

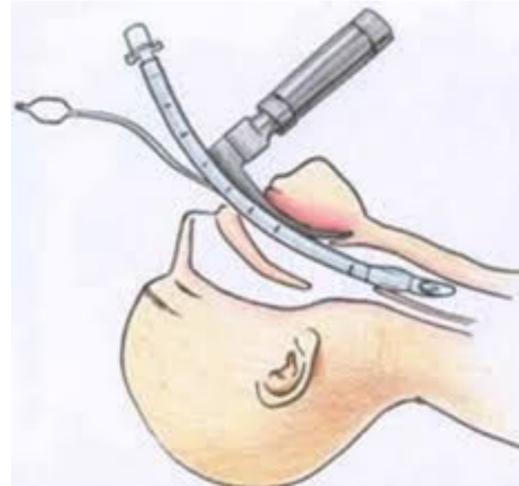


# • Novel Designs in Endotracheal Intubation Gregg Neal Bascos, Biomedical Engineering, 2021

Intellectual Achievement beyond the Classroom

## SUMMARY

*In the battlefield as well as the civilian world, Airway compromise is a leading cause of death. The primary method of treatment for first responders is endotracheal intubation, which employs the use of an Endotracheal Tube (ETT) with an inflatable High Pressure-Low Volume (HPLV) cuff located on the end of the ETT. Proper sealing of the HPLV cuff to the tracheal wall following inflation is important to ensure effective delivery of oxygen and avoid damage to the tracheal tissue (over-inflation) or fluid aspirations into the lung (under-inflation). These conditions are difficult to avoid in some evacuation scenarios such as airlifts, where local pressure can vary significantly [1]. The purpose of this project is to create an innovative endotracheal tube design overcoming these issues through eschewing the HPLV approach for a novel expanding mechanism. Our mechanical securement design is a radially expanding cylinder that seeks to contact a larger tracheal surface area with a reduced maximum pressure, enabling a fluid tight seal while reducing risk of dislodgement and tissue damage.*



## SPICES

- *I was able to attend helpful professional development seminars*
- *I learned new manufacturing skills and experimental design*
- *I learned things I never would have learned in the classroom*

## HERBS

*This project best embodies two aspects of HERBS: Honorable and Resilient. This project took a lot of work and there is still work to be done. This work is all our own and any help was credited correctly .*



## LEARNING OUTCOMES

- *Became proficient with hardware tools, 3D printing, and design software*
- *Established a basis of experience with which to base future projects on.*
- *Learned how to organize and present research to other researchers.*

## IMPACT

*This project had a significant impact on myself, the laboratory, and the collaborators of the project. We all learned something through this project, myself the most, and our work may one day save lives around the world.*

## ADVICE

- *Have effective communication!*
- *Don't be afraid to ask questions.*
- *Have fun and get to know people in the lab*
- *Learn everything you can*