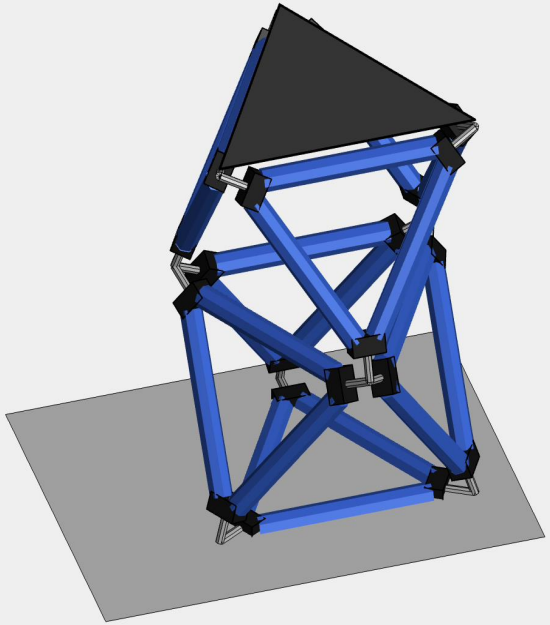
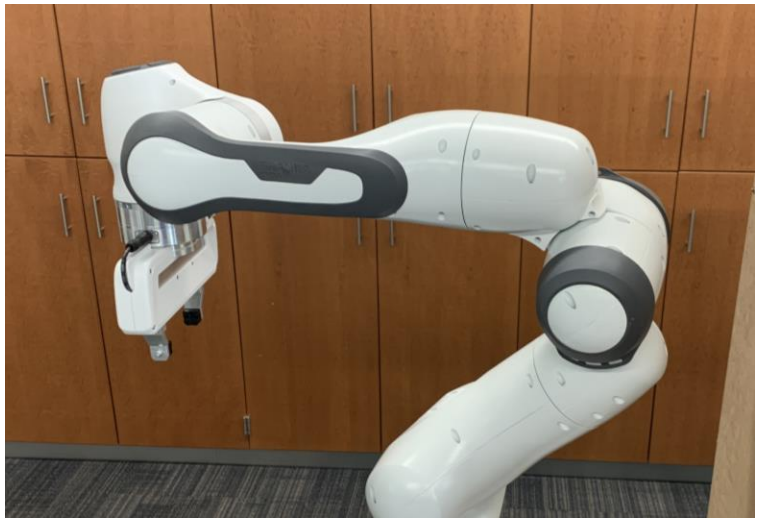
Constant Pressure Untethered Soft Robotics: Solution to the Limitations of Soft Robots

Chris Paul and James Wade

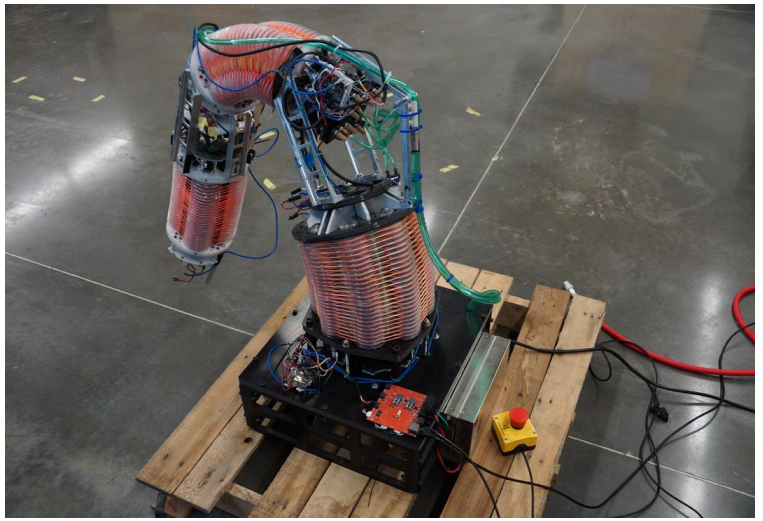


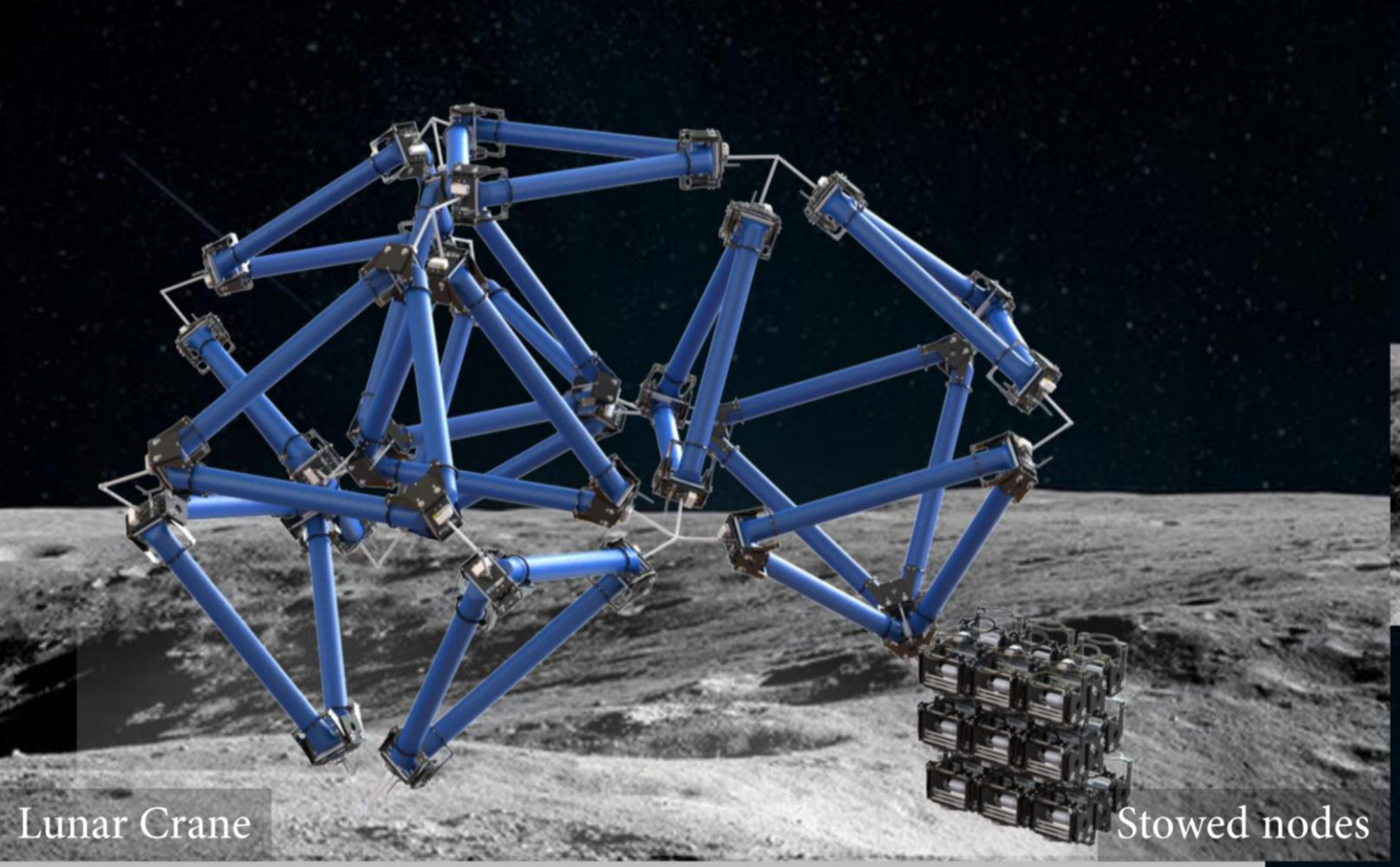
What is Soft Robotics?

