1145-39-107 **Jonathan Machado*** (jomachad@uncg.edu) and **Pedro Vásquez** (pedro.vasquez1@upr.edu).
Controlling Alternans in a Discrete Cardiac Cell Model.

In this study, we consider a condition called alternans, a period-2 heart rhythm characterized by oscillations between strong and weak heartbeats known to precede serious heart disorders. Several studies have analyzed methods to prevent or terminate alternans, but in those cases alternans occurred primarily because of instabilities in the cell membrane potential. Alternans also can arise from instabilities in intracellular calcium cycling related to contraction. Here, we use a discrete model of four coupled difference equations to examine whether suppression or complete elimination of alternans is possible using two classes of control methods, one that applied feedback terms directly to individual state variables and another that modifies the timing of heartbeats. To study alternans suppression, we use direct iteration of the model along with a linear stability analysis to provide a theoretical basis for our findings. We present results on the effectiveness of these control methods as well as the observed dependence on the instability underlying alternans. (Received July 30, 2018)