Bio: Dr. Yoon is a postdoctoral research fellow in the Department of Hematology and Oncology Research at the Cleveland Clinic, and soon to be an assistant professor in the Department of Mathematics and Computer Science at Adelphi University. Her research interest is mathematical modeling of biological phenomena. In particular, focused on two human diseases (cancer and schistosomiasis) and their controls. She went to Ewha Womans University in South Korea for her B.S. and M.S. degrees, and to Case Western Reserve University for her PhD degree.

Abstract: Cancer treatments, including drug therapies, eventually fail due to the resistance induced by the treatments. In this talk, I will discuss several recent projects about drug resistance. In one project, we explored the underlying process of resistance development. It has been conventionally assumed that the evolution of tumor cells (from sensitive to resistant types) occur by a single process of ‘driver’ mutation. However, our experimental data and modeling study do not support this. Instead, we have observed that the effect of the drug seems to change cell types gradually over time. I will talk about this new hypothesis, along with the utilized data, model, and analysis. Another topic of interest is effective drug regimens that could prevent or mitigate the onset of resistance. We have focused on sequential application of drugs where resistance to one drug induces sensitivity to another drug, a concept called collateral sensitivity. Based on drug cycles linked by the relationships of collateral sensitivity, we have (i) built a mathematical model, (ii) found the optimal way to switch drugs, and (iii) analyzed clinical meaning and implementation of our optimal therapy, all of which will be discussed in the talk.

Refreshments at 2:30pm in RT 1517