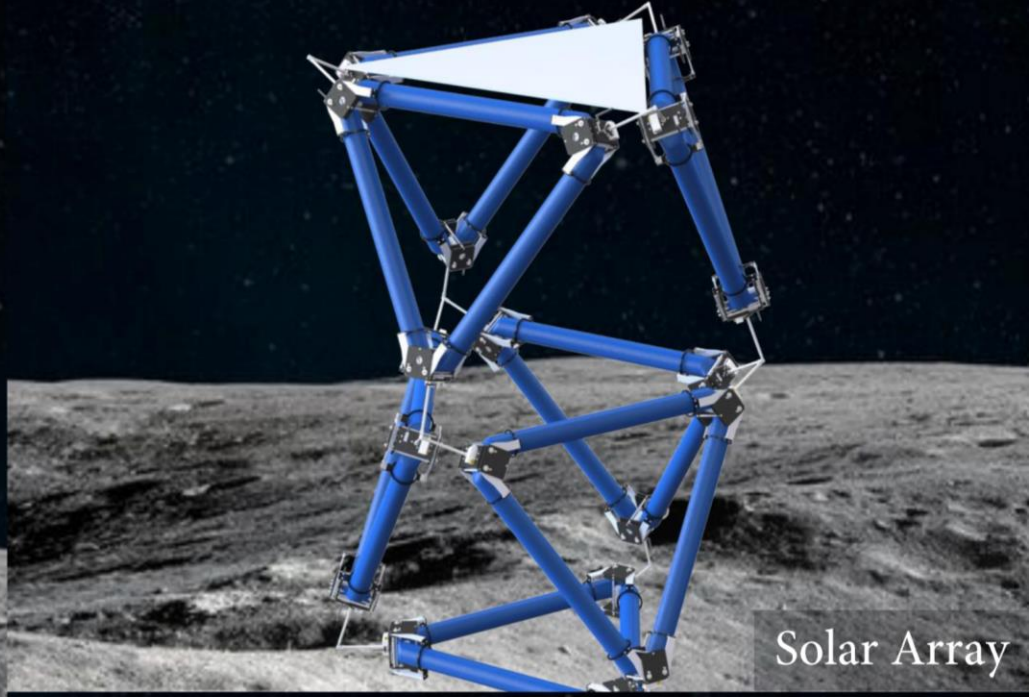
- Traditional "Rigid" Robotics
  - Made of harder materials
  - Powerful
  - Dangerous

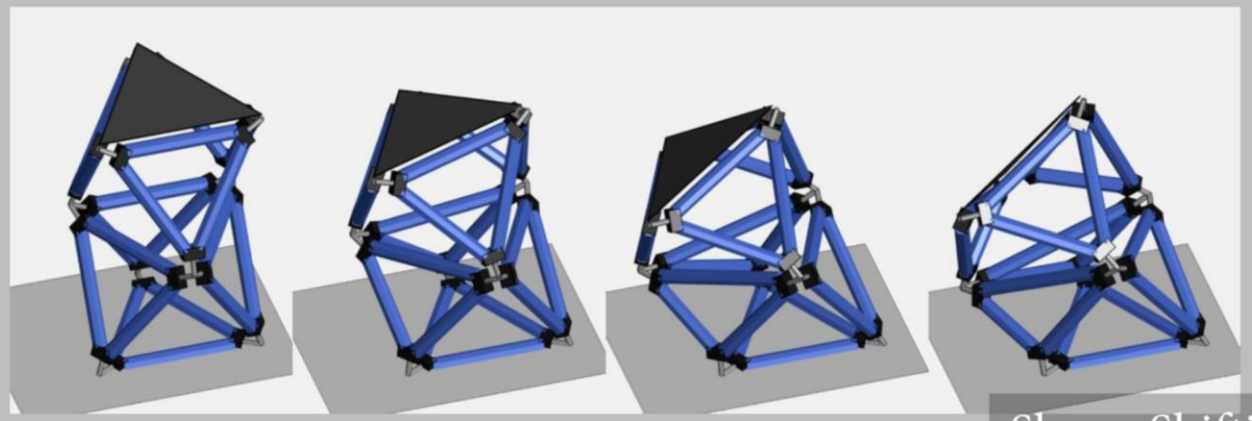


- Soft robots
  - Made of soft, flexible materials
  - Mainly pneumatic
  - Safer
  - Tethered to air compressor




Lunar Crane
Stowed nodes


Solar Array


Shape-Shifting


Octahedron

Overview

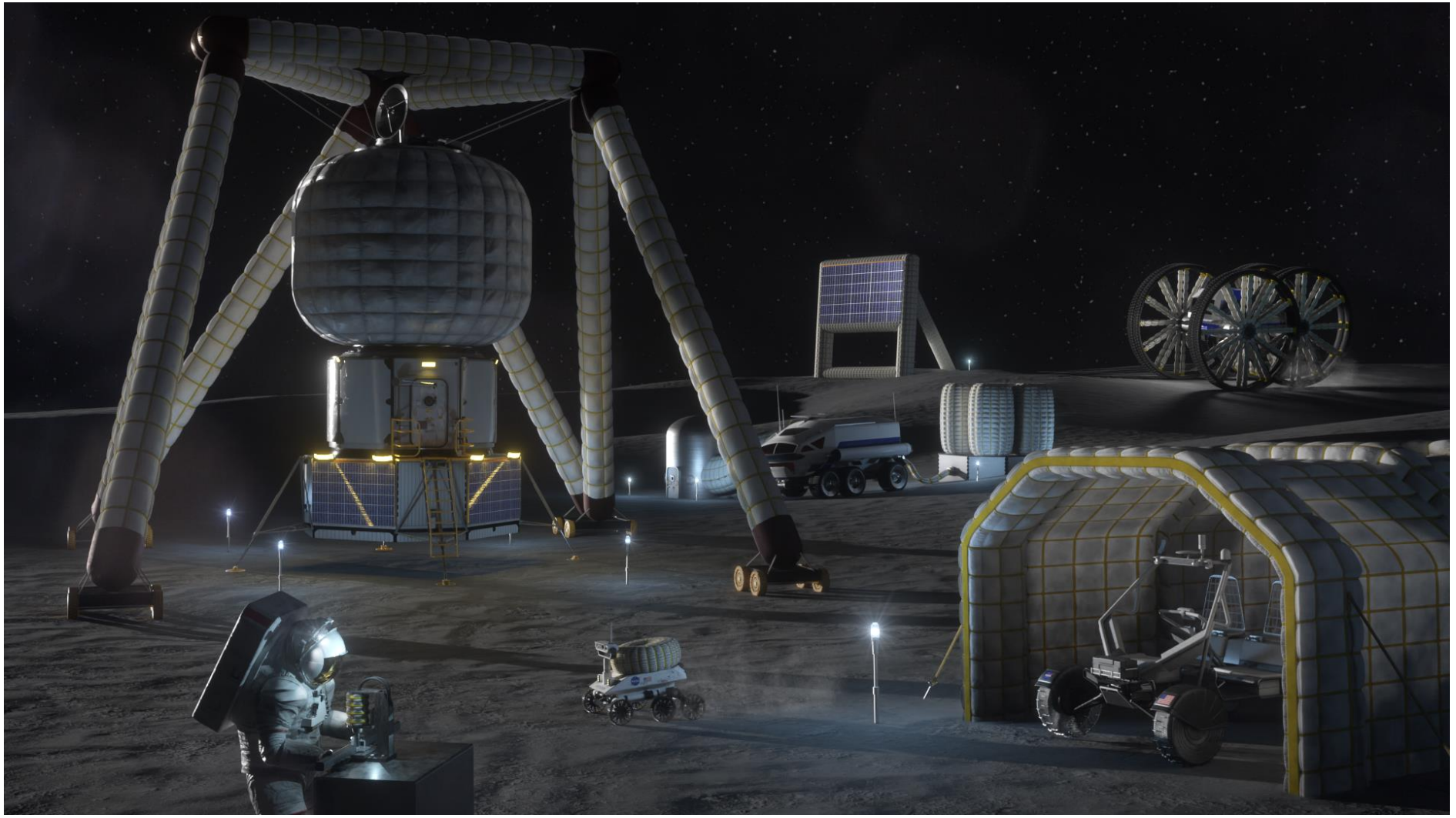
Current Research:

