

- 1. Research Title: Flexible Electronics for Responsive Structures and Sensors**
- 2. Individual Sponsor:**

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- 3. Academic Area/Field and Education Level**

Chemistry, Chemical Engineering, Polymer Science and Engineering, Materials Science, Mechanical Engineering, Electrical Engineering (BA/BS, MS or Ph.D. level)

- 4. Objectives:** Processing, packaging, and integration of flexible/stretchable conductors for architected responsive constructs and physiologically relevant components
- 5. Description:** An opportunity exists to perform research that integrates stretchable electronics into physically deformable structures in order to monitor and report physical deformations through responsive electrical performance. A range of possible material sets which could be utilized to achieve explore this area include but are not limited to nanoparticle / elastomer composites, liquid metal conductors, and intrinsically conductive organic polymers. The research project would likely consist of a combination of materials synthesis exploration, advanced processing such as multi-material additive manufacturing to generate novel integrated designs, and mechanical testing of fabricated devices with in-line, real time electrical characterization. The use and testing of these materials and developed components as would be one natural outcome or application space of this work. Natural outcomes of this research would be to develop new materials, integration strategies, and design protocols that could be implemented to generate novel mechanical/electrical functionality to report physical changes in structure, enable machine-logic based operation, tissue interfacing electrodes for physiological monitoring and / or textile integrated electronic circuitry.
- 6. Research Classification/Restrictions:** This research is unclassified with the goal of publication in the open literature, however the general research area is Distribution D