Behavioral Repertoires for Soft Robotics

EAGER:Behavioral Repertoires for Soft Robotics (NSF 1939930)

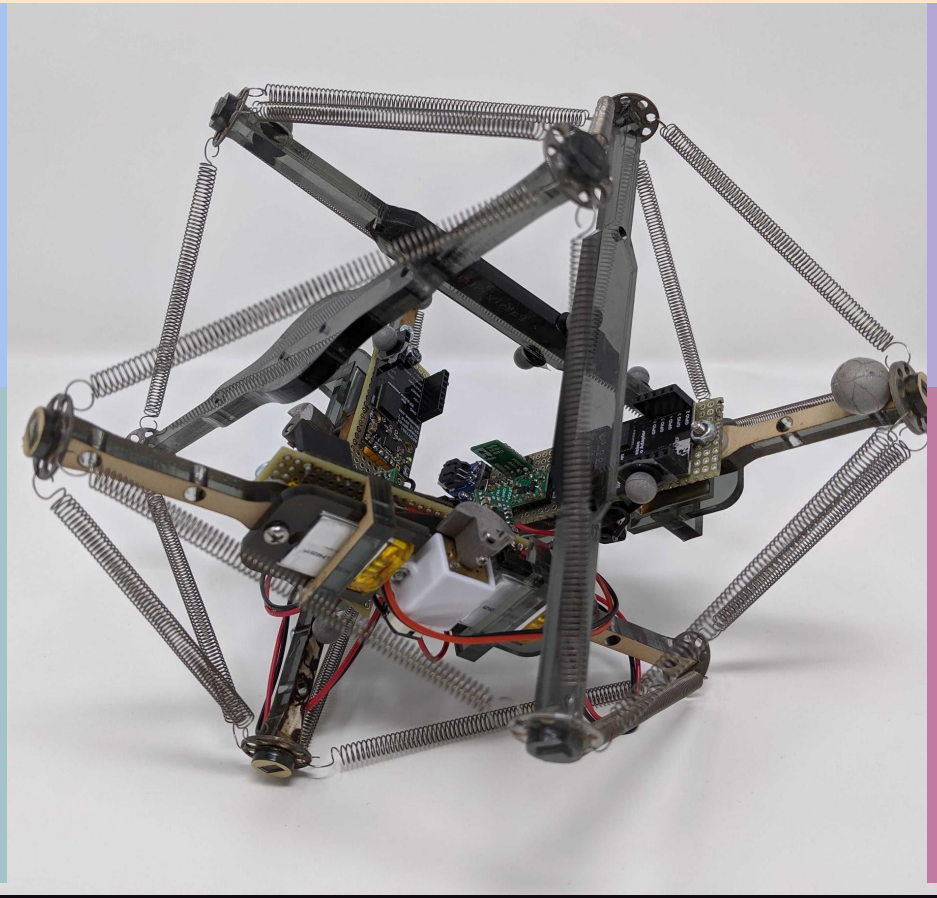
John Rieffel, Union College

Challenge

- Exploring and exploiting the full range of soft robotic dynamical behaviors in a data-efficient manner

Solution

- Novelty-Generating Quality Diversity Algorithms (QDA)
- MoCap
- Tether Free Tensegrity Robot



Scientific Impact

- new methods for complex soft robots to outperform conventional robots across environments, and resiliently adapt to conditions and damage.

Broader Impact

- flexibly respond to natural disasters
- other key national interests
- integrative undergraduate research and training

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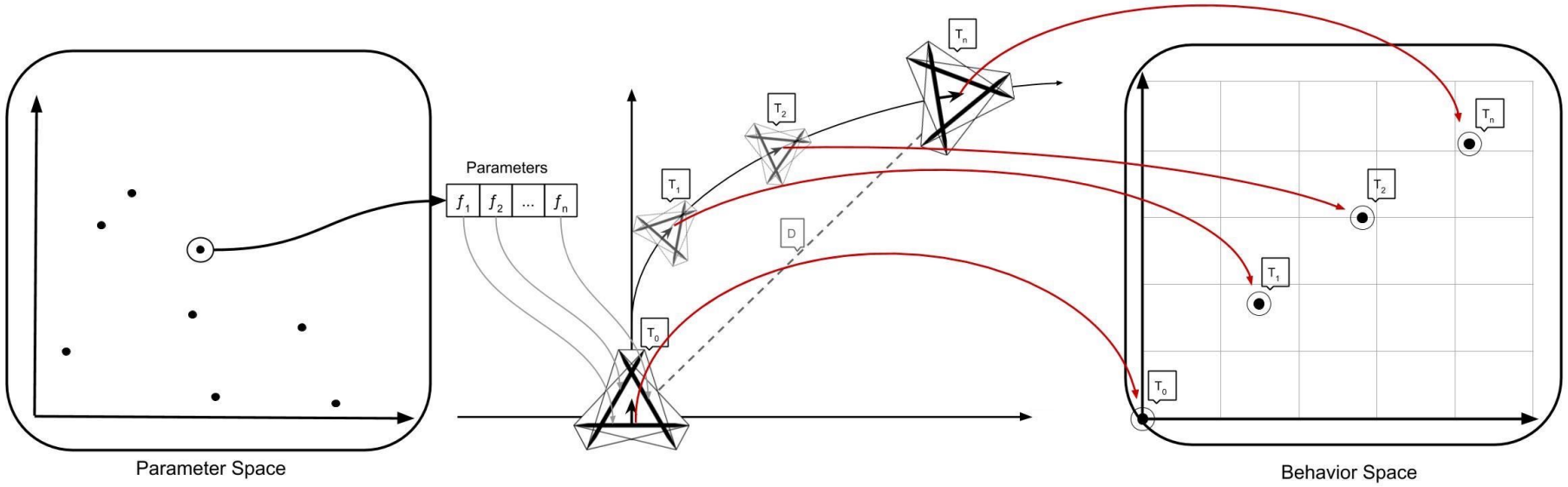

