Development of a reversed Twisted String Actuator (TSA)

The Institut für Medizingerätetechnik is investigating low cost Twisted String Actuators (TSA). TSA work by using a low torque DC motor to twist a string to produce a high linear force. However, using this same concept to produce rotational motion has not been investigated. Therefore, this project is focused on creating a rotational TSA. A linear drive will be used with a pre-twisted string to create rotational motion. A simple 3D printed apparatus should be designed and built to prove the concept. In particular, the rotational TSA should produce 180 deg of rotational motion with 5 Nm torque. The final prototype will be evaluated by its ability to lift masses attached to the rotational disc.

The main points to be addressed are:

- Rearrangement of previously published TSA equations to derive rotational TSA equations, and determine required system dynamics.
- Literature search of low cost linear drive technology and selection of appropriate linear drive.
- Concept design and evaluation of linear drive and rotational disc configuration.
- Design and build of simple rotational TSA apparatus.
- Evaluation of apparatuses performance using masses.

Supervision will be provided in English by a native English speaker (From New Zealand). As a result, the thesis should also be written in English.