- Mechanical Design
- Communication
- Motion Simulation

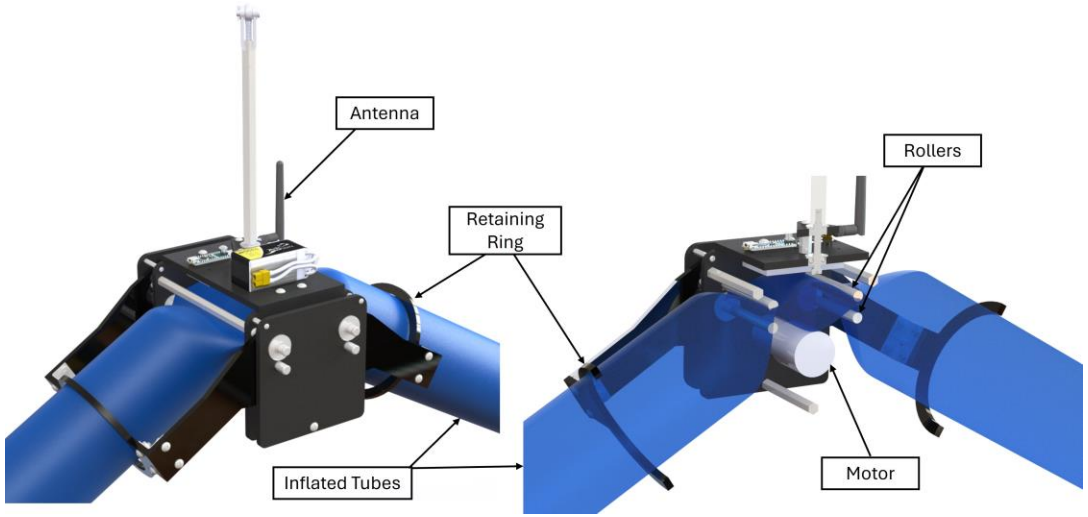
Future Improvements:

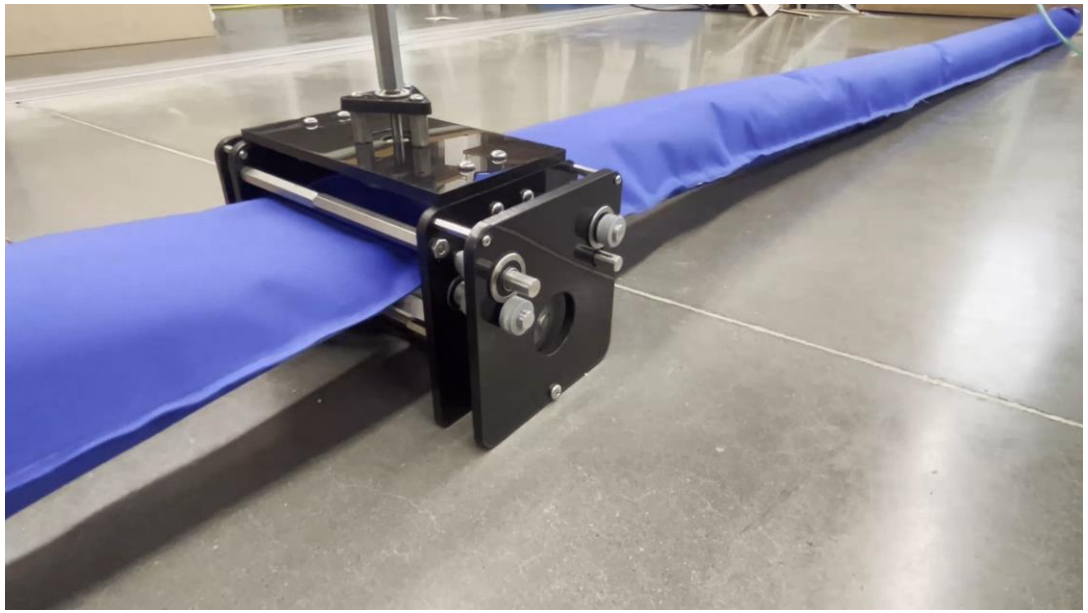
- Motion Optimization
- Environmental Robustness

Our Current Research



Mechanical Construction





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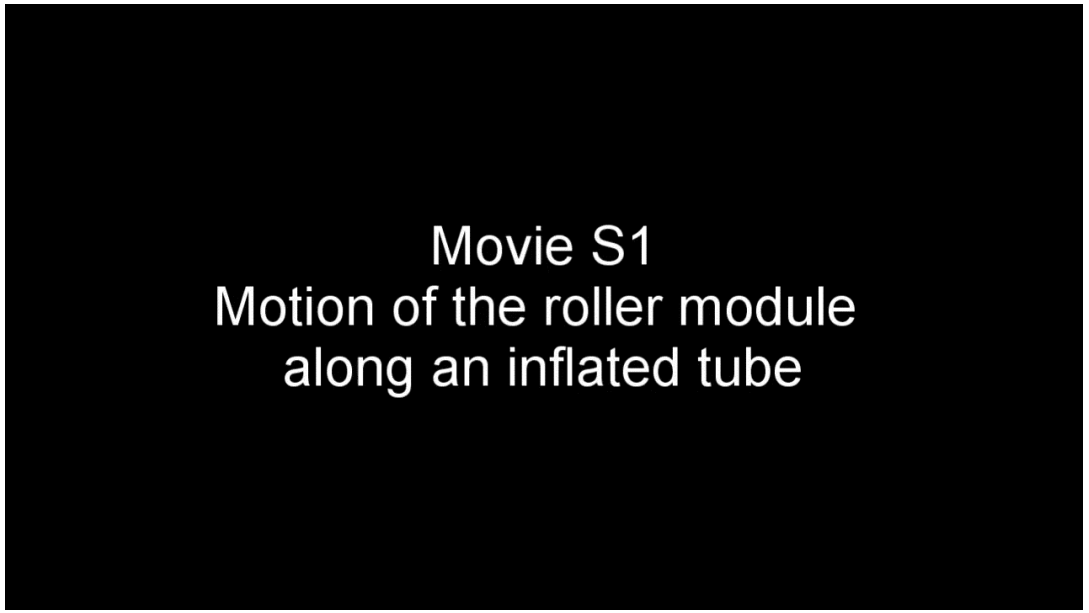

