

Fall 2021 Department of Chemical and Biological Engineering Seminar Series

H. M. Comer 1026

11:00-11:50AM

Dr. Mary Kathryn Sewell-Loftin
University of Alabama at Birmingham*Micromechanical Forces in the Tumor Microenvironment*

Abstract: The tumor microenvironment (TME) is a complicated milieu of both mechanical cues and biochemical signaling that act in concert to drive tumor growth, angiogenesis, and responses to chemotherapies. Investigating the interaction of such biomechanical and soluble factors is a challenging prospect, with many current models providing limited control over the parameters or being incompatible for performing real-time analyses. Our lab is focused on using novel microtissue systems that leverage independent control over multiple biomechanical factors to enhance the understanding of how mechanobiology may be used to target, treat, or prevent cancer progression. These systems utilize microfluidic devices that permit real-time, live cell studies to investigate tumor cell migration and tumor-associated angiogenesis. Our early work demonstrated that cancer-associated fibroblasts (CAFs) drive angiogenesis in a 3D microtissue through mechanical perturbations generated in the matrix through actin-myosin contractile mechanisms; the mechanically-driven angiogenesis was shown to be at least partially independent of soluble growth factors, including Vascular Endothelial Growth Factor (VEGF). Ongoing work in the lab is related to investigating mechanoreceptors on tumor-associated blood vessels, breast cancer metastasis, and ovarian cancer mechanobiology in chemoresistance mechanisms. Our lab studies the interface of cancer biology and bioengineering to improve our fundamental understanding of the TME and potentially develop novel therapeutic strategies.

Bio: Dr. Sewell-Loftin was born and raised in Birmingham, Alabama. She received her Bachelor's and Master's degrees in Chemical Engineering from the University of Alabama. In 2014, she completed her Ph.D. in Biomedical Engineering at Vanderbilt University. Afterwards, she move to St. Louis, MO, while working as a post-doctoral researcher at both the Department of Biomedical Engineering at Washington University in St. Louis and in the Internal Medicine Department in the School of Medicine. During her early research career, Sewell-Loftin focused on studying biomaterials and the mechanobiology of developing heart valves. More recently, her work has focused on characterizing biomechanical behaviors of the tumor microenvironment that drive cancer progression and angiogenesis. In her spare time, Dr. Sewell-Loftin enjoys Broadway musicals and singing in a capella performing groups. She resides in Mountain Brook with her husband, Christopher, and her cat, Leopold.