

Time: Monday May 2nd, 2011 5:00pm  
Location: Buchanan A202

**Modeling Cardiac Arrhythmias as Reentrant Activity in Excitable Media**

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Cardiac arrhythmias such as ventricular tachycardia (VT) and fibrillation (VF) can be fatal if left untreated. In two dimensions, these reentrant arrhythmias can be modeled as one or more spiral waves in a system of excitable media. The appearance of spiral waves due to structural inhomogeneities – such as damaged tissue or scar tissue – is well-studied and well-explained. However, patients can present with VT yet have no permanent cardiac inhomogeneities. How can an arrhythmia arise in a patient with no apparent structural defects? A potential mechanism is the appearance of a temporarily 'deactivated' region. I will discuss the basic biology of the heartbeat, present the mathematical systems that are used to model it, and show how an arrhythmia can appear in an undamaged heart.