

Chez Pierre

Presents ...

Wednesday, February 6, 2013

10:00am

MIT Room 4-331



SPECIAL CHEZ PIERRE SEMINAR

Kirill Korolev

Massachusetts Institute of Technology

“Ecology and evolution of cancerous tumors and expanding populations”

Species expand their geographic ranges following an environmental change, long range dispersal, or a new adaptation. For species like the influenza virus, range expansions are the way of life. When species spread to new territories, they not only alter the affected ecosystems, but also change the course of their own evolution. I will first show that range expansions could destroy genetic diversity even when it is favored by natural selection. The loss of diversity is caused by genetic drift (demographic fluctuations) and is similar to a phase transition in Physics. Then, I will describe how range expansions can help populations to escape social parasites and maintain high levels of cooperation. This escape is possible, but not guaranteed when cooperators can spread faster than cheaters can invade them. Finally, I will discuss evolutionary dynamics of growing cancer tumors and show that accumulation of damaging mutations can be an Achilles' heel of cancer.