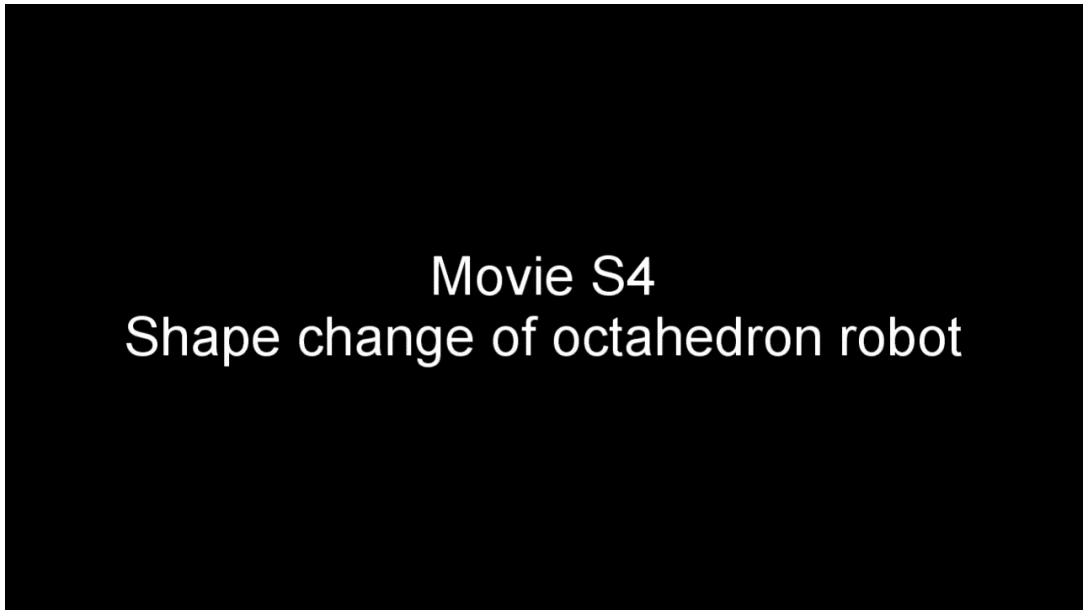

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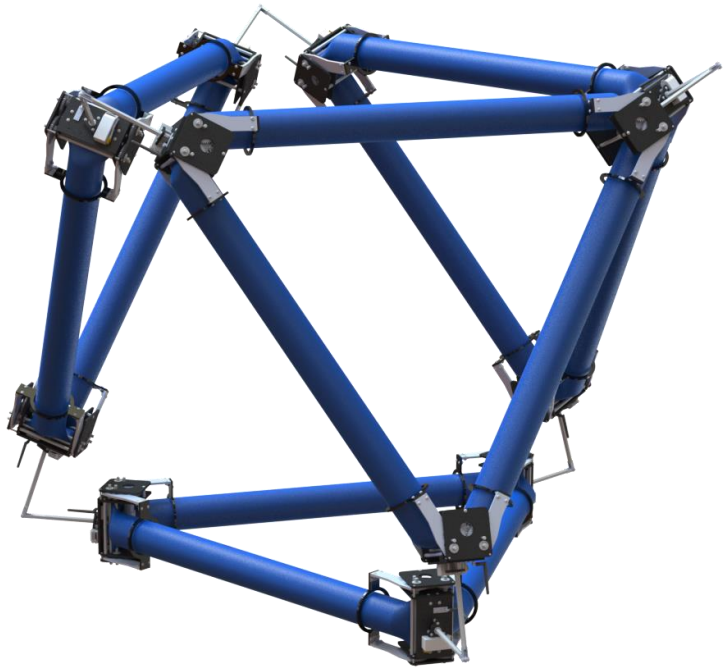
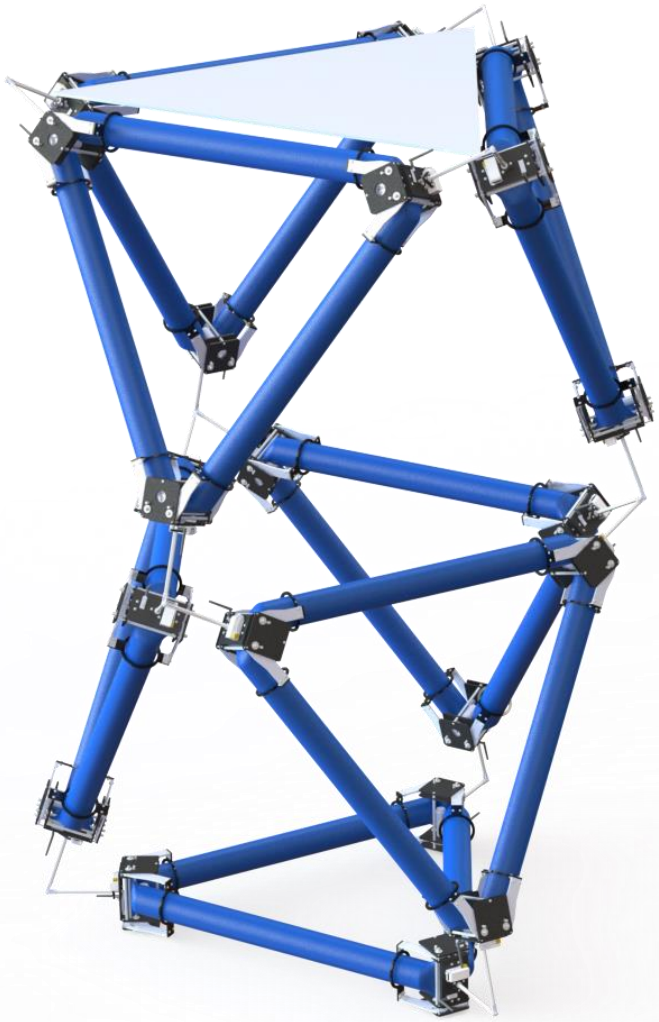
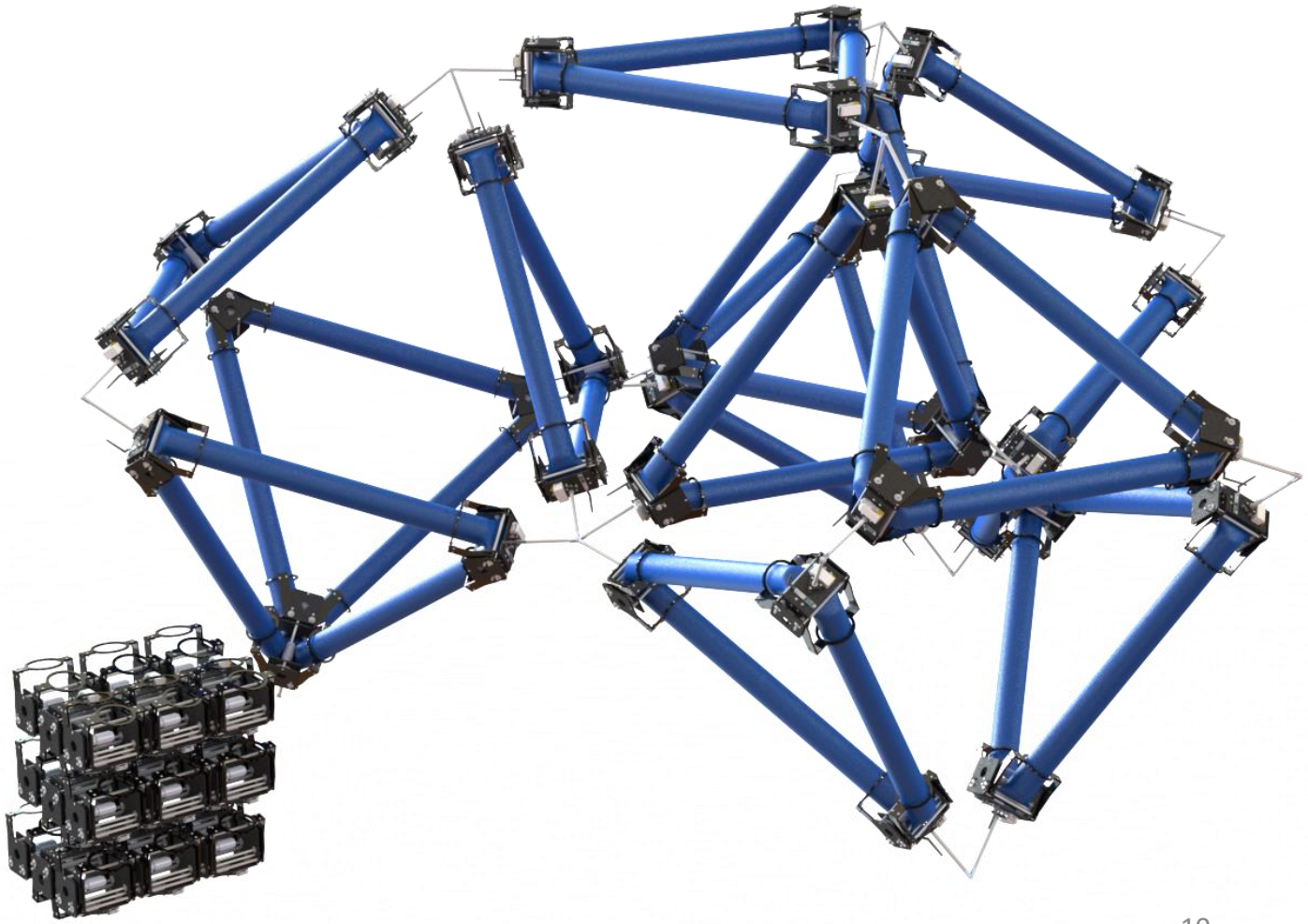
