The mechanical function of the cervix becomes crucial during pregnancy when it resists the compressive and tensile forces generated from the growing fetus. Premature cervical remodeling and accelerated tissue softening is hypothesized to cause early cervical dilation leading to extremely premature birth. The overall goal of our group is to understand the process of cervical tissue remodeling and the corresponding material properties of the cervix during pregnancy. In this talk, cervical tissue remodeling will be described through investigating the mechanical and biochemical properties of \textit{ex vivo} cervical tissue specimens. A material model will be presented that accounts for the anisotropy of cervical collagen fibers, and possible remodeling relationships will be presented as a function of the tissue’s biochemical composition. Finally, a 3-D finite element model of pregnancy derived from MRI data will be presented to evaluate the mechanical performance of the cervix during pregnancy.