MAE MEng Design Project Announcement Template - 16-17 AY, KPetersen 7

Brief Description of Design Project Goals:
Overview:
Soft robots have recently gained a lot of interest because of their potential applications in safe human-robot interaction, versatile manipulation abilities, and robust operation in unstructured environments. We are exploring several aspects of these soft robots including the potential for untethered small-scale soft robots, implementation of sensors in soft robots, and underwater soft robots.

Specific MEng Contribution:
Electro-Conjugate fluids have been shown to jet in electric fields, and this has led to implementations of several relatively soft robots. These robots all rely on a rigid ring and needle mechanism to produce the asymmetric electric field that cause the fluid to jet and corresponding pressure build-up to deform the soft robots. We will attempt to create a similar jet using soft electrodes embedded directly in polymer. Not only may these mechanisms be completely soft, they will be less expensive and easier to fabricate, and we may introduce procedures to cast many in parallel. Time permitting we may also explore combination with hyperelastic materials for amplified deformations. Weekly meetings will be held to assure progress of the project.

ECE Field Advisor Name:

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Project Web Site:
http://cei.ece.cornell.edu/research-2/soft-robot-actuators/
Number of MEng Students Needed:
2
Required Skills:
Smart, motivated, and creative students interested in robotics and practical implementations. Students must have experience in Solidworks CAD design software, rapid prototyping, and Matlab. Experience in modeling of electric fields, fluid dynamics, polymers, or molding and casting would be beneficial.
Estimated Project Time Frame:
2016-17 Academic Year, Two (2) Semesters