1176-35-316 **Ryan M Evans***, 100 Bureau Drive, Gaithersburg, MD 20899, and **Seulki Cho**, **Arvind Balijepalli** and **Anthony J. Kearsley**. *A Mathematical Model for Biological Field Effect Transistors.*

Biological field effect transistors (Bio-FETs) are modern bioelectronics instruments offering valuable and novel biomarker measurements. In contrast to traditional measurement techniques that require specialized facilities and expensive equipment, Bio-FETs offer rapid, accurate and low-cost measurements. Since these instruments are hand-held and portable, they promise to yield wider accessibility to critical medical diagnostic tests. During a typical experiment, a chemical reactant bath is injected into a solution-well containing a buffer fluid. These chemical reactants diffuse through the solution-well and bind with chemical reactants confined to a sensor surface. This produces a time-series signal that can be used to analyze the chemical reaction of interest. The process can be mathematically modeled with a diffusion equation that is coupled nonlinearly to a kinetics equation describing reactions on the sensor surface. There is a discontinuity in one of the boundary conditions owing to the geometry of the device. An elegant reformulation of this coupled set of partial differential equations that allows us to obviate the discontinuity will be presented and a comparison with experimental data will be given. (Received January 25, 2022)