



PURDUE UNIVERSITY

Department of Mathematics Colloquium

Speaker: Professor Avner Friedman, Ohio State University

Title: "Multiscale Models of Tumors"

Date: Tuesday, March 20, 2007

Time: 4:30 P.M.

Place: MATH 175

Abstract

At the restriction point of its first growth phase G1, the cell must decide whether to go into the S phase, apoptosis, or the quiescent phase G0. A similar decision is made just before the cell is ready to go into mitosis. The above decisions are affected by the cells environmental conditions, e.g., hypoxic neighborhood, overpopulation, etc. When some genes are mutated, the decision to go into S may be made in spite of unfavorable conditions, such hypoxic conditions, and this leads to tumor proliferation.

The multiscale model we shall discuss deals with the effects of gene mutation during the time a cell spends in each phase, as well as during the absolute time. After formulating the general model, I shall deal with much simpler situations whereby the cells are divided into only three different populations: proliferating, quiescent, and dead cells. In the even simpler case when we have only proliferating cells, I shall describe mathematical results such as global existence and bifurcation for PDE free boundary problems. It will be very challenging to extend these results to models which include several classes of cells.

Refreshments will be served in the Math Library Lounge, 4:00 P.M.