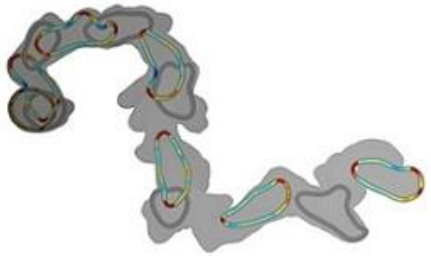
Physics 131- Fundamentals of Physics for Biologists I



Office Hours:

12/12 Thursday 2.15pm-3.30pm Course Center

Question and Answer Session during Reading Day:

(check your email for a location)

Saturday 4pm-5.30pm

12/15 Monday 4-5pm My office AV Williams 3341

12/15 Monday 5-6.30pm Course Center

EvalUM

Please do the EvalUM survey:
https://CourseEvalUM.umd.edu

I will send you another request for a survey by our visitors from the University of Colorado:
https://www.surveymonkey.com/s/NJNRMFD

Research Experience

Quantitative Life Sciences Research Experience - Physics299L

Research Course – its focused on doing scientific research in groups, no exams etc.

Meets Friday 2pm-4pm plus in small groups one more time during week

Admission is by permission of the instructor. We have 24 slots for the 240 Phys131 students, (you gets first dibs ☺)

For questions, or to apply, email me
wlosert@umd.edu I need:

One paragraph explaining what you hope to learn from this Research Experience, and how it will help your career.

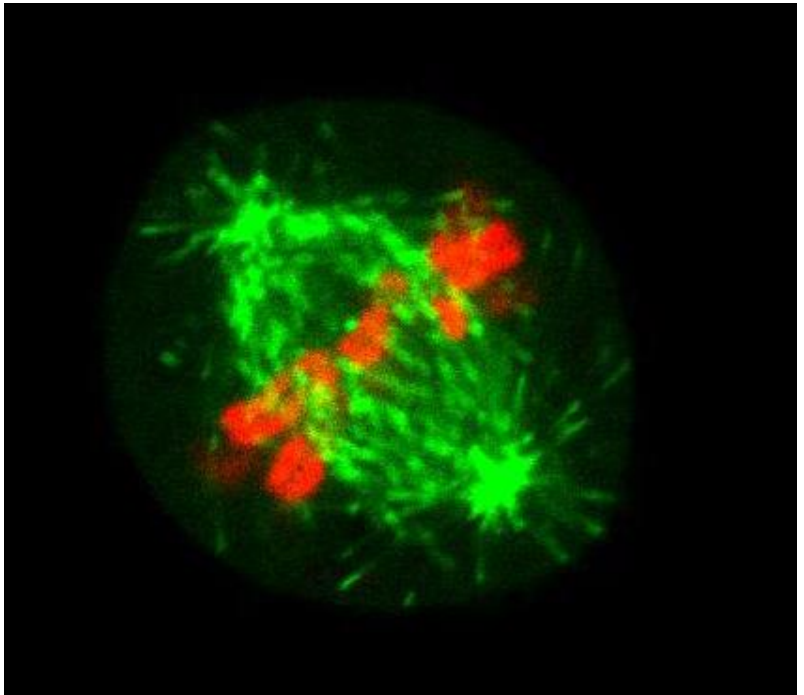
Topic: Intracellular Dynamics During Cell Division

