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**Stochastic Analysis of Antibody-antigen Binding in a Microfluidic Device**[1] SHAUNA ADAMS, CONG ZHANG, HARVEY ZAMBRANO, A.T. CONLISK, The Ohio State University — Over the last decade, microfluidic "Labs on a Chip" (LOC) have evolved from a single microchannel to micro-total analysis systems (TAS) capable of integrating thousands of reaction vessels, conduits and valves-the contents of an entire chemical laboratory-on a single chip. These systems have several advantages in biomedical applications, including lower equipment and personnel costs, reduced power requirements, faster separations, and smaller sample and reagent volume requirements. Circulating tumor cells (CTC) are cancer cells found in the blood stream indicating the presence of a tumor in the body. We consider the population of magnetically tagged antibodies to be characterized by a collection of stochastic trajectories; the probability of finding an antibody at a given position is assumed to be defined by the Fokker-Planck equation. The first objective is to determine the probability that one or more magnetically labeled antibodies will assume a trajectory that is within the neighborhood of a given cancer cell. Once this occurs the binding process can be described using a deterministic analysis and the modeling of this process is the second objective of the paper.

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