1027-92-225 **J Abiva**, **F. Berezovskaya** and **E. T. Camacho*** (ecamacho@lmu.edu), Loyola Marymount University, University Hall, 1 LMU Drive, Suite 2700, Los Angeles, CA 90045-2659, and **E. Joseph**, **G. Karev**, **A. Mikaelian**, **C. Rogers** and **A. Wirkus**. *Mathematical Models of A Neuron Firing.*

Neurons are responsible for transmitting messages throughout the body via long distance electrical signals known as action potentials. The Hodgkin-Huxley equations mathematically model the influx and efflux of these ions across the cell membrane. The Fitzhugh-Nagumo equations have been used as a caricature of the Hodgkin-Huxley equations of neuron firing and to capture, qualitatively, the general properties of an excitable membrane. In this talk we will examine modifications of each of these systems of equations. For the Hodgkin-Huxley equations, we propose a modified version that incorporates the effect of alcohol on neuron firing. We investigate the qualitative behavior and interpret the results of the steady-state solutions in the fast and fast-slow phase planes. For the Fitzhugh-Nagumo equations, we modify the equations to model the spatial propagation of neuron firing; we assume that this propagation is caused by the cross-diffusion connection between the potential and recovery variables. We show that the cross-diffusion version of the model, besides giving rise to the typical fast traveling wave solution exhibited in the original "diffusion" equations, additionally gives rise to a slow traveling wave solution. (Received February 27, 2007)