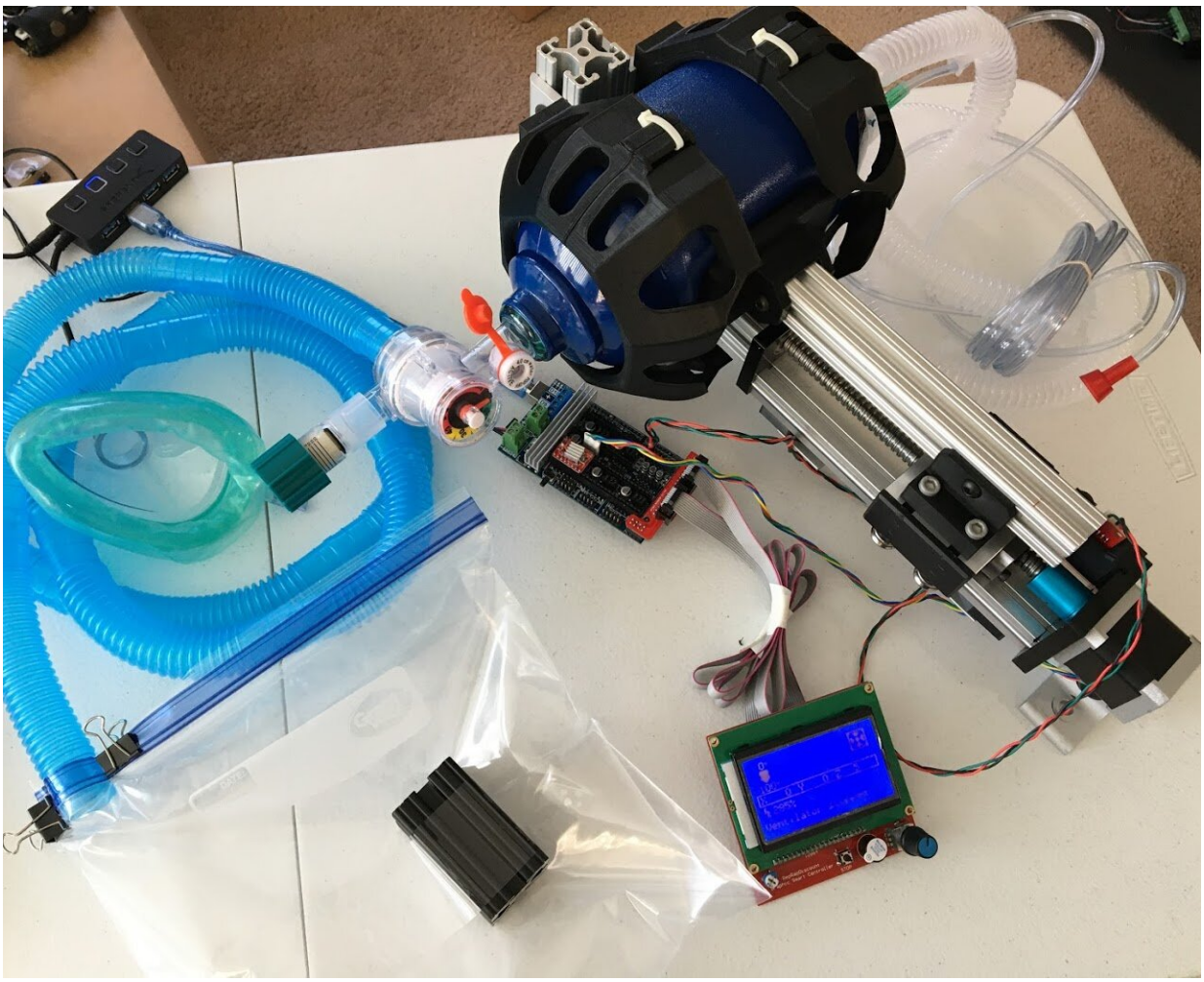
Automating manual resuscitators could aid sickest COVID-19 patients, developing countries

April 23 2020, by Cory Nealon



Credit: University at Buffalo

Spurred by fears of a shortage of ventilators to treat COVID-19 patients, a University at Buffalo-led research team is developing a low-cost solution using a common medical device.

The device is a resuscitator that health care workers manually squeeze to pump air into the lungs of people struggling to breathe. It's common in ambulances and emergency rooms.

The research team—comprised of doctors and engineers working on the Buffalo Niagara Medical Campus—is creating technology that automates the squeezing of the resuscitator.

If successful, the system has the potential to turn an untold number of resuscitators into devices that, like mechanical ventilators, help patients breathe without the assistance of another person.

"With the projected shortage of ventilators here in New York State and elsewhere, this is a problem that needs to be addressed immediately," says one of the researchers leading the effort, Chi Zhou, Ph.D., associate professor in the UB Department of Industrial and Systems Engineering.

Other team leaders include Sanjay Sethi, MD, professor; chief of pulmonary, critical care and sleep medicine at the Jacobs School of Medicine and Biomedical Sciences at UB; and Ruogang Zhao, Ph.D., associate professor in the Department of Biomedical Engineering, which is a joint program of the Jacobs School and the UB School of Engineering and Applied Sciences.

The team also includes Albert Titus, Ph.D., chair of biomedical engineering; Julia Faller, clinical director of UB's Behling Simulation Center and medical director of perioperative services at Roswell Park Comprehensive Cancer Center; and Tianjiao Wang, Ph.D. student in industrial and systems engineering.

The system is composed of low-cost, off-the-shelf components, including simple electronics and an actuating device that squeezes the resuscitator.

The team is testing the system to ensure it is compatible with standard clinical practices. Once that happens, the researchers will make the plans available online so developing countries can make use of the system.

The team also may seek emergency approval from the U.S. Food and Drug Administration for human use in the United States.

For the latest updates on the team's progress, including design plans and future testing data, visit: https://sites.google.com/view/ub-fast-prototyped-vent.

Provided by University at Buffalo