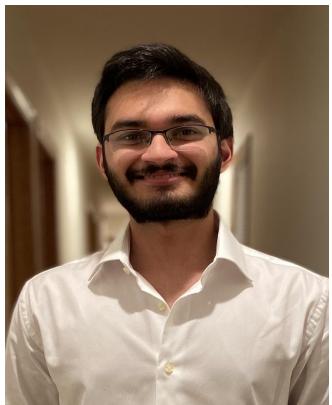


TEAM - 35

INCHWORM ROBOT

University of Illinois At
Chicago - Engineering
Expo 2021

Meet The Team



Omer Durrani

Rear Foot and Documentation



Matt Halverson

Body Linkages and Rear Foot



Daniel Kulach

Software and Electronics



Alex Lewandowski

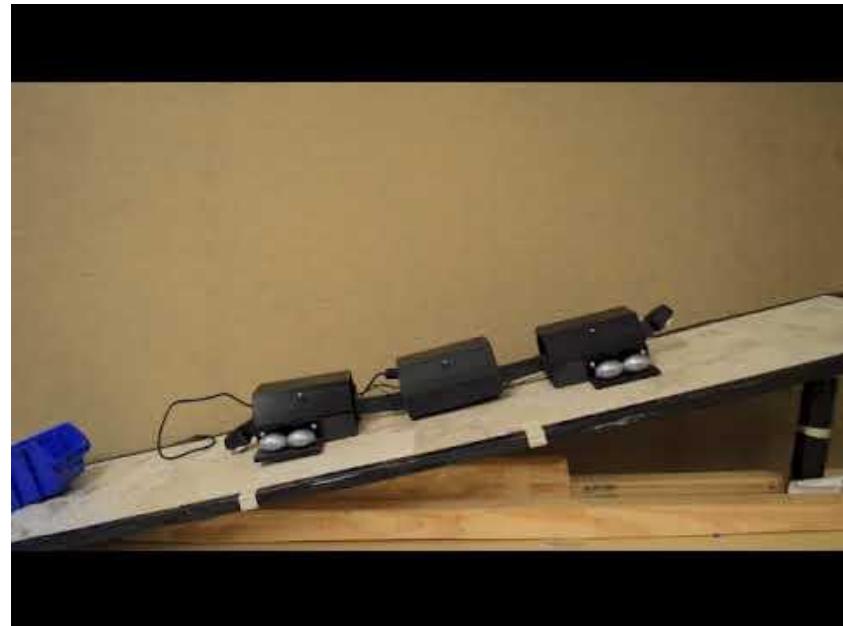
Front Foot and Tendon Actuation



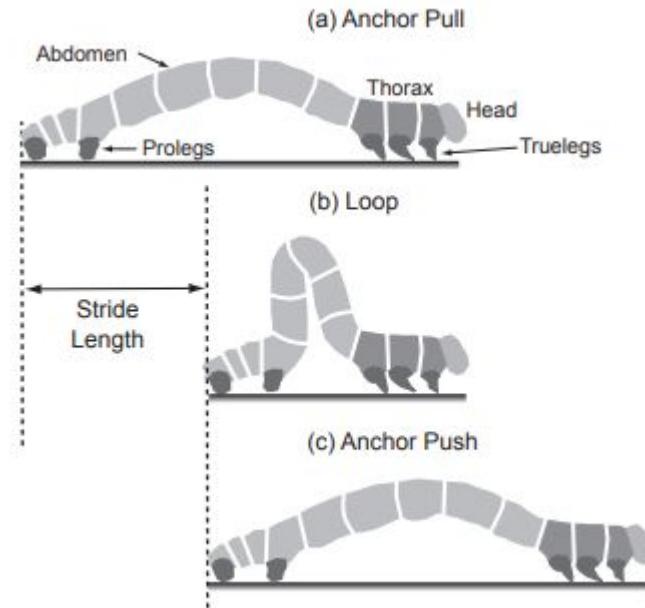
Mikayla Sirovatka

Fabrication/Prototyping and Electronics

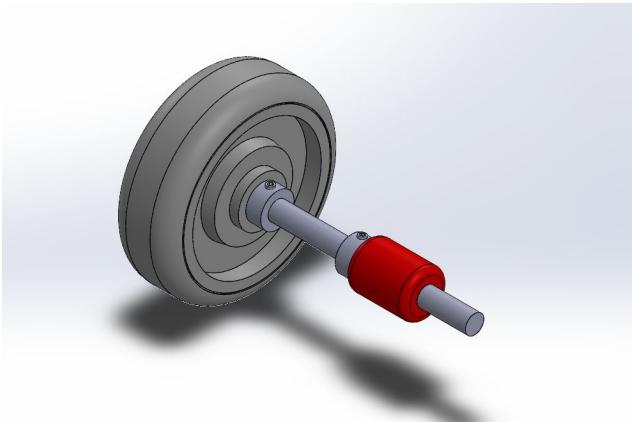
Biologically Inspired Robotics