K. Doney, A. Petridou, J. Karaul, A. Khan, G. Liu and J. Rieffel, "Behavioral Repertoires for Soft Tensegrity Robots," *2020 IEEE Symposium Series on Computational Intelligence (SSCI)*, Canberra, ACT, Australia, 2020, pp. 2265-2271, doi: 10.1109/SSCI47803.2020.9308218.

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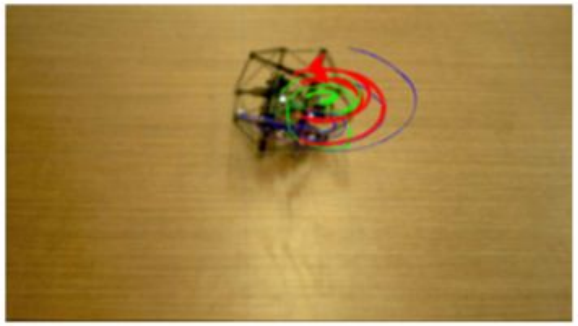
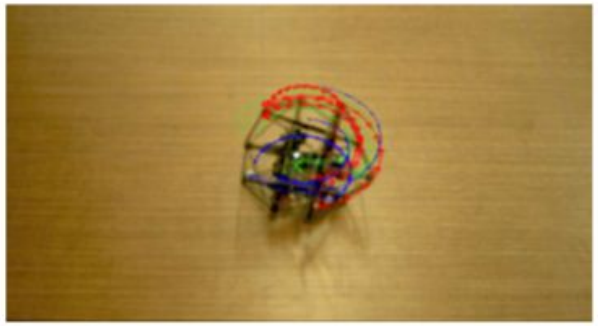
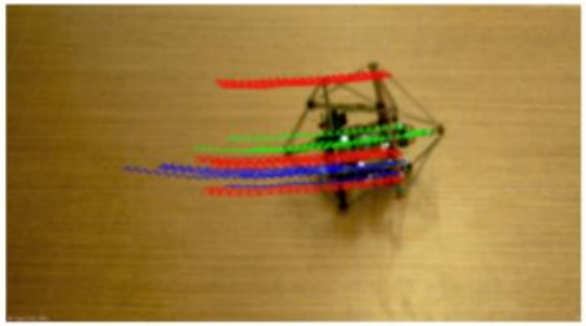
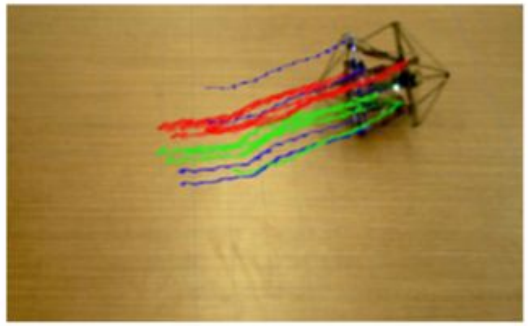
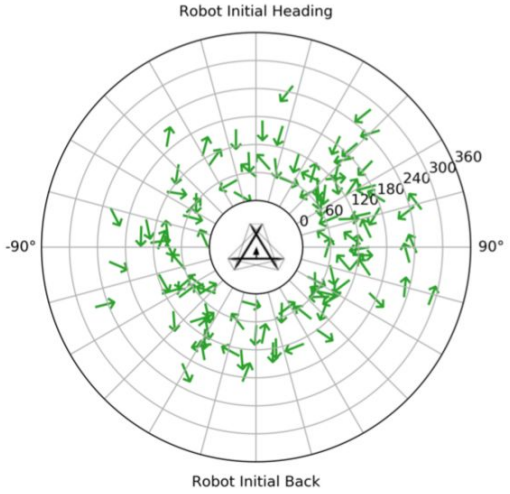
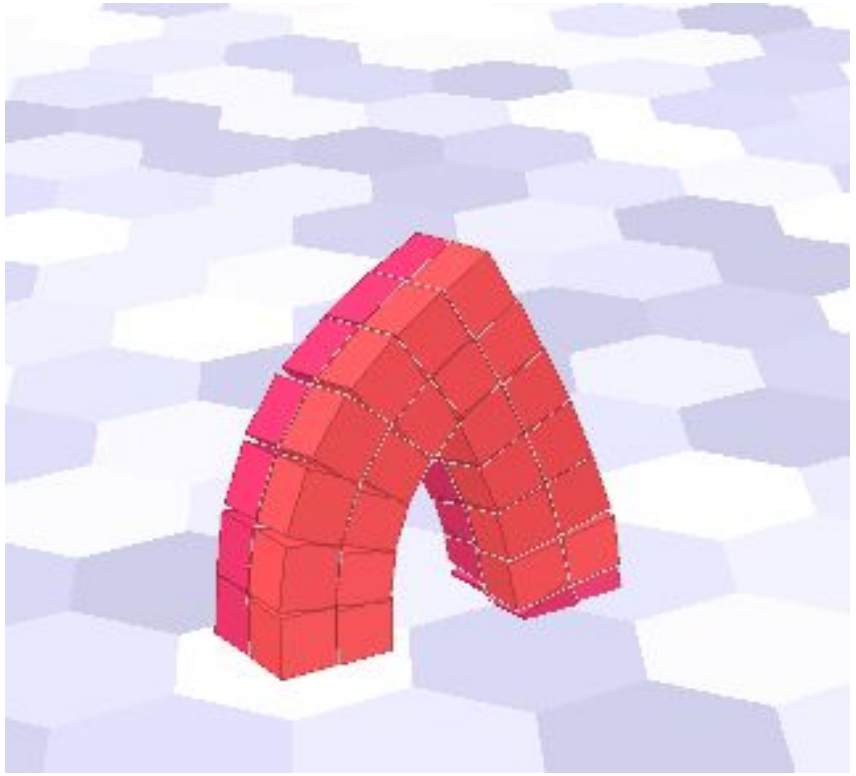