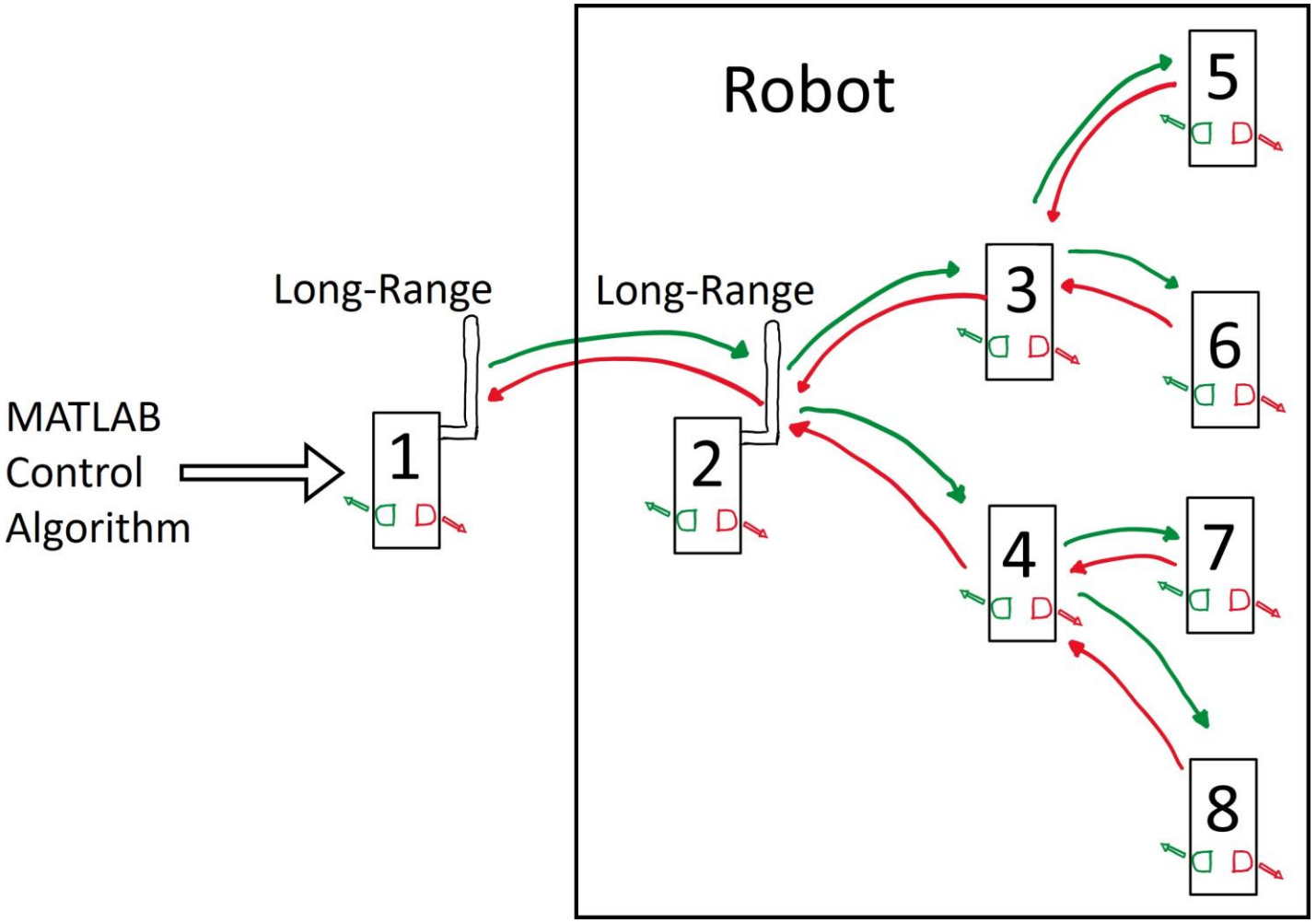


Mechanical Construction





Node Communication

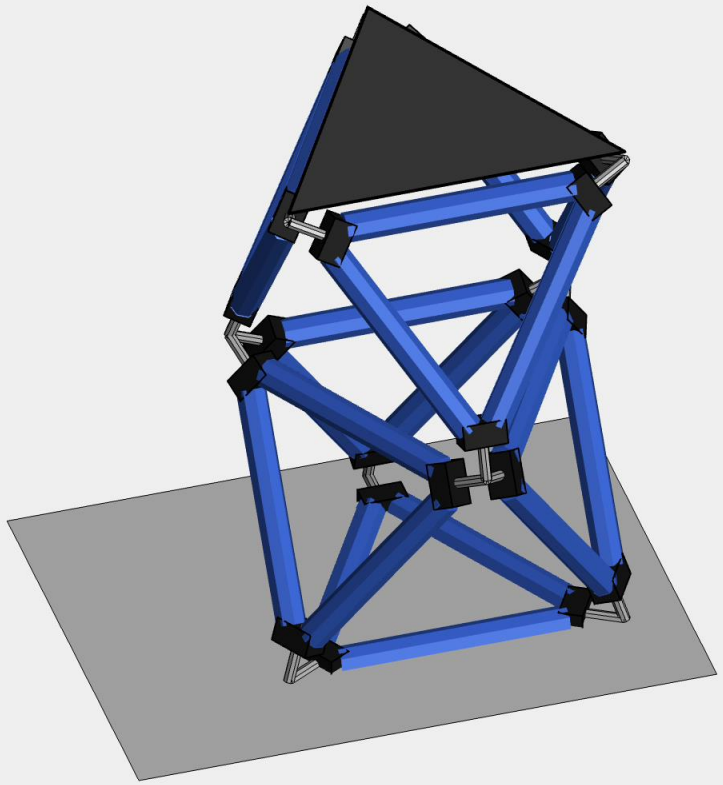


Motion Simulation

Kinematics:

The study of motion with no concern for the forces needed to cause that motion.

