1135-92-2975 **Jamie Prezioso*** (jep127@case.edu), Department of Physiology & Biophysics, Case Western Reserve University, 10900 Euclid Ave., MS4970, Cleveland, OH 44106, and **Daneila Calvetti**, **Erkki Somersalo**, **Rossana Occhipinti** and **Walter Boron**. *Computational Model of Electrode-induced Microenvironmental Effects on pH Measurements Near a Cell Membrane.*

When studying gas channels in cells, surface and intracellular pH are determined in an oocyte using electrodes which measure the concentration of hydrogen ions (H^+). It has been hypothesized that the presence of the electrode creates microenvironmental effects on pH measurements near the cell membrane. We develop a mathematical reaction-diffusion model of the electrode tip at the cell membrane which is restricted into a subdomain with artificial boundary conditions to keep the computational burden manageable. We consider an oocyte immersed in a liquid in which the pH is modulated by controlling the contents of carbon dioxide, CO_2, which reacts with water forming carbonic acid, H_2CO_3, which further dissociates to bicarbonate HCO_3^- , thus releasing a proton H^+. The local concentrations change due to diffusion, reaction, and gas transport through the cell membrane. To implement the solution numerically, we first discretize the solution in the spatial direction using a finite element scheme, reducing the problem into a system of ODEs. Through a series of numerical experiments, we show that the electrode does, in fact, create a microenvironment impacting the extracellular pH measurements. (Received September 26, 2017)