Special Colloquium

UCR

Mathematics

Department

DR. KATARZYNA REJNIAK

H. LEE MOFFITT CANCER CENTER & RESEARCH INSTITUTE

"TRANSPORT PHENOMENA IN CANCER DEVELOPMENT AND TREATMENT"

The life-threatening progression of cancer is inextricably linked to transport phenomena. Metastatic spread—the main cause of cancer-related deaths—requires cancer cells to invade and move through the surrounding tissue, travel via the blood or lymphatic circulation system, and to migrate toward and colonize the distant organs. Similarly, chemo-, immuno- or hormone therapies relay on the success of both intravenous and extracellular transports to be effective. In this talk I will discuss mathematical modeling approaches based on the fluid-structure interaction techniques that can capture and test these transport phenomena. I will use the immersed boundary method to address mechanobiological questions related to circulating tumor cells in the blood system, and the regularized Stokeslet method to focus on the microenvironment-driven microscale pharmacology. These mathematical models were based on experimental data acquired from biomedical imaging, such as immunohistochemical staining, bright field or confocal fluorescent microscopy, and I will present how such data were used for model calibration. The model results show that the insight provided by mathematical modeling integrated with experimental data can improve our understanding of the mechanical properties of cancer cells and tissues and can contribute to the development of better anti-cancer treatments.

Wednesday, March 1st, 2017

Tea Time @ 2:40 p.m. in Surge 282

Talk Begins @ 3:10 p.m. in Surge 284

Ends @ 4:00 p.m.

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