

# “Advanced exploration of extraterrestrial objects through shape-changing robots”

Joshua Powers  
University of Vermont  
Morphology, Evolution, and Cognition Lab  
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## Background & Significance

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Rigid robots are the standard for task specific space expeditions. While these robots have been very effective on large planetary surfaces, it is difficult for them to traverse high variability terrain on smaller objects such as asteroids, and Kuiper-belt-like objects. These robots generally fail directly or indirectly due to their weight, size, or non-compliant bodies.

Soft robots have unique characteristics absent from rigid machines: low-mass, compact, highly compliant bodies. Soft robots draw heavily from the way in which living organisms move and adapt to their surroundings. Soft robots also allow for increased flexibility, adaptability, and resilience to damage.

Soft robots also provide a unique capability over rigid machines: the ability to change their shape. As demonstrated in nature, this behavior has several desirable properties, including the ability to enter and operate in a wider range of environments than a fixed-shape organism. As our ability to create shape-changing soft robots improves, they may similarly be able to enter and operate in a growing range of environments.

## Project Goals

# Summary of Key Findings

Describe the key outcome of your work in terms suitable for an educated, but non-expert reader. 300 words maximum.