Motion Simulation



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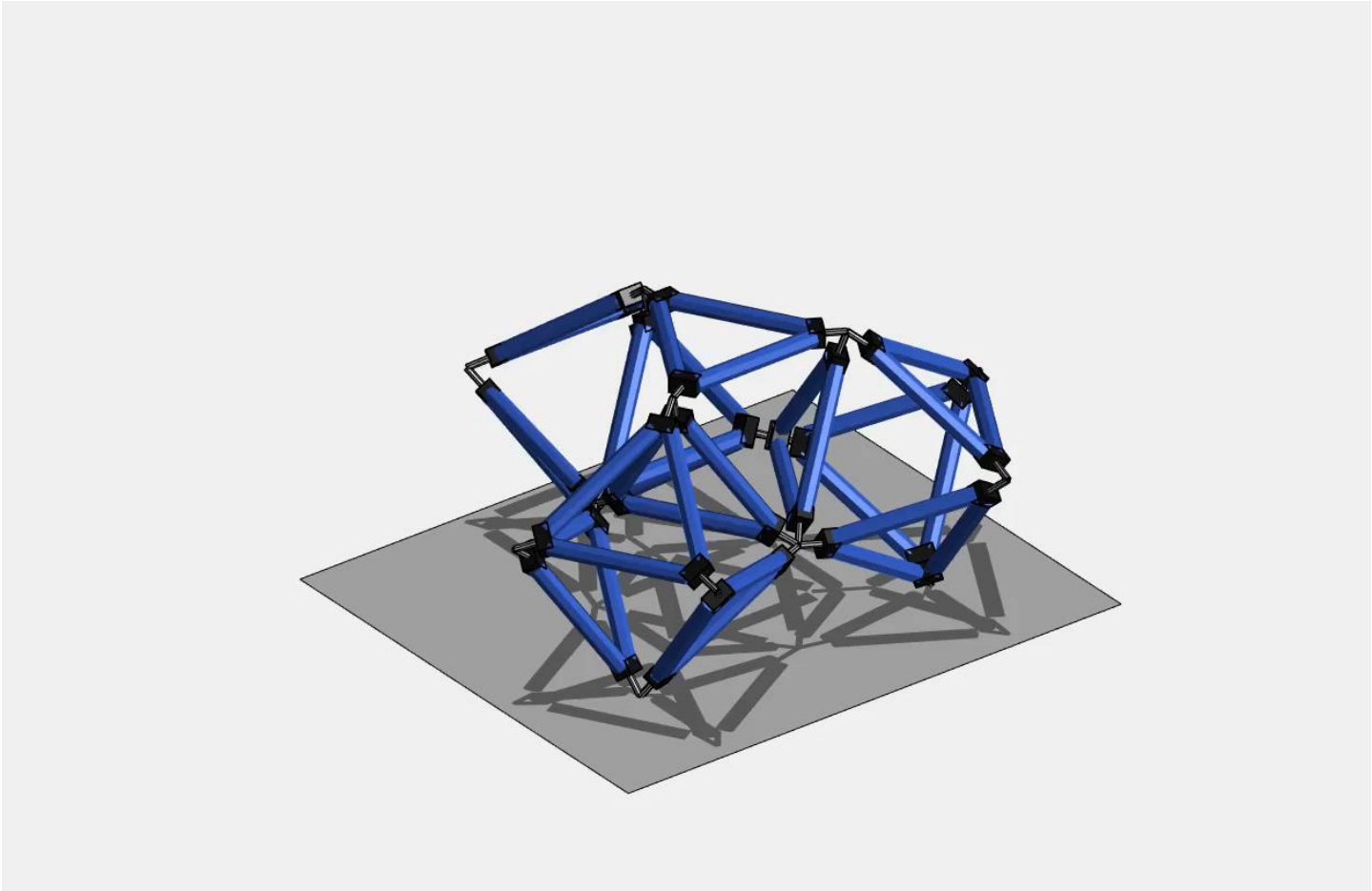

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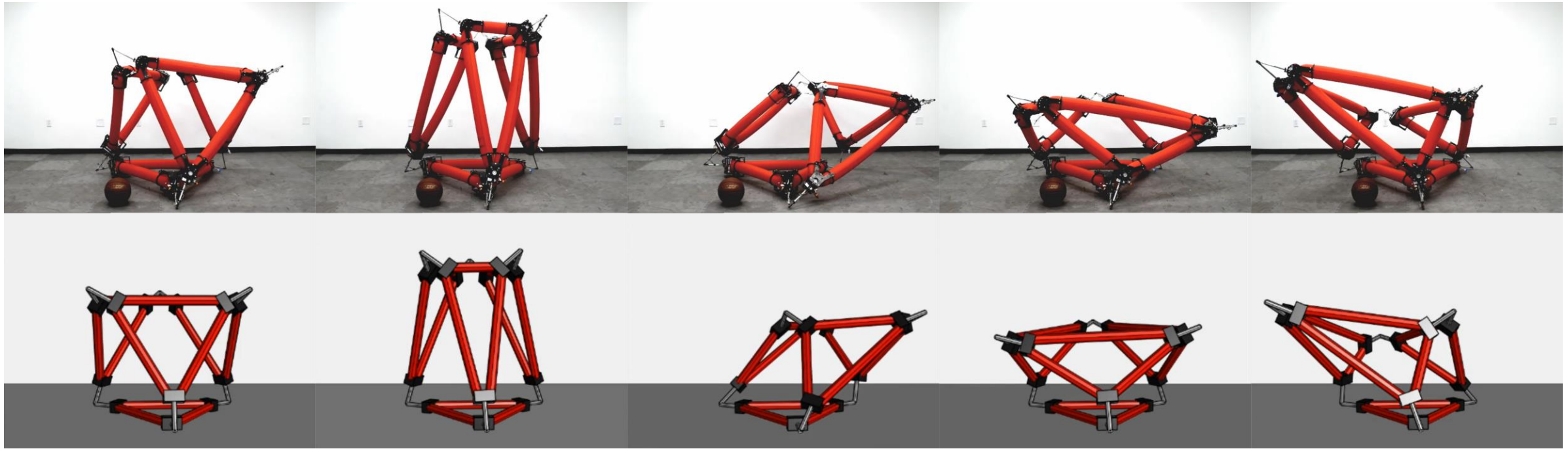