Led by me, with 3 NIH Postdocs and 1 UMD Postdocs

1-2 visits to NIH for experiments

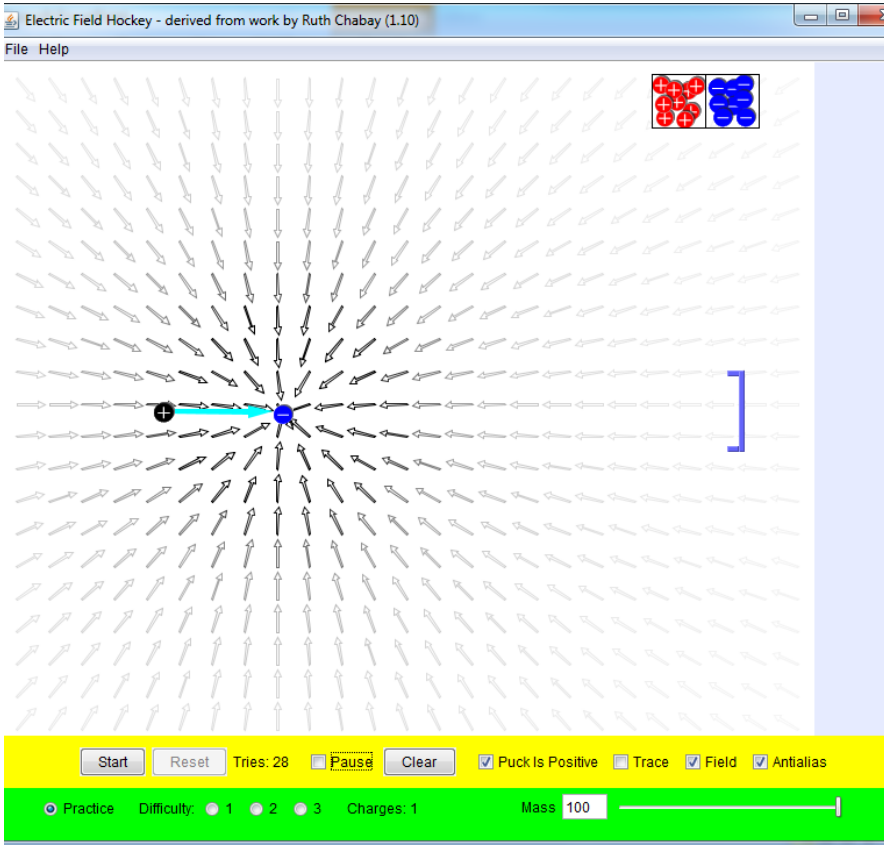
Skills from 131:

