

# Data Assimilation in a Brain Tumor Model

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Uncertainties in prediction of brain tumor growth arise from many sources, some of which include the poorly understood and stochastic nature of the underlying cell biology governing the tumor growth, estimation of initial conditions and model parameters, and variances in patient brain geometry. Additionally, the use of magnetic resonance (MR) imaging to assess the location and size of the tumor has inherent uncertainties due to registration error and the underlying population densities. In this presentation we discuss and demonstrate the use of *ensemble forecasting* and *data assimilation* to make improved short-term (30-day) estimates of the growth and spread of a simulated brain tumor. The results illustrate the potential feasibility of this approach to better forecast the evolution of individual patient lesions and other biological systems.