Inchworm Locomotion: Two-Anchor Crawl Gait



Foot Design Concepts



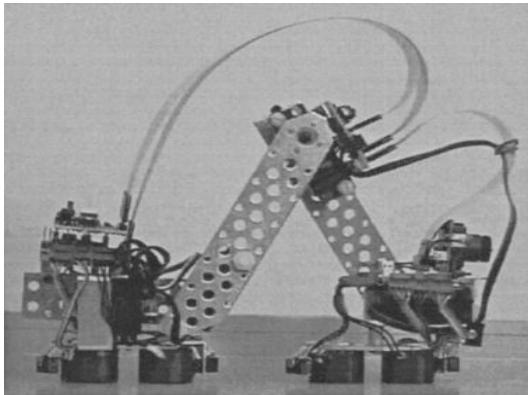
"One-way wheel" Design

Advantages

- Least resistance
- Allows rear angle changes

Disadvantages

- Not anchoring



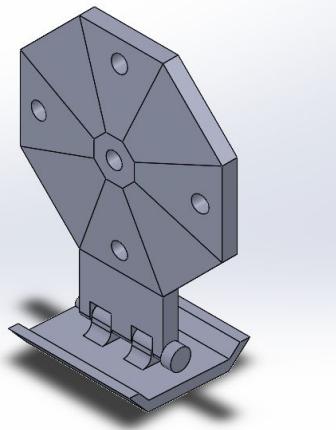
Electromagnet Design

Advantages

- Strong anchors

Disadvantages

- Requires power
- Limited to metal surfaces



"Gecko Tape" Design

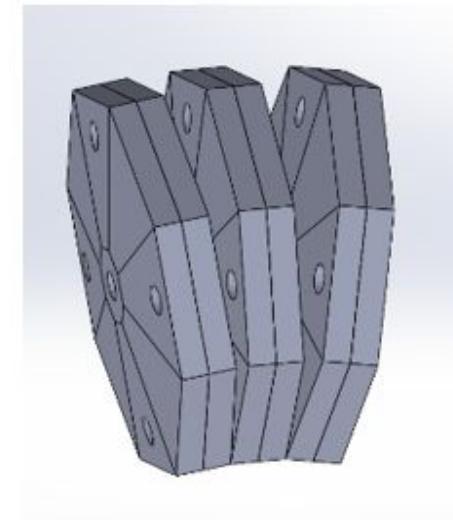
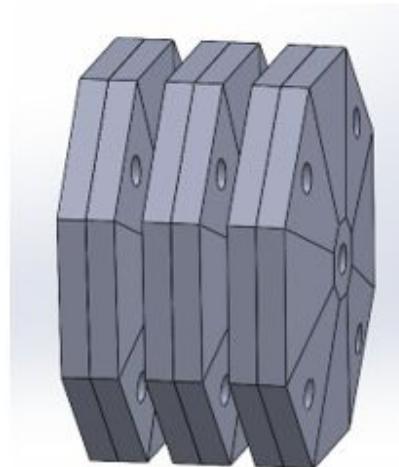
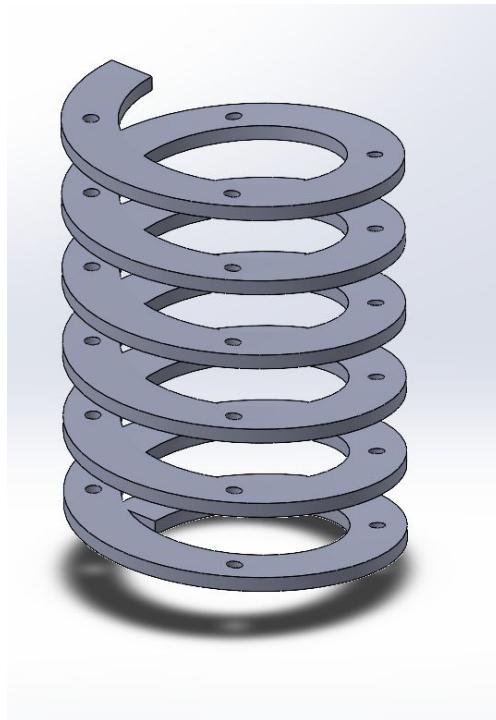
Advantages

