

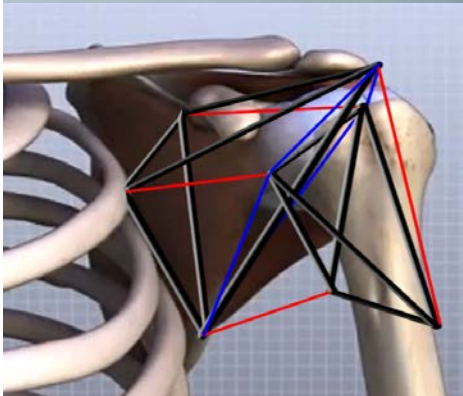
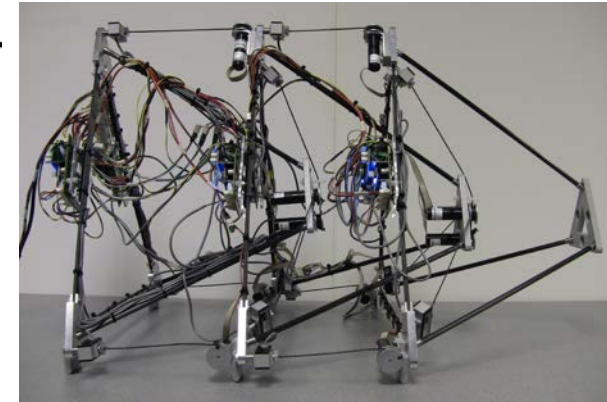
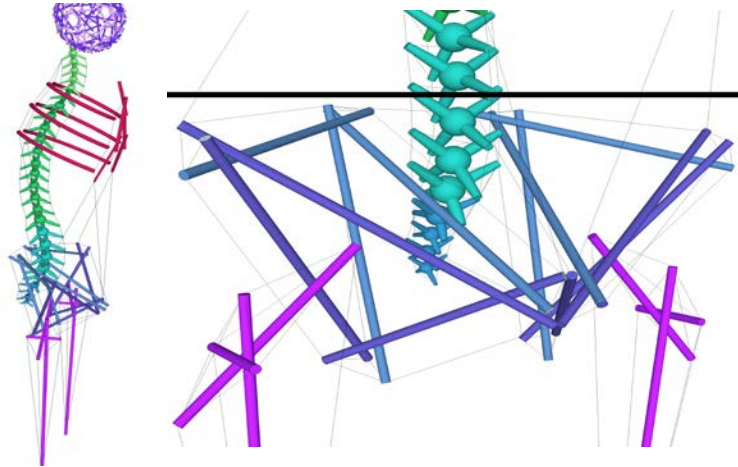
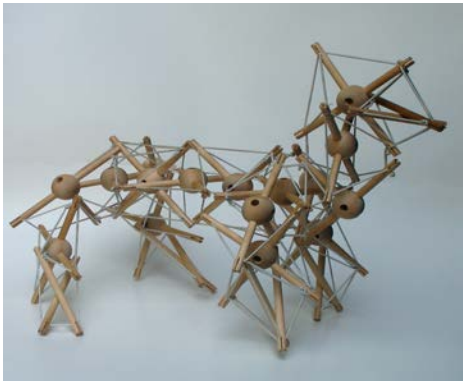
SCORES:
Structurally Compliant Robots for
Extreme Survivability



