Testing System for Respiratory Devices: Baskin Human Cough and Mucus Production Simulator (Googun) Engineering Lisa Mcphillips (Bioengineering), Natalie Luttrell (Bioengineering), Owen Bosley (Bioelectronics), Patrick Mogianesi (Bioelectronics), and Todd Nabonne (Bioelectronics)



The Googun is a corporate-sponsored project aimed at building a system for stress-testing medical devices in development, by providing a cheaper, safer alternative to human test subjects. Our Googun offers pseudo-realistic mucus production and cough behavior, similar to that of an average person, making it ideal for testing respiratory devices.

Our client, Certus Critical Care Inc. (3Ci), is developing prototypes that have sensors located near the end of an endotracheal tube. They need to test how their sensors are affected by the secreted mucus from the patient at this location, as they do not yet have data on the short and long term effects of mucus on their sensors.



Left to right: Patrick M, Natalie L, Lisa M, Todd N, and Owen B. Photo taken 1/6/2020



University of California, Santa Cruz and Certus Critical Care

Mucus Propulsion Module (MPM)



CERTUS CRITICAL CARE

<u>User Interface</u>

The client required an interface to control the MIM and MPM modules. Our solution involved a graphical interface that monitors the status of the modules and allows for the user to send instructions on operation of the modules.

Googun Control Graphical Interface



<u>Conclusions</u>

We successfully fabricated and characterized a Googun system. Unfortunately, due to the COVID-19 pandemic, we were not able to fully vet the system with verification tests. Due to social distancing laws, we were not able to test the systems together. The pandemic also prevented us from obtaining a working ventilator or an endotracheal tube.

Acknowledgements

We would like to thank David Poisner from Certus Critical Care Inc, professors Petersen and Favaloro, Joe Cox, and our TA Sushmita Joardar for making this all possible.