Robotic Designs And Systems Portfolio

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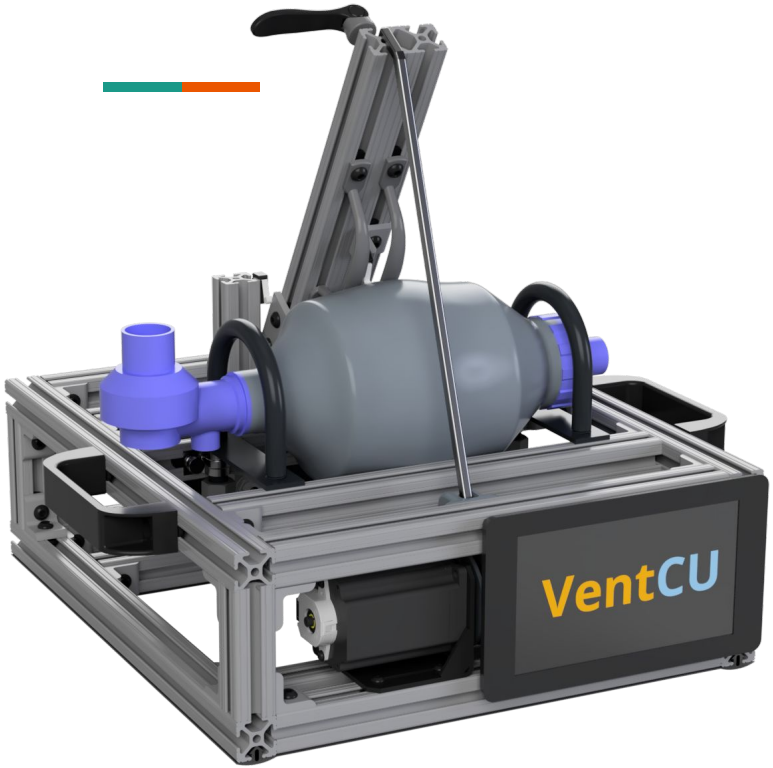
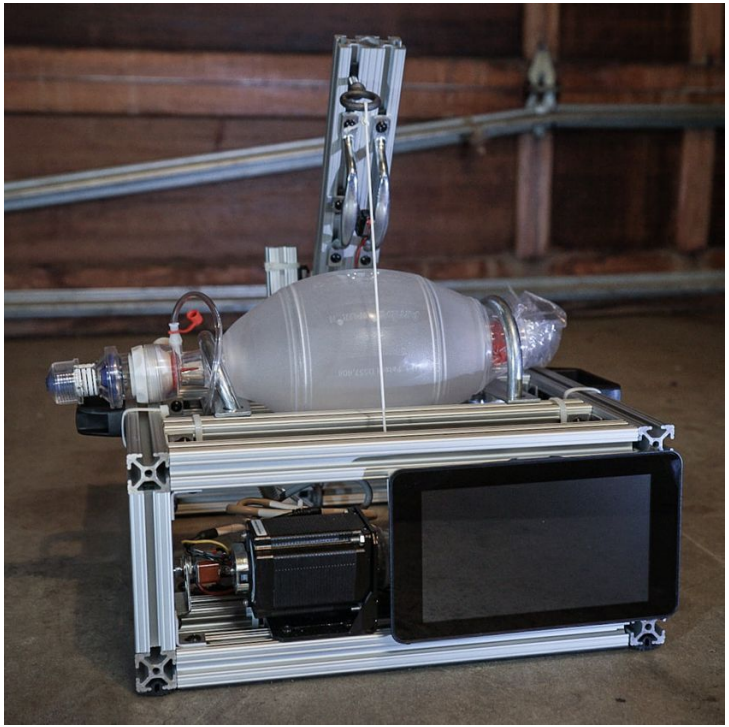