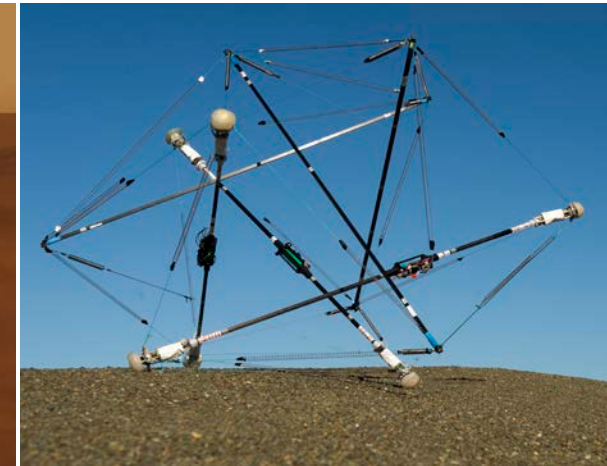
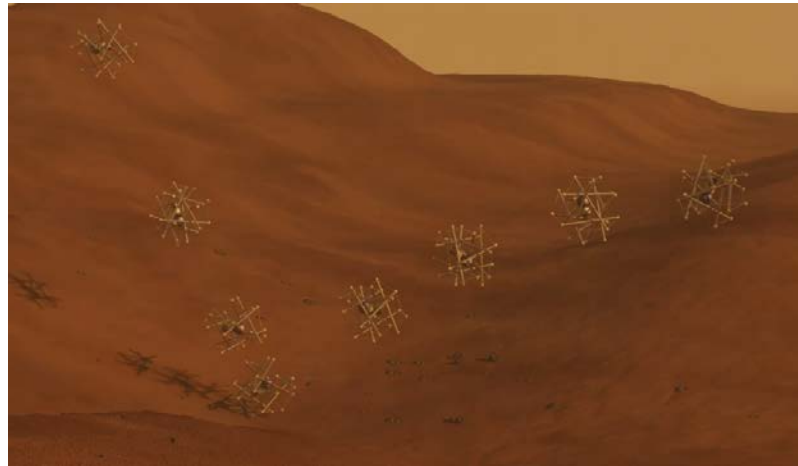
Vytas SunSpiral
Dynamic Tensegrity Robotics Lab
NASA Ames Research Center

SCORES: Structurally Compliant Robots for Extreme Survivability

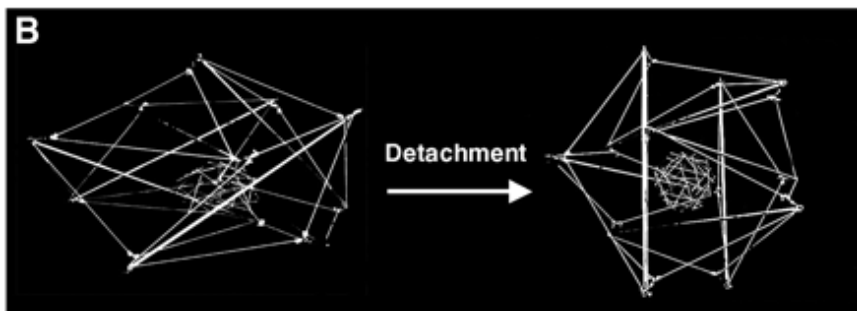
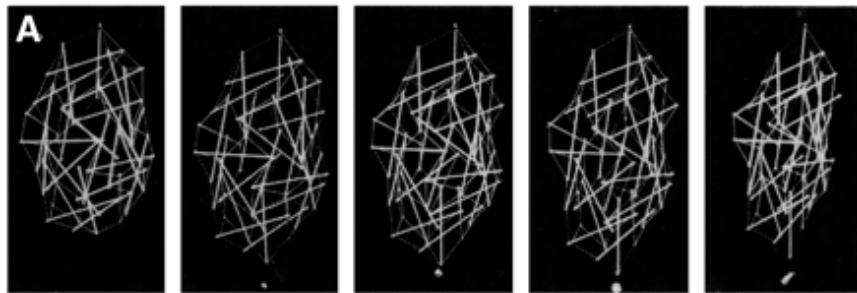
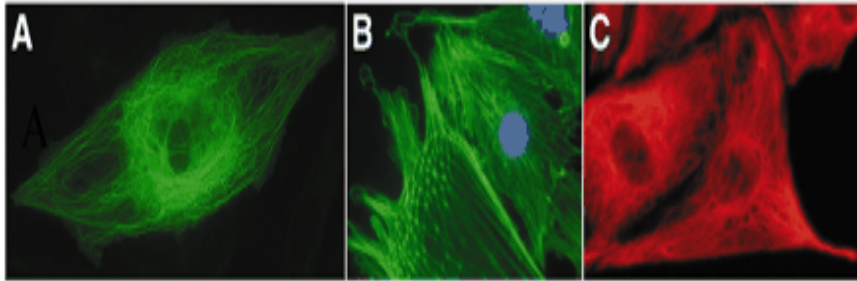
Structurally Compliant Bi-Peds, Quadrupeds, **Spines**, and High-DOF Joints