- Lightweight
- Easily fitted to any footprint

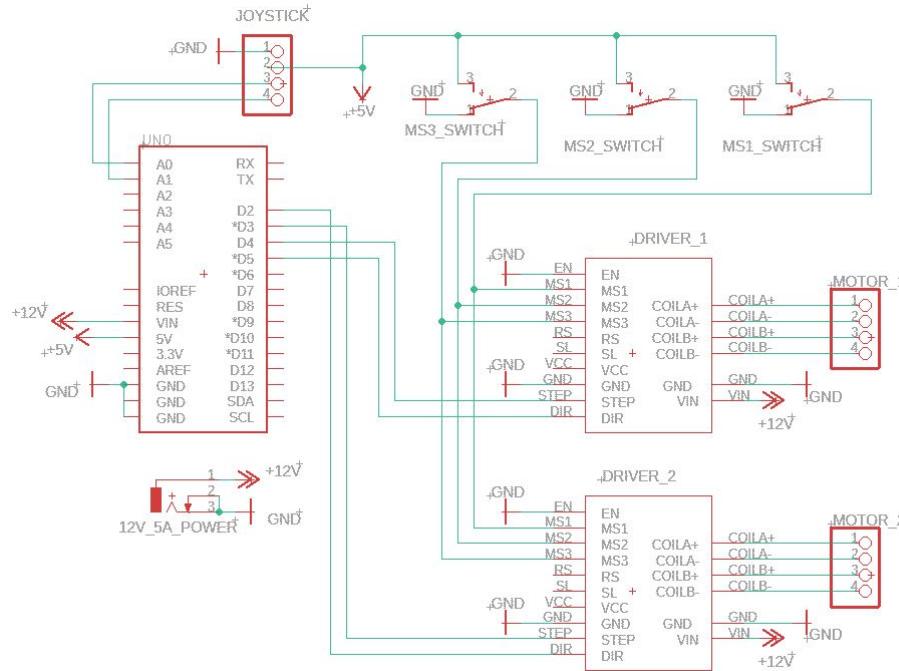
Disadvantages

- Must be lifted near vertically
- Fails if the tape collects debris