Emergency Ventilator

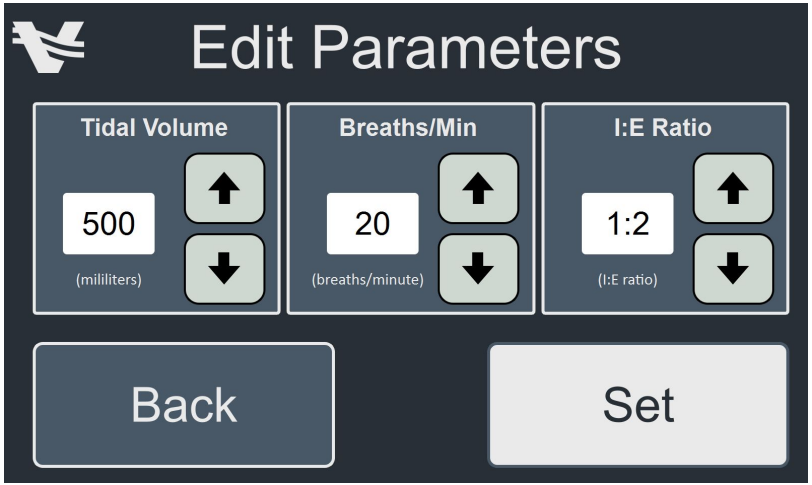
https://coda.io/@maker/ventcu
https://github.com/VentCU/bbwtb

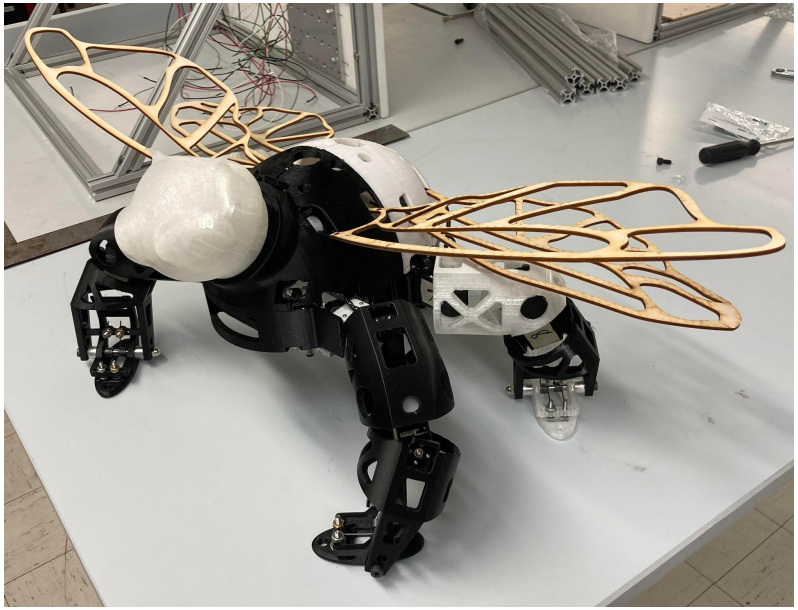
- Developed open-source, fully COTS solution purchasable under $900 and able to be assembled within 2 hours
- Awarded $8000 to engineer rapid response, emergency ventilator for COVID-19 patients out of 80 proposals
- Designed and performed FMEA in Onshape; assembled two units in parallel to meet project specifications
- Implemented real-time performant control system and user interface in Python, PyQt with a Raspberry Pi 3



Emergency Ventilator cont.

Demo Video: https://youtu.be/eqpvQLLvKiU





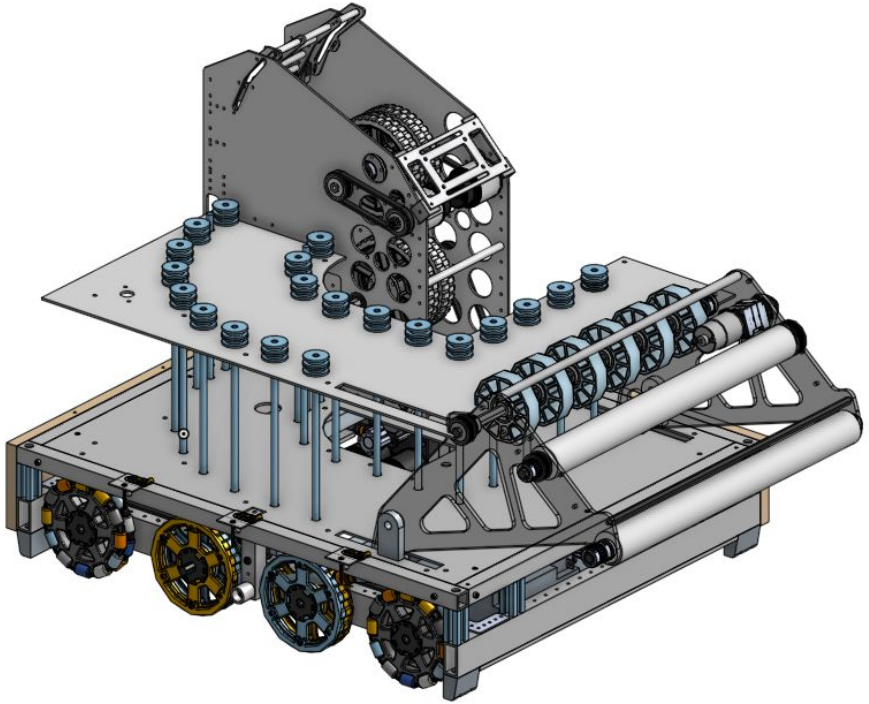
“Gorbachev”

