1125-92-2138   **Meghan Stevens*** (`meghan.stevens@drake.edu`), **Arden Baxter**, **Kristen Abernathy** and **Zachary Abernathy**. *Global Dynamics of a Breast Cancer Competition System.* Preliminary report.

In this talk we present a system of five ordinary differential equations to model the competition for space and resources between breast cancer cells and healthy cells. We include the cancer stem cell hypothesis, which states that there exist proliferating cancer stem cells that repopulate non-proliferating tumor cells and can lead to tumor recurrence. These cancer stem cells exist in a smaller population, making them harder to detect. Additionally, our system contains an equation for the immune system in order to show how the body naturally defends itself from invading tumors. Finally, because the majority of breast cancer cells are estrogen-receptor positive, we include the role of excess estrogen in the body introduced through birth control. Estrogen increases the amount of cancer cells while hindering the effectiveness of the immune system. Its presence also increases the likelihood that healthy cells will mutate.Through stability analysis of sub-models in addition to the full model, we are able to find states in which cancer is eradicated, as well as states in which cancer persists, given certain parameter values. (Received September 19, 2016)