Flex Lab Research Seminar
Thursday, April 13, 2023
3:30 to 4:30pm
Flex B038

Guest Speaker: Vahid Tac

Physics-Constrained Data-Driven Modeling of the Mechanical Behavior of Soft Materials

Description:
Some applications in the frontiers of modern science and engineering such as personalized surgery and soft robotics necessitate development of accurate mathematical descriptor of material mechanical behavior. The materials in these applications such as soft tissue and rubber exhibit an extremely nonlinear behavior and routinely undergo large deformations. This complicates efforts for the development of constitutive material models for such materials. We use machine learning to develop constitutive material models to describe the behavior of soft materials, but in a way that physics-based constraints are satisfied a priori. This presentation is a summary of two different approaches for physics-constrained data-driven modeling of hyperelasticity and a physics-constrained model of viscoelasticity.