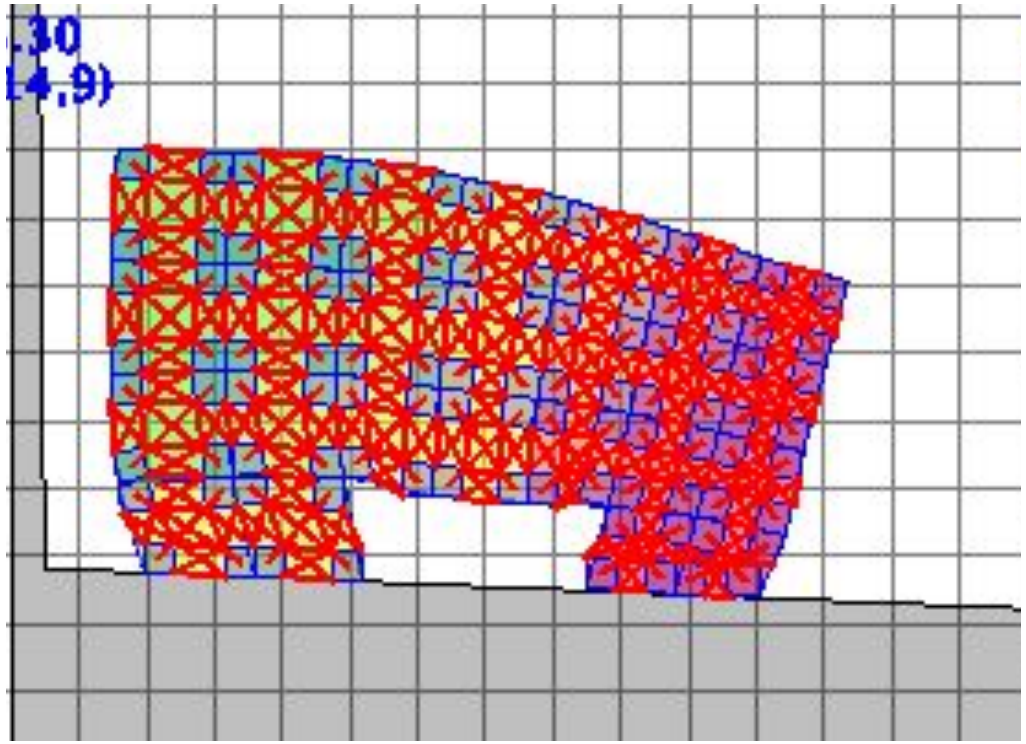
Results:

- 100+ unique behaviors
- high fitness solutions

Current Work: applying QDA to voxel-based soft robots



Voxcraft



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Undergraduate Team:

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- Hyojin Han
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Send us your robots, we'll make 'em move!