Poodle Moth Robot, WIP

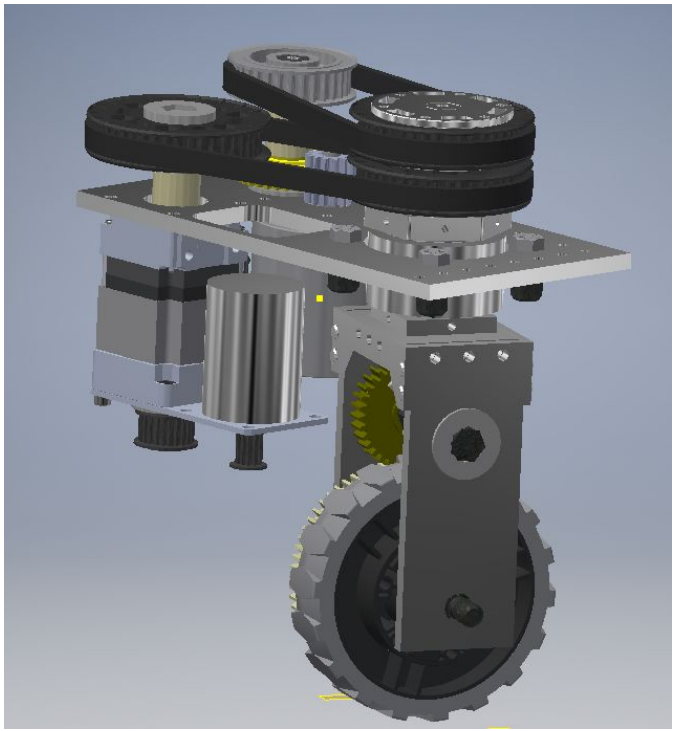
https://www.youtube.com/watch?v=I9hVhX-LS0o

- Developed walking, organically shaped quadrupedal robot resembling the Venezuelan Poodle Moth
- Collaborated with sculptor, Mimi Park (https://www.mimipark.art/), to execute 3D-printed and laser-cut design
- Python control system on a RPi
- CAD Model: https://cad.onshape.com/documents/cb704e436db7a57dad8a6aa9/w/950198fe3f9d408afedca085/e/cc87b716b8f3546e935aa969?renderMode=0&uiState=6197327db3dce9685394faa4

