1125-92-1251 **Kang-Ling Liao*** (kangling325@gmail.com), **Xue-Feng Bai** (xue-feng.bai@osumc.edu) and **Avner Friedman** (afriedman@math.osu.edu). *Mathematical modeling of anti-PD-1 and IL-27 synergy in cancer immunotherapy.*

Anti-PD-1 drug is showing promise in clinical trials of cancer treatment, and some have already received FDA approval. There is the expectation that these drugs will transform the landscape of cancer treatment. Combining the anti-PD-1 with an immunotherapeutic drug achieve significantly better results than by the immunotherapeutic drug alone. An important question is how much of an improvement is actually achieved by anti-PD-1. In this talk, I will talk about this question by a mathematical model, where we focus on a specific immunotherapeutic drug, IL-27. Our simulations show that in combination therapy, the efficacy of the treatment depends nonlinearly on IL-27 and anti-PD-1. For any amount of IL-27, increasing anti-PD-1 always increases the tumor reduction. On the other hand, it is not always true that increasing IL-27 increases the tumor reduction. If the amount of anti-PD-1 is smaller than a certain value, there exists a critical value of IL-27 such that the following holds: (i) If the amount of IL-27 is smaller than the critical value, then increasing IL-27 increases the tumor reduction. (ii) If IL-27 is larger than the critical value, then increasing IL-27 decreases the tumor reduction; this occurrence is result of the complex role that IL-27 plays as an anti-tumor drug. (Received September 15, 2016)