PS #5 due today, before 3PM
(in class, or Rm. 68-371)

Final PS has been posted (due 12/11/07,
hard deadline, last day of classes)

Tomorrow’s recitation topic
‘Modeling microtubule dynamics’

Crawling of most cells is based on actin

- keratocyte
- labeled actin

Actin polymerization → Mechanical Force

red: actin
green: microtubules
blue: DNA

The Cytoskeleton

(Vic Small)
Introducing actin

Actin is a polar molecule

Spontaneous addition of monomers to produce polymer filament.

The polymerization “motor”

How can polymerization push?

Thermal fluctuations are important

Brownian ratchet model: Peskin, Odell and Oster

Elastic Brownian ratchet

Oster and Mogilner

Polymerizing actin filaments exert mechanical forces
Polymerizing actin filaments exert mechanical forces and can propel non-living cargo.
Polymerizing actin filaments exert mechanical forces and can propel non-living cargo.
**Molecular Motors**

kinesin is a molecular motor that runs to the plus end of a MT
(Movie kinesin walking, Ron Vale, UCSF)

dynein is a molecular motor that runs to the minus end of a MT

**Cell cycle & Mitosis**

Movie 1 - animal cell
Modeling example:


Borisy et al.