1086-VL-1786 **Matt Zumbrum*** (zumbrum@math.udel.edu). *Surface-Volume Reactions and Optical Biosensors with Arrays of Reacting Zones.* Preliminary report.

Surface-volume reactions occur in many biological and chemical processes. In a surface-volume reaction, one reactant is contained in a fluid which flows over a surface to which another reactant is immobilized. Unlike the case where reactants are well-mixed, standard kinetics cannot be applied to these reactions and transport effects must be taken into account.

Optical biosensors are devices widely used to replicate surface-volume reactions and to measure reaction rate constants. Early biosensors included a single reacting zone for the study of a single reaction. New devices include arrays of reacting zones in a single flow channel, allowing for the study of up to four hundred reactions simultaneously. Real time measurements of bound reactants in a reacting zone are taken and averaged to obtain a sensogram of the bound state.

We consider the reaction-limited problem with small Damköhler number and discuss a model for ligand depletion and bound state evolution over arrays of reacting zones using perturbation analysis. We extend previous work to arrays of reacting zones with different association and dissociation rates, including an effective rate constant (ERC) equation for individual reacting zones. (Received September 24, 2012)