NOVA SOUTHEASTERN UNIVERSITY | NSU Florida

MATHEMATICS COLLOQUIUM SERIES Hosted by the Department of Mathematics

Time: Friday, October 18th, 2019, 12:05-12:55pm

Place: Parker Building, Room 301

Speaker: Peng Feng, Professor of Mathematics

Florida Gulf Coast University, Fort Myers

Title: How Mathematics Can Help Winning the War Against Cancer?

Abstract: In this talk, I will present a few mathematical models that aims to understand how our immune system interact with cancer cells. In particular, we focus on a model that studies the role or regulatory T cells. Recent advance in the field of regulatory T cell reveals that it plays a vital role during immunotherapy. For example, a higher ratio between regulatory T cells and effector T cells within tumor tissue is associated with worse prognoses in many cancers, including ovarian cancer (Leffers et al., 2009), lung cancer (Tao et al., 2012), glioblastoma (Sayour et al., 2015). On the other hand, the tug war between regulatory T cells and effector T cells for interleukin-2 may chisel immune response against cancer. In this talk, we demonstrate mathematically, for the first time, that the initial ratio between regulatory T cells and effector T cells does impact the tumor recurrence time. We also demonstrate the effectiveness of utilization of IL-2 may flip the outcome of immunotherapy, providing further evidence that it may be clinically viable to modulate the consumption of IL-2 by Tregs.

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