- *Image/motion analysis*
- *Tackling tough problems in groups*



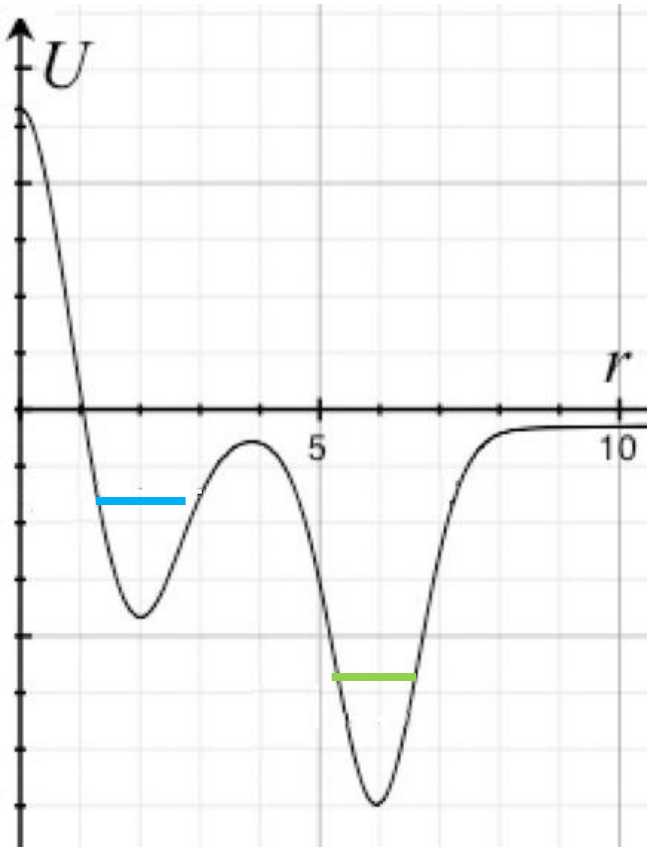
Potential Energy

Sketch the Potential Energy



Whiteboard, TA & LA

Equilibrating temperature in our model

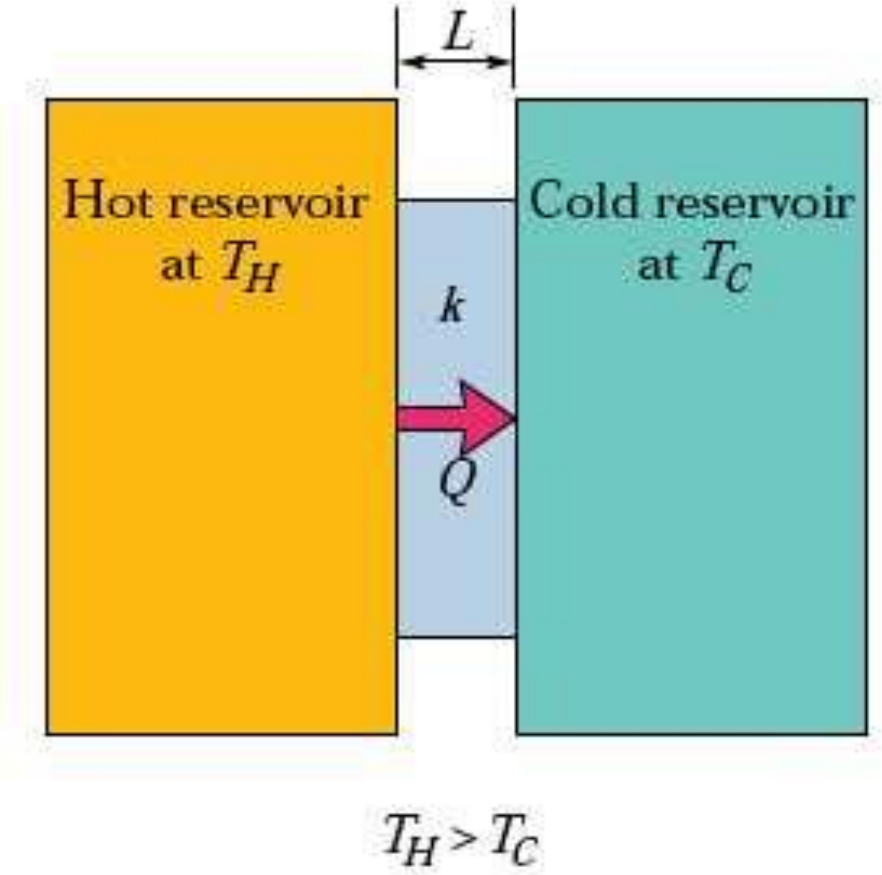


The molecule started in the blue state in thermal equilibrium. The green state has the same temperature as the blue state.

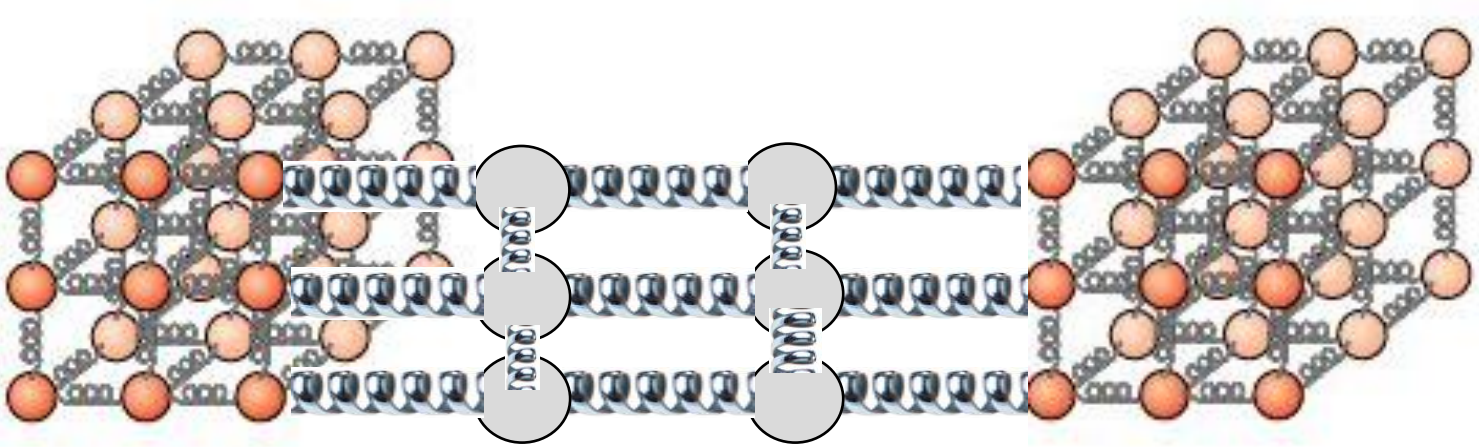
- **The two states are at the same temperature, since they are the same amount above their minimum potential energy**
- **The straight line denotes the total energy, so it is different in blue and green state**
- **Such a model would describe an exothermic reaction in chemitry**

Heat Flow by Conduction

- Simplest case (again)
  - Hot block at T_H
  - Cold block at T_C
  - Connecting block that carries ("conducts") thermal energy from the hot block to the cold.



Creating a microscopic MODEL



Hot Object

Connecting Block

Cold Object

Lets model the flow of thermal energy similar to fluid flow. Difference in temperature ΔT is driving the flow of thermal energy/sec Φ

$$\Delta T = Z\Phi$$

Flow of thermal energy/sec depends on the:

k: material property of the block – thermal conductance

L: length of the block

A: cross section Area of block

$$Z = \frac{1}{k}\frac{L}{A}$$

Whiteboard, TA & LA