1086-92-732 **John W Cain*** (jcain2@richmond.edu), University of Richmond, Dept. of Mathematics and Computer Science, 28 Westhampton Way, Richmond, VA 23173. *Chaos Control in Cardiac Tissue: Local Stimulation Versus Far-Field Pacing.* Preliminary report.

We contrast the modeling and simulation of two vastly different methods for terminating cardiac arrhythmias. The traditional method, local stimulation, is used by medical devices such as the implantable cardioverter-defibrillator (ICD). An ICD delivers spatially-localized electrical stimuli via an implanted electrode, often at the base of the right ventricle. The newer method, known as far-field pacing (FFP), involves application of a pulsed electric field across the whole heart. If the FFP field strength is sufficiently large, propagating electrical waves can emanate from interfaces between conducting and non-conducting tissue, ideally leading to a "resetting" of the tissue in which a normal rhythm resumes. Experiments indicate that FFP is highly successful in this regard, even at energies far lower than the pain-inducing jolts of local stimulation.

Our simulations, performed using a standard reaction-diffusion PDE model of waves in excitable media, support a previously-reported and very natural suspicion: Attempts to use impulsive forcing to control spatiotemporal chaos will fail if the forcing is restricted to an overly-localized region. We discuss possible implications in the realm of medical device design, as well as other contexts outside of medicine. (Received September 11, 2012)