

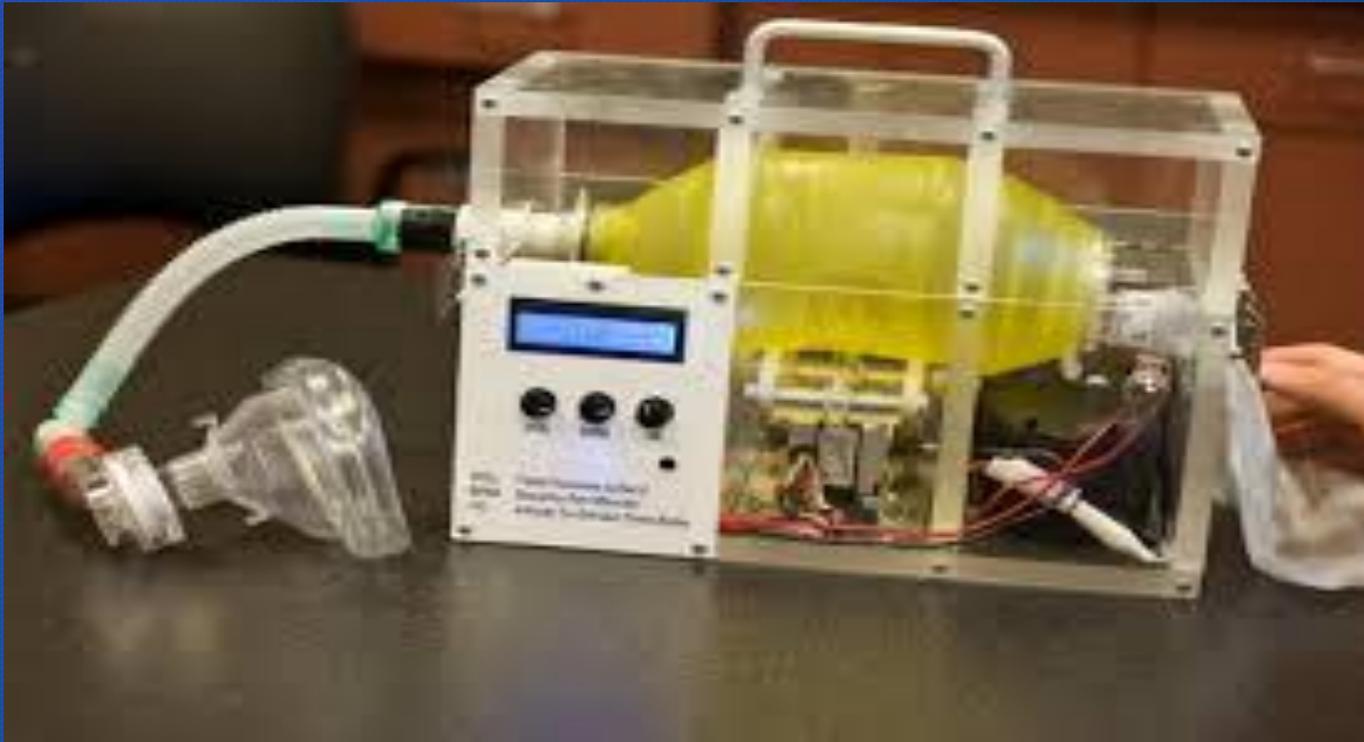
The Ventilator Challenge

A mechanical ventilator is an automatic machine designed to help patients that have difficulty breathing move air in and out of the lungs.

