1086-92-2863 **Joseph Juliano*** (joseph.juliano@asu.edu), **Andrea Hawkins-Daarud**, **Russ Rockne**, **Peter Canoll** and **Kristin Swanson**. *A multi-scale approach to investigate invasion characteristics of heterogeneous glial cells and its implications on the overall growth kinetics of glioma progression.* Preliminary report.

A rat model for glioblastoma multi-form (GBM), the most malignant and common form of brain cancer, has recently been developed by depositing a platelet derived growth factor (PDGF) expressing retrovirus into a rat brain. The retrovirally-infected cells recruit healthy surrounding glial cells inducing a malignant phenotype similar to human GBM. These studies have led to the development of the Proliferation-Invasion-Recruitment (PIR) mathematical model, a system of PDEs used to investigate the contribution of recruitment via PDGF secretion to the overall dynamics of glioblastomas. This continuous model is based primarily on parameters of net rates of proliferation and invasion. In previous work, these parameters were estimated at a global level from serial magnetic resonance imaging. In this research, we connect estimates of invasion in a multi-scale approach by estimating fitted mean-squared-distances of individually tracked cell movement to a persistent random walk model. Individual cell estimates and population estimates were used to determine appropriate invasion parameters for the PIR model. The quality of these estimates is quantified by using them in the PIR model and making comparisons between predicted population distribution and observed tumor kinetics. (Received September 25, 2012)