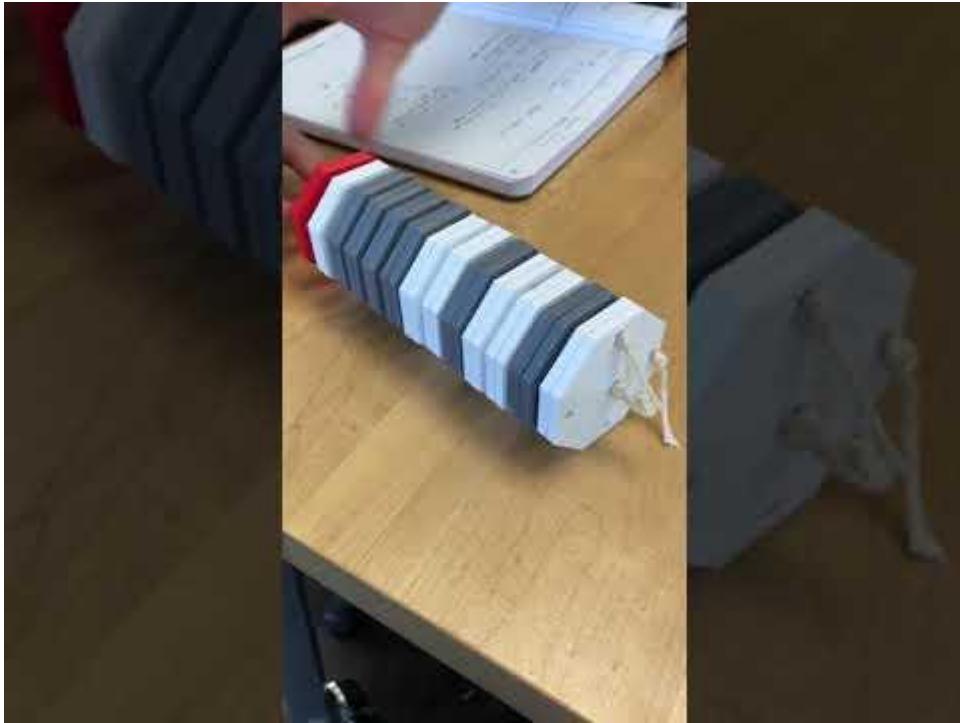
Body Considerations



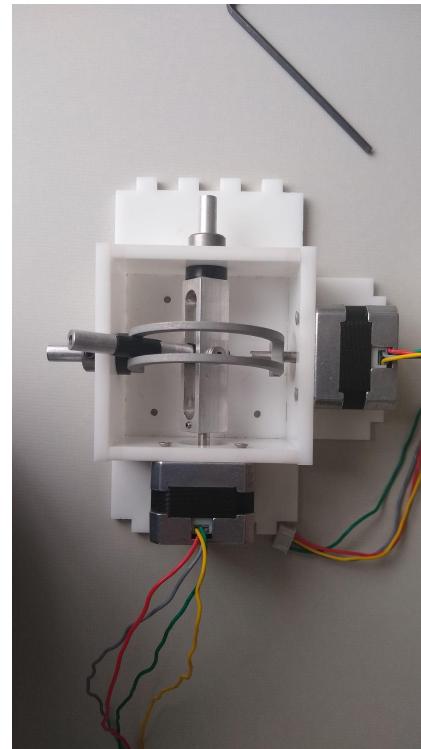
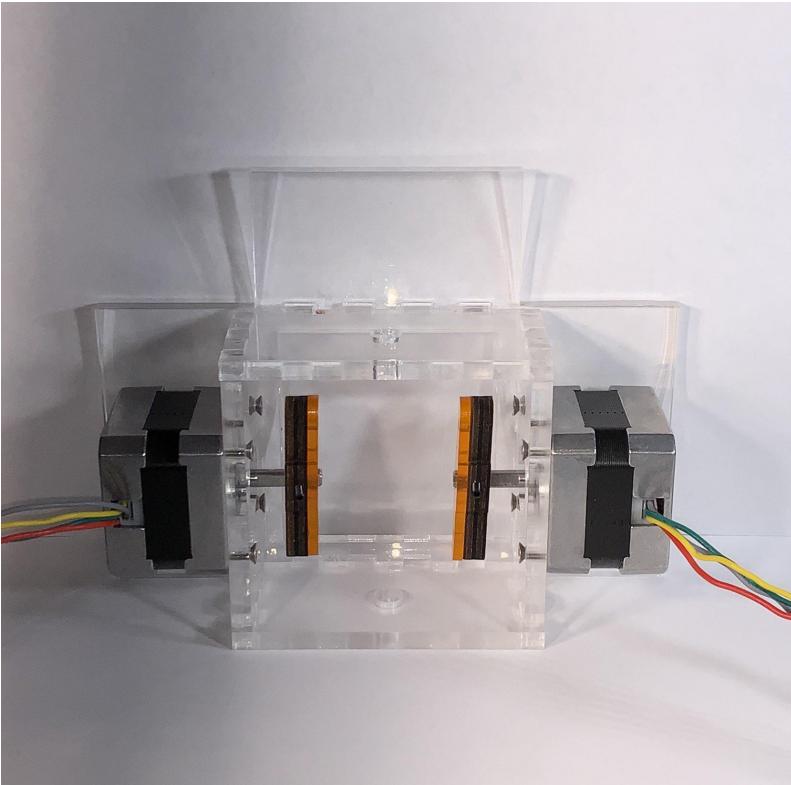
Electronics considerations



