

Simulating Compliant 3D Structures

Extensions to PushMePullMe and NASA Tensegrity Robotics Toolkit

CISC499 Projects Supervised by Dorothea Blostein Winter 2017

If you are interested in these projects, email blostein@cs.queensu.ca. Please attach your transcript, or describe your background and courses you have taken.

A [tensegrity](#) structure is a network of isolated components under compression held in place by components under tension. Tensegrity structures are strong and flexible due to the dynamic interplay of tension and compression forces. Tom Flemons' models of [leg](#), [arm](#), [torso](#), [mast](#) demonstrate the ability of relatively simple tensegrity structures to capture complex aspects of force transmission through a human body.

In these 499 projects, students extend existing software platforms in order to support one or more of the following goals:

- Offer simulation support for tensegrity model builder [Tom Flemons](#).
- Simulate cytoskeleton in collaboration with theoretical biologists [Richard and Natalie Gordon](#).
- Investigate machine learning for tensegrity structures. Build on the three-level machine learning framework created by a previous CISC498 group: parameter learning, structure learning, and control learning.

The software platforms we use are [PushMePullMe](#) and the [NASA Tensegrity Robotics Toolkit](#). For more information, visit my home page research.cs.queensu.ca/~blostein