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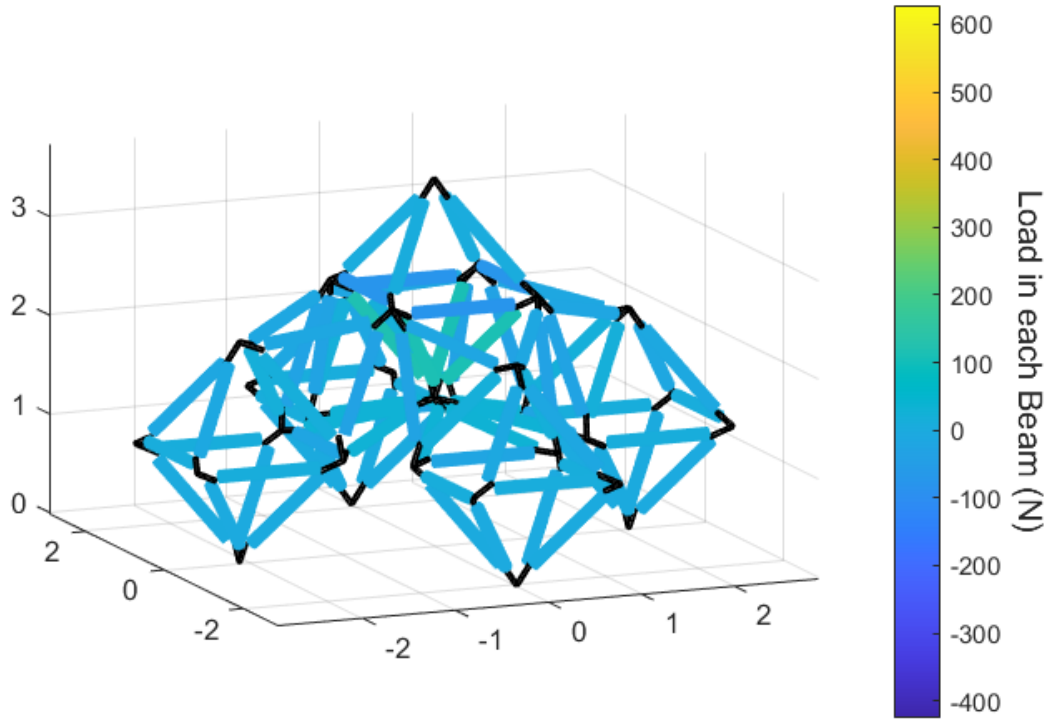
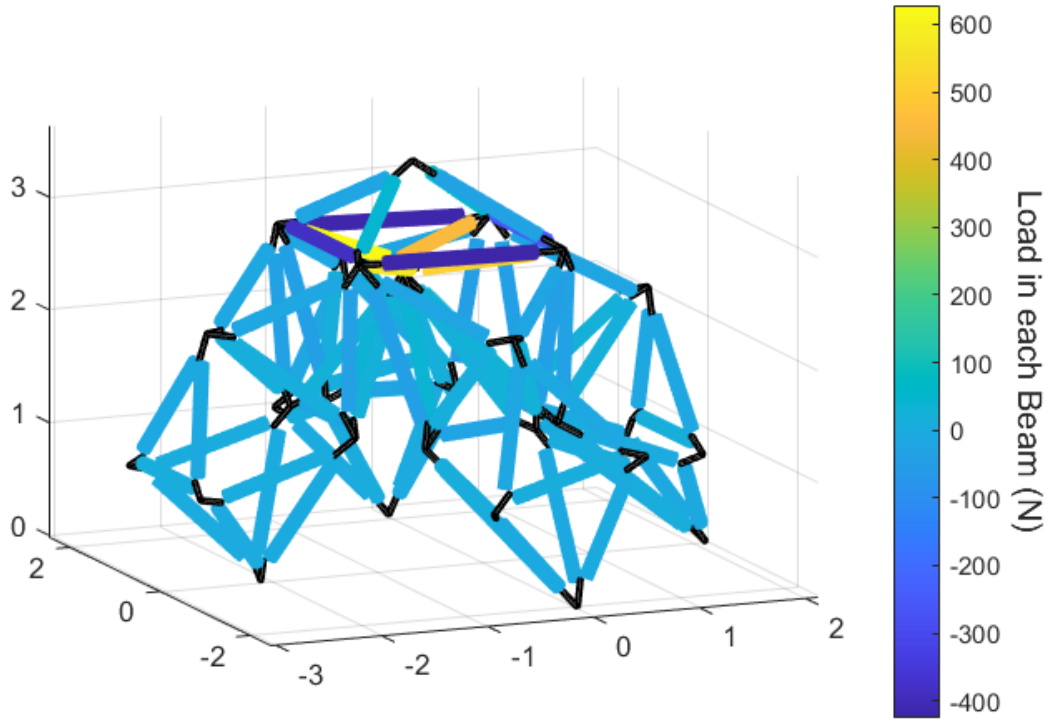
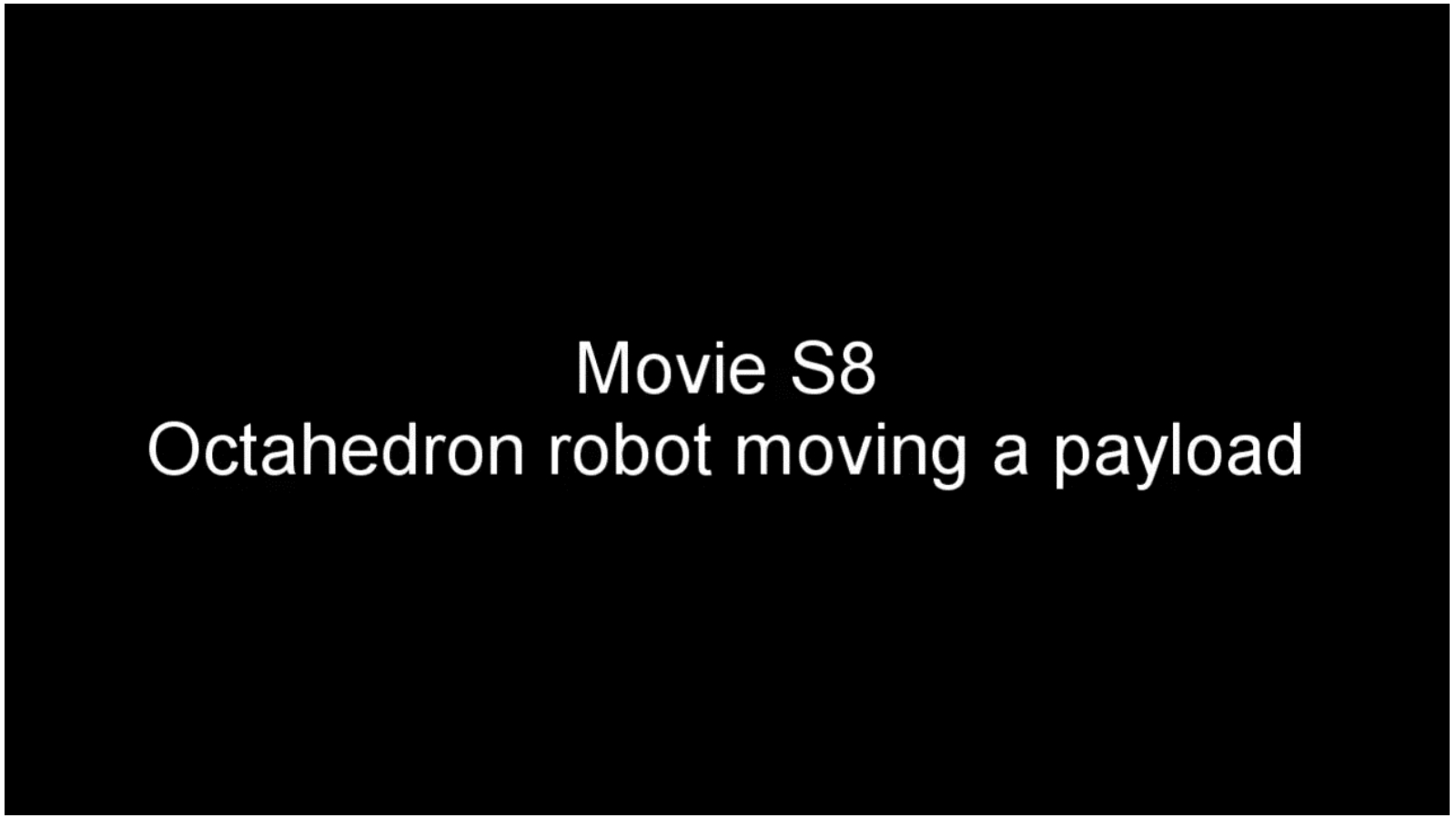




