIO X™ 3D Bioprinter

3D bioprinting is an emerging technology in tissue engineering and regenerative medicine with applications in, for example, the generation of artificial cartilage. The BIO X™ 3D bioprinter from CELLINK is compatible with a wide range of biomaterials. Its three printheads allow for precisely control geometries and spatial patterning of cells and biopolymers. Through the technology’s advanced functionality and versatility, we have the opportunity to develop complex tissue constructs, automate 3D cell cultures, and explore novel drug delivery platforms.



# BTEC ASSISTANT HIGHLIGHT

## Nicholas Rabines (BME '23)

Nicholas has been working as a BTEC Assistant since spring 2022. He was born in Houston, TX, but his family is originally from Peru. Nicholas’s first experience using BTEC was during his biomedical measurements course. As a BTEC Assistant, he has created demos for several instruments in BTEC, including the iBright gel imager, oscilloscopes, function generators, and signal amplification and filter boxes. He also used BTEC to work on developing a device that monitors diaphragmatic excursion via a non-invasive measurement system for phrenic nerve surgery for his Device Diagnostics and Design course. For his senior design project, Nicholas is working in the Nia Lab investigating the effects of pulmonary diseases on lung acoustics as a potential diagnostic biomarker. Working in BTEC has allowed Nicholas to gain practical hands-on knowledge and experience with numerous biomedical devices and technologies.



# PAST EVENT HIGHLIGHTS

## BTEC x Biomedical Engineering Society (BMES) Design-A-Thon

**BTEC and the BMES student chapter at BU** launched a year-long design competition focused on challenges around healthcare disparities for under-represented minorities and low-income communities with the goal of including diversity in design to enhance outcomes. Entries from 11 teams, spanning the areas of Data Science, Precision & Predictive Medicine; Molecular & Tissue Engineering & Drug Delivery; and Biosensors, Medical Devices, & Diagnostics, were presented to **BME Graduate Student mentors** for feedback at the end of December. There were over 45 attendees at the three-hour Saturday event with pizza provided of course. The competition final, with **prizes sponsored by Merck**, will be on April 29<sup>th</sup>.



## Society of Women Engineers at BTEC

**SWE gathered in BTEC** to take the required BTEC safety training as a group and to learn more about the cutting-edge technologies available to them. All 20+ attendees quickly passed the quiz and one won an alginate print of a heart shape made on the 3D bioprinter.



## BMES Student Chapter MATLAB Workshop

BMES held a MATLAB Workshop at BTEC that was designed and led by **Jacob Chin (BME & CE '25)**, a BTEC Assistant and BMES member. Over 20 students across all engineering majors participated and learned tips and tricks for using MATLAB effectively in their courses and design projects.

## SILab Catapult Challenge

The annual SILab Catapult Challenge took place on a brisk Saturday afternoon in November on Nickerson Field before a panel of judges. The previous weekend 8 teams had 7 total hours and limited resources to design and build their 3 x 3 x 2 ft<sup>3</sup> catapults. The winning catapult, by **Martin Dimo (Mech E '23)** and **Johnathan Muhvich (BME '23)**, was able to project a golf ball an average of 62 feet!



Diane Joseph-McCarthy, Executive Director BTEC  
Kavon Karrobi, BTEC Manager  
Katie Kelso, SILab Manager  
For more information, email: [btec@bu.edu](mailto:btec@bu.edu)