1135-AH-872 **Jeffrey Kopsick*** (kopsicjd@dukes.jmu.edu) and **James Sochacki**. *Investigating How Neurons Communicate Through the Power Series Method (PSM).* Preliminary report.

Based on the physical conceptions and processes underlying the electrical activity of neurons, Hodgkin and Huxley created the first biophysical model for the giant squid axon. Their Nobel Prize winning work and ideology has helped shape our current understanding of conductance-based models. The canonical numerical methods used to approximate the solutions of these models are Runge-Kutta and variants of it. Stemming from the computational neuroscience results of R.D. Stewart and W. Bair's work and the complexity of these dynamical systems, we have developed an algorithm using the Power Series Method (PSM) to improve the numerical solutions to the differential equations that describe these types of models. This talk will focus on comparative studies of the PSM and Runge-Kutta methods in different conductance-based models, motivated by the work of Hodgkin and Huxley. Applications of our work include improving parameter estimation (e.g. rate constants), better understanding neuronal response to external current and the transition state parameters effects on the action potential.*

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