Future Improvements

Future Improvements: Motion Optimization



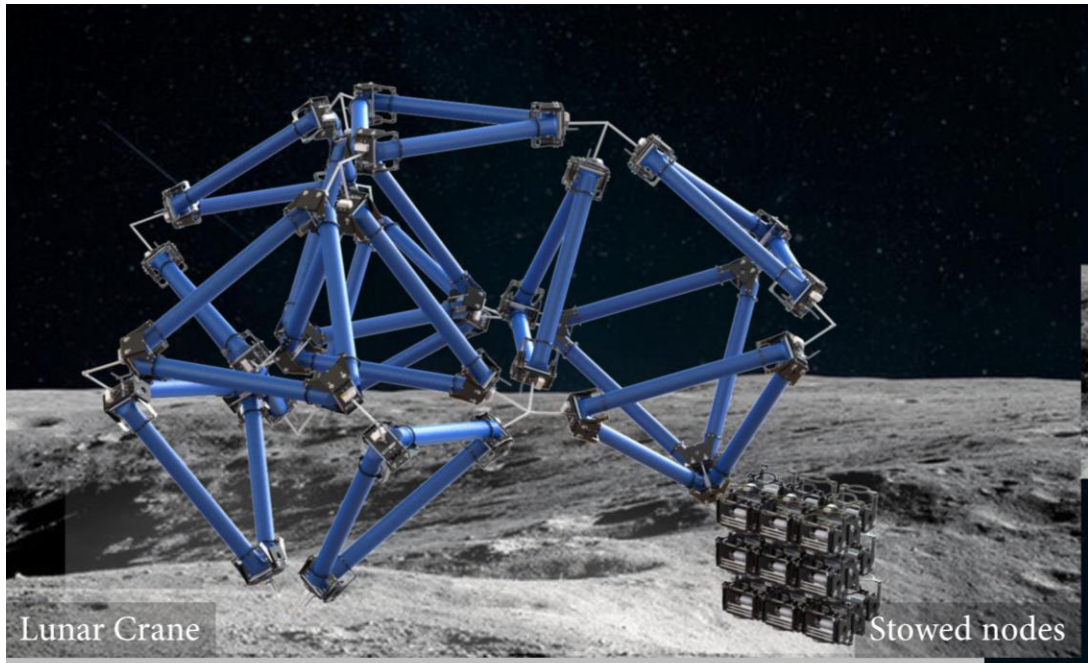
Future Improvements: Environment

Lunar & Earth Environmental Factors:

- Temperature
- Dust
- Gravity
- Radiation
- Punctures

Autoliv Thermal Chamber

Outro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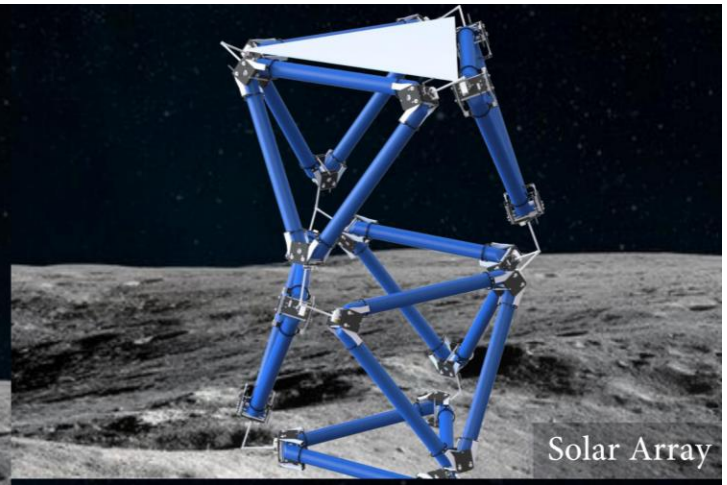
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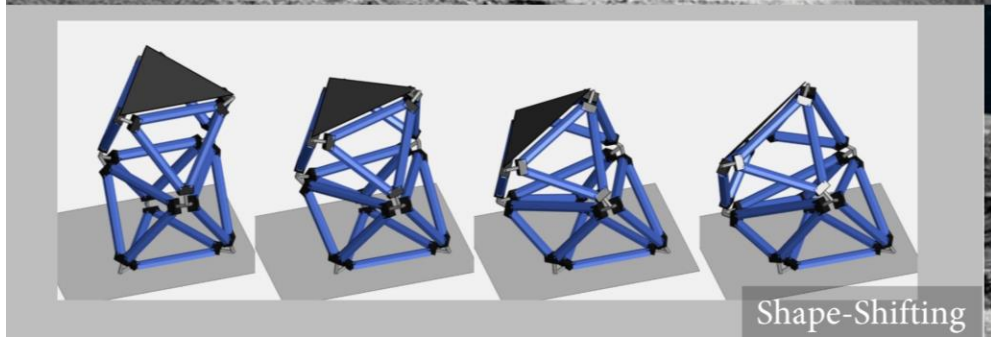
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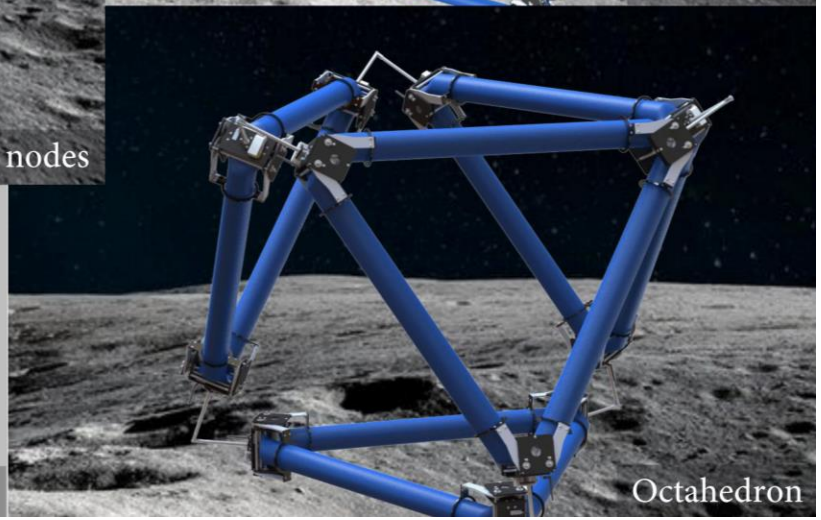
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Questions?