SUPERball for High-speed Landing and Mobility



Tensegrity and Biology



Copyright 2006 Tom Flemons



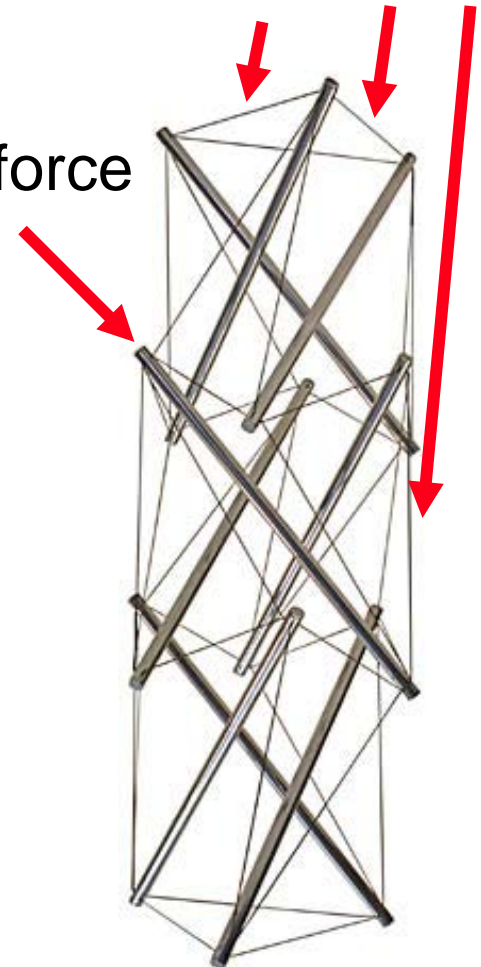
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Tensegrity Force Distribution Properties

- **High Strength to Weight Structure**
- **Minimize points of local weakness**
- **No lever arms to magnify forces**
- **Passive Global Force Distribution**
- **Tunable Structural Stiffness (pre-tension)**

Slight increase in force

Applied force

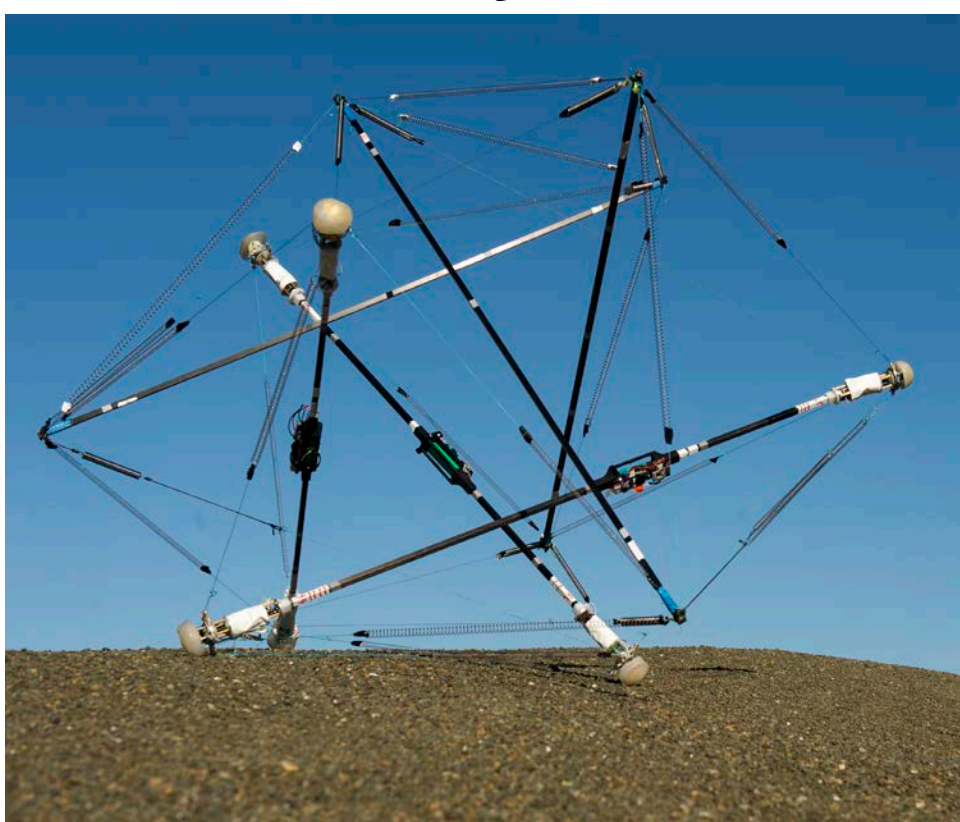


Tensegrity Spines for Powerful and Agile Robots

Dynamic Tensegrity Spines for Powerful and Agile Robots

NASA Innovative Advanced Concepts (NIAC)

