

**Meeting:** 999, Nashville, Tennessee, SS 12A, Special Session on Biomathematics

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**K. Renee Fister\*** ([renee.fister@murraystate.edu](mailto:renee.fister@murraystate.edu)), 6C Faculty Hall, Department of Mathematics and Statistics, Murray State University, Murray, KY 42071, and **Thalya Burden**, **Jon Ernstberger** and **Jennifer Hughes** ([jennifer.hughes@murraystate.edu](mailto:jennifer.hughes@murraystate.edu)). *Optimal Control of Immunotherapy*.

We investigate a mathematical model for the dynamics between tumor cells, immune-effector cells, and the cytokine interleukin-2 (IL-2). In order to better determine under what circumstances the tumor can be eliminated, we implement optimal control theory. We design the control functionals to maximize the effector cells and interleukin-2 concentration and to minimize the tumor cells. We show that an optimal control exists. After which, we characterize our unique optimal control in terms of the solutions to the optimality system, which is the state system coupled with the adjoint system. Finally, we analyze the optimal control and optimality system using numerical techniques. (Received June 24, 2004)