

# BME464L Project (Fall 2013, Palmeri)

## Soft Tissue-Mimicking Phantom Rotation Controller

### Research Problem

Medical imaging research is performed on soft tissue-mimicking materials during the research and development process to avoid the overhead and complexities introduced with *ex vivo* and *in vivo* studies. Gelatin-based phantoms with micron-size scattering particles are commonly used in ultrasound and CT imaging to mimic soft tissues [1]. During the fabrication of these phantoms, the gelatin mixture must be rotated at a constant, prescribed rate for a specified amount of time to insure that a uniform distribution of scattering particles is achieved during the crosslinking process.

### Project Objective

Design a microcontroller-based device that interfaces with a DC gear motor that allows a user to specify the rate of rotation as a function of time over a specified temporal range. The device should also allow for emergent cessation of rotation when excessive resistance is encountered by the rotation apparatus and the ability to notify a user when rotation is complete or has been aborted. This project can also involve the mechanical design and fabrication of the rotation transmission mechanism and phantom holding apparatus.

### Clinical Contact

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### References

- [1] Hall et al. "Phantom Materials for Elastography", IEEE Transactions on Ultrasonics, 1997