

# Creating Tensegrity Structures in ArtiSynth

CISC499 Project Supervised by Dorothea Blostein  
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The goal of this project is to provide facilities for creating tensegrity structures in ArtiSynth, a public domain Java toolkit for 3D biomechanical modeling. ArtiSynth provides modeling of particles, rigid bodies, finite elements and point-to-point muscles. <http://artisynth.magic.ubc.ca>

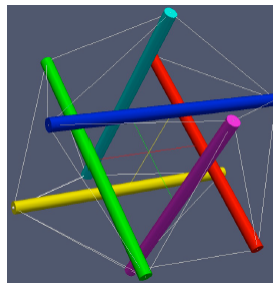
*Tensegrity* (tensional integrity) is a structural principle popularized by Buckminster Fuller: a network of elements under compression is held in place by elements under tension. Tensegrity structures are both strong and flexible due to the dynamic interplay between tension and compression forces. Tensegrity is used in applications such as robotics, biological modeling, art and architecture.

[www.youtube.com/watch?v=uMug6XzP1R4](http://www.youtube.com/watch?v=uMug6XzP1R4) Tensegrity leg

[www.youtube.com/watch?v=wR0AllwEgSE](http://www.youtube.com/watch?v=wR0AllwEgSE) NASA Tensegrity robotics

Suggested steps in this project:

1. Familiarize yourself with ArtiSynth. Study the tutorials and examples to learn the Java format used to define a structure as a collection of components such as rigid bodies and springs.
2. Write the Java code to create some sample tensegrity structures in ArtiSynth. Begin with the tensegrity sphere: six struts and 24 cables arranged as shown below.



3. Design and implement a tool to make it easy for a non-programmer to create tensegrity structures in ArtiSynth. One approach is to have the end user write a textual description of the connectivity of a tensegrity structure; you provide a tool to translate this text format to Java code in ArtiSynth format.
4. If time permits, make a conversion tool for sharing tensegrity models between ArtiSynth and the NASA Tensegrity Robotics Toolkit (NTRT).

[ti.arc.nasa.gov/tech/asr/intelligent-robotics/tensegrity/ntrt](http://ti.arc.nasa.gov/tech/asr/intelligent-robotics/tensegrity/ntrt)

You can consult with the three CISC498 students working on an NTRT related project this year.