

CAREER: Transformable and Reconfigurable Soft Robots

CMMI-2048142, Start date: 9/1/2021, PI Isuru Godage, DePaul University

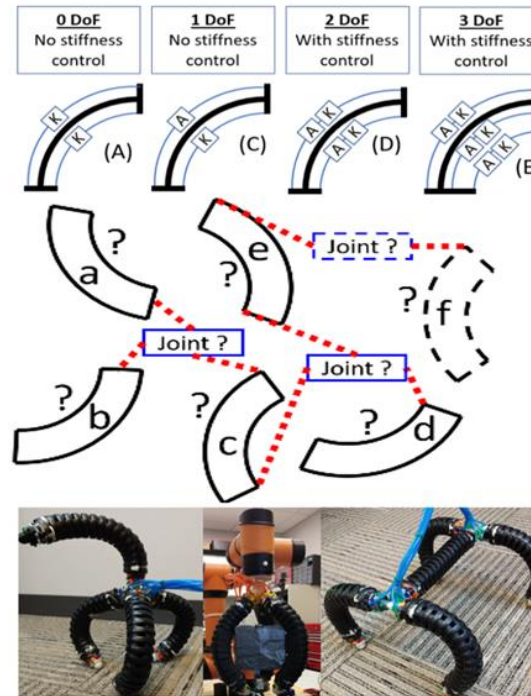
This proposal introduces a novel, systematic approach to optimally configuring simple, heterogeneous, and variable-stiffness soft modules into sophisticated cyber-physical systems to solve complex manipulation and locomotion challenges.

Challenge

- Preconceived design
- Limited actuating DoF
- Fixed topologies

Solution

- Five fundamental soft units
- Varying DoF- deformability - and stiffness
- Topological optimization
- Morphological computing for control.



(top) Schematics of module types, (bottom) Different types of robots constructed from those modules

Scientific Impact

- Reconfigurable soft robots
- Utilize heterogeneity and simplicity
- Novel modeling and control methods

Broader Impact

- UG curriculum development
- Student workshops and summer academies
- Teacher training
- Search and rescue, human-friendly soft co-robots, wearable robots for rehabilitation