Final Body Design



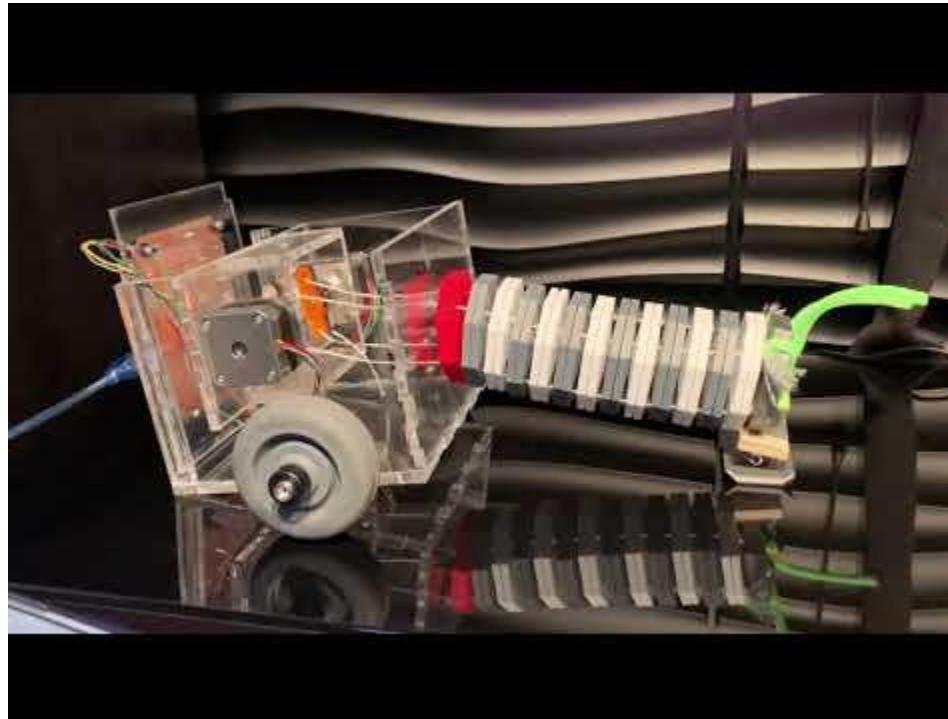
Final Design Actuation



Final Design overview



Final Design



Conclusion

- Overall, body concept has been proved
- Improvements can be made in actuator selection and assembly techniques
- Switchable clutches on rear wheels would enable more effective turning



ACKNOWLEDGEMENTS

The team would like to thank our sponsor, Professor Bhounsule for giving us the opportunity to get hands on experience in building a robot from scratch and being so helpful throughout the process.

The team would also like to thank our advisor, Professor Alonso for guiding and helping us at every step making sure the team was on the right track.

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