1106-34-1949 **Alexander Middleton*** (middletona6@winthrop.edu). *A Nonlinear Model of Cancer Tumor Treatment with Cancer Stem Cells.*

According to the American Cancer Society, cancer is one of the leading causes of death, second only to heart disease. We present a system of nonlinear, first-order, ordinary differential equations that describes tumor growth based on healthy cell, tumor cell, and cancer stem cell populations. We include terms within our model which reflect the differing effects of chemotherapy and anti-angiogenic therapy to respective cell populations. We perform stability analysis on the equilibrium solutions to predict the long-term behavior of the cell populations. With analysis, it is shown that chemotherapy, with the co-administration of anti-angiogenic treatment, can produce three states: recurrence or persistence of cancer, and a cure state. Results are supported numerically and bifurcation diagrams are included to illustrate the different behavior of cell populations depending on the amount of treatment administered. (Received September 15, 2014)