

# Department of Applied and Computational Mathematics and Statistics Colloquium

**Heiko Enderling**


Center of Cancer Systems Biology  
Tufts University School of Medicine

will give a lecture entitled:

## ***Mathematical and Computational Modeling of Cancer Stem Cells in Tumor Growth***

### **Abstract**

The cancer stem cell hypothesis postulates that only a subpopulation of cancer cells in a tumor is capable of initiating, sustaining and re-initiating tumors, leaving the bulk of the population being non-stem cancer cells that lack tumor initiation and progression potential. We develop mathematical and computational models of the interaction of these two phenotypically distinct populations, and observe that the emerging tumor population can exhibit various non-linear growth kinetics. An environmentally independent dormant state is an inevitable early tumor progression bottleneck for a large range of biologically realistic cell kinetic parameters. When intrinsic cell kinetics combine in unexpected manner, escape to tumor progression occurs as morphologically distinct self-metastatic expansion of multiple self-limited tumor clones. We show how numerical results from the model also further our understanding of how the fraction of cancer stem cells in a solid tumor evolves.



**Monday, January 21, 2012  
4:00 p.m. to 5:00 p.m.  
127 Hayes-Healy Center**

Colloquium Tea

3:30 p.m. to 4:00 p.m. 154 Hurley Hall