

# The Design and Construction of a Novel Variable-Geometry Snake-like Input Device

Avinash Baskaran and Robert L. Read, PhD

## Abstract

Humans are skillful. By building a bio-inspired manipulable snake-like controller that can be molded into a wide variety of shapes, we allow a human controller to telepresently specify complex shapes and shape changes. We constructed a tetrahelix consisting of seven tetrahedron made of adjustable-length members connected via 3D printed Song-Kwon-Kim joints which allow manual changes to the shape of the controller. These changes in length are digitized and organized via an Arduino and transmitted to more power computers where they may specify a shape to be animated or control a robot of similar shape, or simply specify relative positions in Cartesian space. Although this research is basic, we hope it will eventually amplify human control of in vivo mechanical devices such as endoscopes, search-and-rescue robots weaseling into tight spaces, or general purpose tetrobots used for planetary space exploration as suggested by Prof. Sanderson and his students 20 years ago.

