1135-35-3083 **Ryan M. Evans*** (ryan.evans@nist.gov), NIST, 100 Bureau Drive, Gaithersburg, MD 20899, **Arvind Balijepalli**, NIST, 100 Bureau Drive, Gaithersburg, MD 20899, and **Anthony J. Kearsley**, NIST, 100 Bureau Drive, Gaithersburg, MD 20899. *Nonlinear PDEs and Precision Medicine.*

Tailoring therapies to individuals or specific subsets of a population in order to deliver personalized care could fundamentally remake healthcare delivery. However, widespread use of personalized care is currently limited by our ability to routinely measure pathology in individuals. Moreover, existing clinical diagnostics are in many cases prohibitively expensive. This has led to the development of Biological Field Effect Transistors (Bio FETs)—microscale instruments in which ligand molecules diffuse through a solution-well onto a surface to bind with receptors. Ligand binding with receptors modulates current flow through the device, and produces a signal used to study the receptor ligand dynamics of interest. A nonlinear PDE model for Bio-FET experiments will be presented. Analyzing this model is a challenge, owing to multiple disparate time scales for reaction and diffusion. It will be shown that in this set of equations reduces to a nonlinear integrodifferential equation (IDE) with a singular convolution kernel. Numerical approximations to the solution to this equation will be presented. These results give experimentalists novel way of estimating binding affinities in biomolecule interactions; this is essential for identifying effective drug targets. (Received September 26, 2017)