1116-VM-1415 **Ryan M Evans*** (rmevans@udel.edu), University of Delaware, Mathematics Department, 15 Orchard Rd, Newark, DE 19716, and **David A Edwards**, University of Delaware, Mathematics Department, 15 Orchard Rd, Newark, DE 19716. *Overview of Multi-Component Surface-Volume Reactions.*

A surface-volume reaction occurs when a chemical flows through a channel, and then diffuses to the floor where it can react with immobilized receptors. Scientists study these reactions experimentally using optical biosensors. Chemists are currently running biosensor experiments in which there are multiple types of chemical reactants flowing through the channel of the biosensor, or multiple receptors at the floor.

Correctly interpreting biosensor data relies on having a mathematical model. Our model for multi-component reactions in a biosensor takes the form of a convection-reaction system. Using asymptotic analysis we are able to simplify the full system into a coupled set of nonlinear integro-differential equations for the reacting species concentration. In physically relevant asymptotic limits, this system further reduces to a nonlinear set of ODEs. This renders our asymptotic approximations useful for data analysis.

The exact values of the involved reaction rates are unknown to date. These rates can't be measured experimentally, and the problem of fitting the parameters to data is ill-posed. We discuss a curve-fitting algorithm we are developing to fit the constants, and an experimental design algorithm we are working on to resolve the ill-posedness. (Received September 19, 2015)