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Ami Radunskaya*, aer04747@pomona.edu. *Getting to the target on time.*

Many treatments are time-sensitive, and getting the treatment to the right spot at the right time is crucial to its effectiveness. For example, when treating certain diseases of the brain such as Parkinson's, we need to delivery bursts of drugs to specific spots in the brain, and we need to get these drugs through the blood-brain-barrier. When treating a tumor, we need to keep toxic drugs away from normal tissue, and we need to give immunotherapies in conjunction with drugs that inhibit immune-suppression by the tumor. Mathematically, we would like to model new drug delivery technologies, such as nanoparticles loaded with drugs, decorated with homing devices, and delivered in time-released media. We then need to formulate and solve a complicated, multi-objective optimization problem, and gauge the uncertainty in our predictions: uncertainties that could be life-threatening.

In this talk we will present several models that attack these specific problems, highlighting the challenges and the promises (Received September 12, 2016)