1106-92-678 **Alexander Galarce*** (alexander.galarce@ncf.edu), New College of Florida, Division of Natural Sciences, 5800 Bay Shore Road, Sarasota, FL 34243-2109, and **Sageanne Senneff** (ssenneff@ucsc.edu), Mathematics Department, UC Santa Cruz, 1156 High Street, Santa Cruz, CA 95064. *A Phenomenological Mathematical Model of a Cardiac Action Potential with Intracellular Calcium Cycling.*

In ventricular cells, intracellular calcium serves as a second messenger that modulates current and electrical potential difference between the interior of the cell and the extracellular space. This regulation is essential to proper cardiac function. We present a numerical model incorporating components from the Bueno-Orovio et al. minimal model of the cell membrane potential and the Shiferaw et al. intracellular calcium model in ventricular myocytes. The combined model is a series of nonlinear differential equations which specify the response of the cell membrane and the intracellular calcium concentration to an electrical stimulus. The model allows voltage to influence calcium through a transmembrane current of calcium ions and allows calcium to affect the closure of ion channels, thereby influencing voltage. The two-way coupling permits the formation of alternans, a period-2 dynamical state, to occur through instabilities in voltage or calcium and can be used to study alternans properties in both cases. (Received September 04, 2014)