1154-92-1023 **Helen Byrne**, **Heyrim Cho**, **Rachel Jennings**, **Allison Lewis**, **Angela Reynolds**, **Blerta Shtylla** and **Kathleen Storey*** (storeyk@umich.edu). *Data-driven Modeling of Tumor Growth and Response to Radiotherapy.*

Despite recent technological advances that make it possible to collect detailed tumor information, clinical assessments about treatment responses are typically based on sparse datasets. In this work, we compare tumor growth models of varying complexity, in an effort to determine the level of complexity needed to accurately predict tumor growth dynamics and response to radiotherapy. We start by considering a simple, one-compartment ordinary differential equation model which tracks tumor volume and a two-compartment model that accounts for tumor volume and the fraction of necrotic cells. We investigate the structural and practical identifiability of these models, and the impact of noise on identifiability. We also generate synthetic data from a spatially-resolved, agent-based model (ABM) that simulates tumor growth and response to radiotherapy. We investigate the fit of the ODE models to ABM-generated volume data and use sequential model calibration to determine how much data is necessary to accurately infer model parameters. Our results suggest that a tumor with a large necrotic volume is the most challenging case to fit, but supplementing total volume data with additional necrotic information enables the two compartment model to significantly outperform the one compartment model. (Received September 12, 2019)