**LAURENT MACKAY**, McGill University

*The dynamics of mechanosensitive nascent adhesion formation*

Cellular motility involves the integration of extracellular cues into a cellular motility system that is competent at adhering to the external environment as well as producing directional force. This is acheived by eukarotic cells through tightly regulated spatiotemporal interactions between the actin cytoskeleton, adaptor proteins, and integrin receptors. Complexes of these molecules form what are known as integrin-based adhesions. We present a mathematical model of integrin-based adhesions as co-localized clusters of integrins and adaptor protein. It assumes that integrins and adaptor proteins mutually hinder one another's mobility through a diverse set of interactions. This model is analyzed near equilibrium and stability conditions for its equilibria are found. The model outcome's dependence on biophysical parameters is then characterized, demonstrating that changes in integrin diffusion or binding have similar effects on adhesion size and integrin content. Furthermore, the effects of mechanical force are incorporated as the force-induced activation and ligand binding of integrin, predicting that adhesions will disassemble beyond a critical value of stress. Finally, we use stochastic simulations to demonstrate that this model can produce nascent adhesion assembly when initiated far from equilibrium, allowing us to draw conclusions about the mechanical conditions that allow for this assembly.