Multipurpose Soft Tensegrity Robot Planetary Lander & Surface Locomotion



http://www.sunspiral.org/vytas/cv/TensegrityPhase1_FinalReport.pdf

SUPERball: Landing and Exploration



SUPERball Prototype



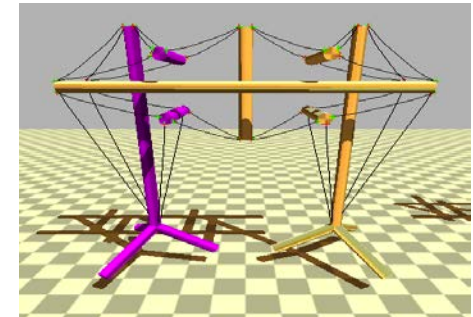
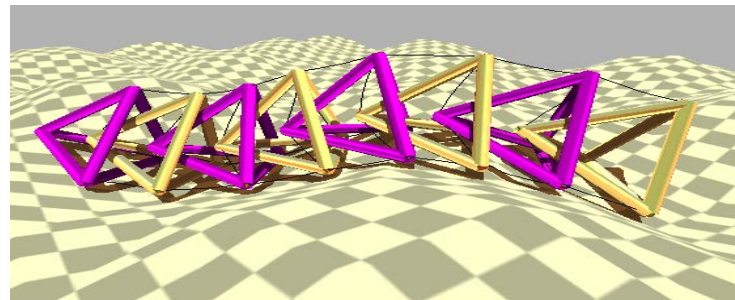
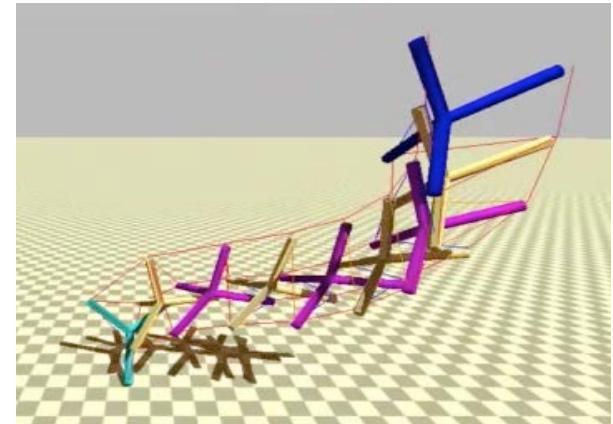
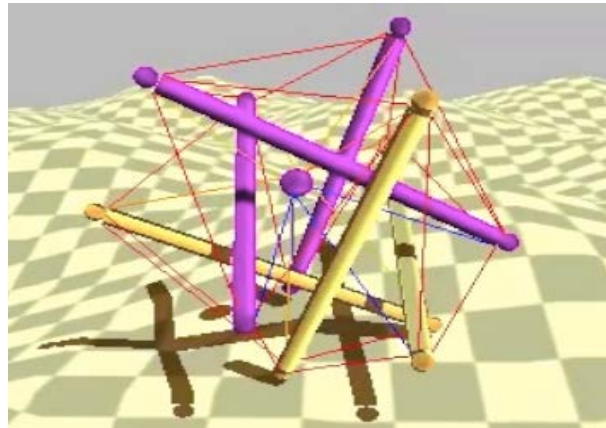
NASA Tensegrity Robotics Toolkit (NTRT)

Just Released as Apache 2 Open Source

Auto-generate CPG network based on robot structure

Integrated machine learning

Full toolchain to explore relationship between structure and locomotion



<http://tinyurl.com/ntrt-sim>

Questions?

Learn More: www.magicalrobot.org



Participate: Vytaas.SunSpiral@nasa.gov