Components

- A source of input energy to drive the device
- A means of converting input energy to output energy in form of pressure and flow to regulate the timing and size of breaths
- A means of monitoring the output performance of the device and condition of the patient

Ideas from Ongoing Work



Prototype Ventilator developed by MIT students in 2010 (MIT News)
<https://news.mit.edu/2010/itw-ventilator-0715>

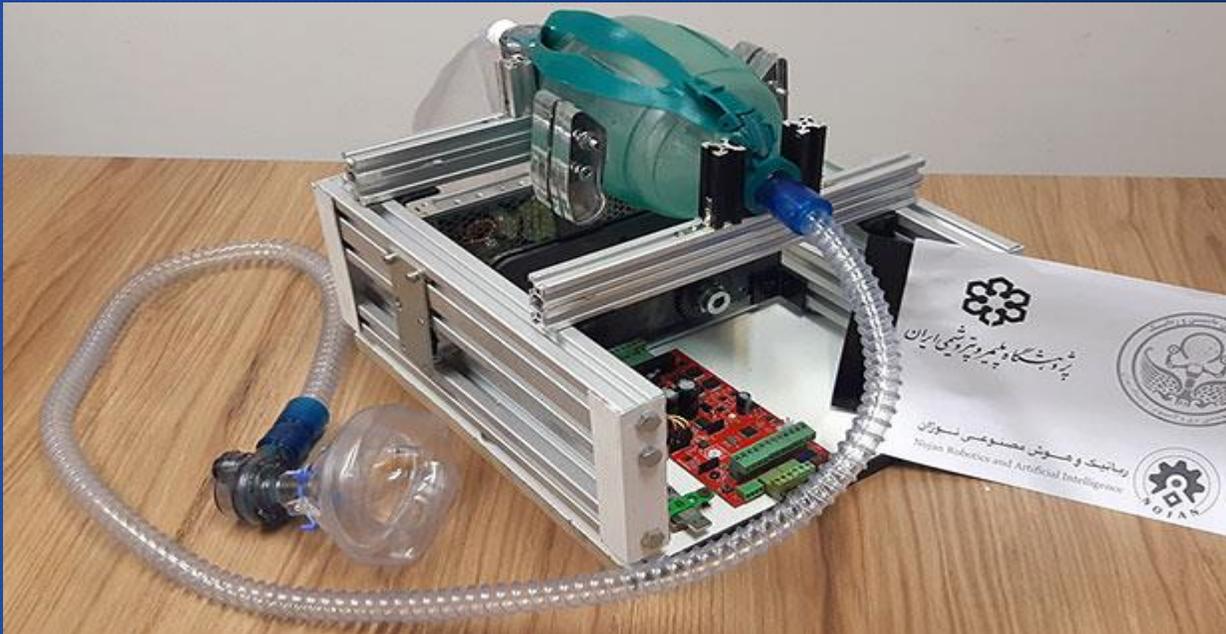
Ideas from Ongoing Work



Device developed by a research group in University of Texas at Austin. The researchers found a way to automatically compress the bag using windshield wiper motor pulled from a Toyota Camry.

<https://www.machinedesign.com/medical-design/article/21127908/researchers-build-a-ventilator-using-an-automotive-motor>

Ideas from Ongoing Work



Ventilator designed by H. Moradi, S.K. Setarehdan, M. Behzadnasab in Tehran, Iran

<https://spectrum.ieee.org/the-institute/ieee-member-news/engineers-iran-open-source-ventilator>

Ideas from Ongoing Work



Ventilator Design by an Indian Engineer that uses an android phone as a controller (AGVA Healthcare)

<https://youtu.be/7vLPefHYWpY>

Challenge Guide

- Read about simple designs (at least 3) starting with (but not limited to) the links shared

You could work on ventilator to intubation design for intensive care patients or equipment for treatment of patient at home

- Prepare a summary on the design you have chosen to work on and why

Simplicity and ease of implementation will be rated higher than complicated designs that will remain on paper

- Break down the ventilator into simpler parts
- Decide on what needs to be designed and constructed, what can be improvised, what can be purchased locally or needs importation.

You don't need to make everything. The goal is to add value

- A small amount of funding will be available for well articulated projects.

There is no point making a ventilator that is not affordable

- Students will be allowed to use our 3D printers to make necessary parts once they can justify their design
- You are free to work individually or in groups (You can request external knowledge from a student from another department e.g. electronics knowledge)