A Large Strain, Arrayable Piezoelectric Microcellular Actuator

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To provide a competitive actuating solution, micro-electromechanical-systems (MEMS)-based actuators need low operating power and form factors. Piezoelectrics provide substantially higher work-output/volume for a given voltage, when compared to other actuating solutions. A bow amplifier constructed of SU-8 beams and short length flexural pivots has been designed [1] and has demonstrated an amplification ratio of greater than 10:1. Current research focuses on increasing this amplification ratio and achieving the goal of 10% axial strain, while reducing parasitic out-of-plane bending inherent in the current fabrication process.

The overall goal of this project is to array one such actuator massively in series and in parallel in order to create a macro-scale, muscle-like actuator. Such a device would have widespread applications in mobile robotics, medicine, and aero/astronautics, where low power, high efficiency, and small form factors might be required.

**REFERENCES**