Popcorn: Dodgeball Launcher

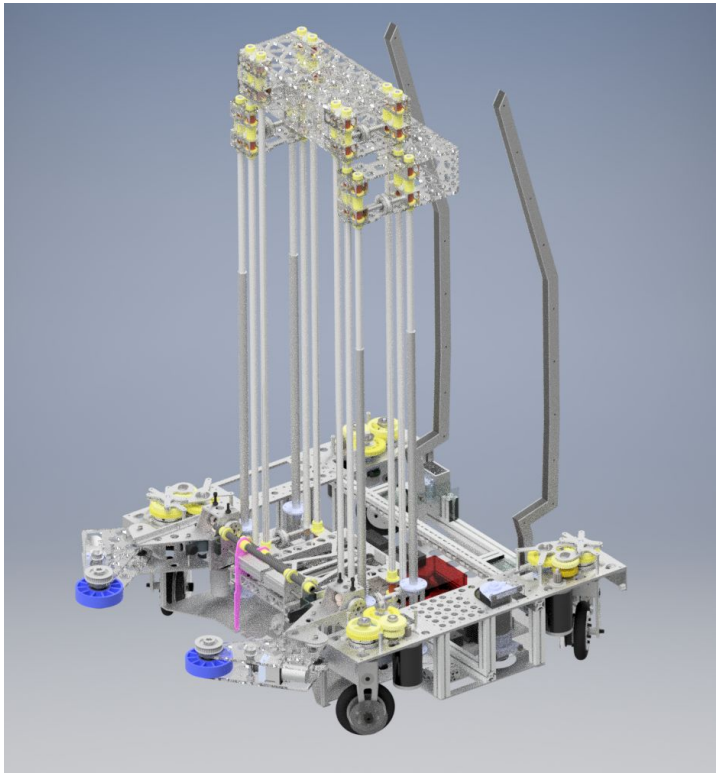


- Lead technical mentor for high school robotics team, 2Train Robotics (FRC #395)
- The little robot that could
- In action: https://www.youtube.com/watch?v=zuLy6TRcgzo
- Mentored students as they developed new iteration of drive-train, ball intakes, and launching systems
- January 2020 - March 2020, Team Project



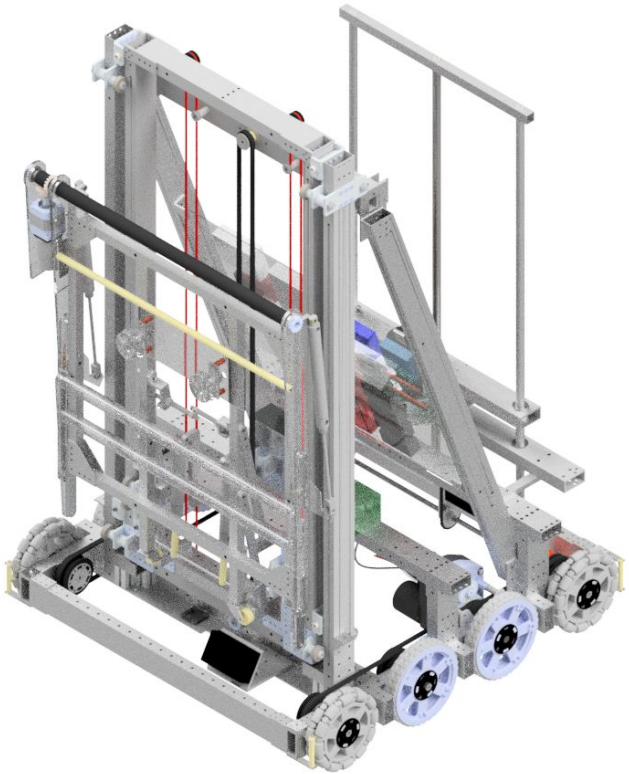
Custom “Swerve” 4WD

- Independent project on custom CNC manufactured “swerve” drive
- Optimized for weight and structural rigidity with FEA analysis in Solidworks
- Reduced weight from 2018 model by 34.5% (11.8—>7.7lbs) and volume profile by 46%
- Implemented BLDC motor control and path planning, transitioned from brushed DC
- May 2019 - Aug 2019, Independent Project



Milkman: 4WD Robot with Lift, Intake

- Team lead designer on “swerve” drive, with 4 independently driven and rotating wheel modules; Inventor, Java
- Vision pipeline over NVIDIA Jetson TK1 with Python, OpenCV scripting
- Paired vision systems with gyroscope, motor controller telemetry for path-planning
- Carbon fiber lift construction and full CNC manufacturing for body
- January 2018 - April 2018, Team Project



Starship: Skid-Steer Robot with Lift, Obstacle Traverse

- Lead technical mentor for high school robotics team
- Taught vision pipeline over Limelight 2 camera for auto-detection and localization of targets
- Guided integration of vision systems with gyroscope, motor controller telemetry for path-planning and auto-alignment
- Lead screw obstacle traverse mechanism built to carry 150lb over 18” block
- January 2019 - April 2019, Team Project