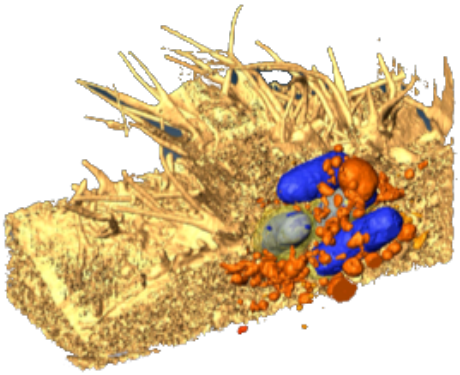
MUN PHYSICS

Department of Physics and Physical Oceanography presents

How to keep you alive and model your death

Undergraduate-Friendly Lecture:

Friday, March 27, 2015
3:00pm room C2045



Professor Andrew Rutenberg

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How do we do physics of biological systems, with spherical cows that still moo? My interests as a theoretical and computational physicist are non-linear, non-equilibrium, and stochastic systems -- and these abound in biology. For undergraduates, or non-specialists, I'll talk about how my group is approaching two new systems that are about you. The first is how bacteria infect people, or at least layers of human cells. The dynamics of the host-pathogen system, from the bacterial perspective, proceeds along distinct stages that can be studied with high-throughput fluorescent imaging. I will tell you about our cellular model, and early results, for the pathogenic bacterium *Salmonella enterica*. The second, higher scale, is to consider old age as a stochastic system. Clinically, the fraction of age-related deficits is as good a predictor of human mortality as chronological age. I will present a network dynamical model of age-related deficits that includes interactions between deficits, deficit formation and repair, and mortality. We can now use our model to improve how we choose and track deficits.