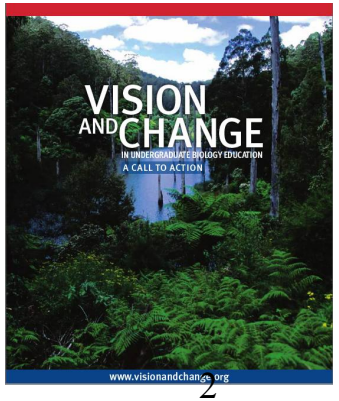
- **Theme Music: Bon Jovi**

  Starting all over again

- **Cartoon: Lynn Johnston**

  For Better or for Worse

- Over the past decade there have been increasing calls to modernize the education of biology and pre-med students.
- This class is part of a national project sponsored by the Howard Hughes Medical Institute and the National Science Foundation to respond to the *Scientific Foundations for Future Physicians Report* (2009)
- This report calls for multi-disciplinary competency-based science education to better prepare students for medical, pharmacy, and veterinary schools and also to better educate students who are studying the basic biological sciences.



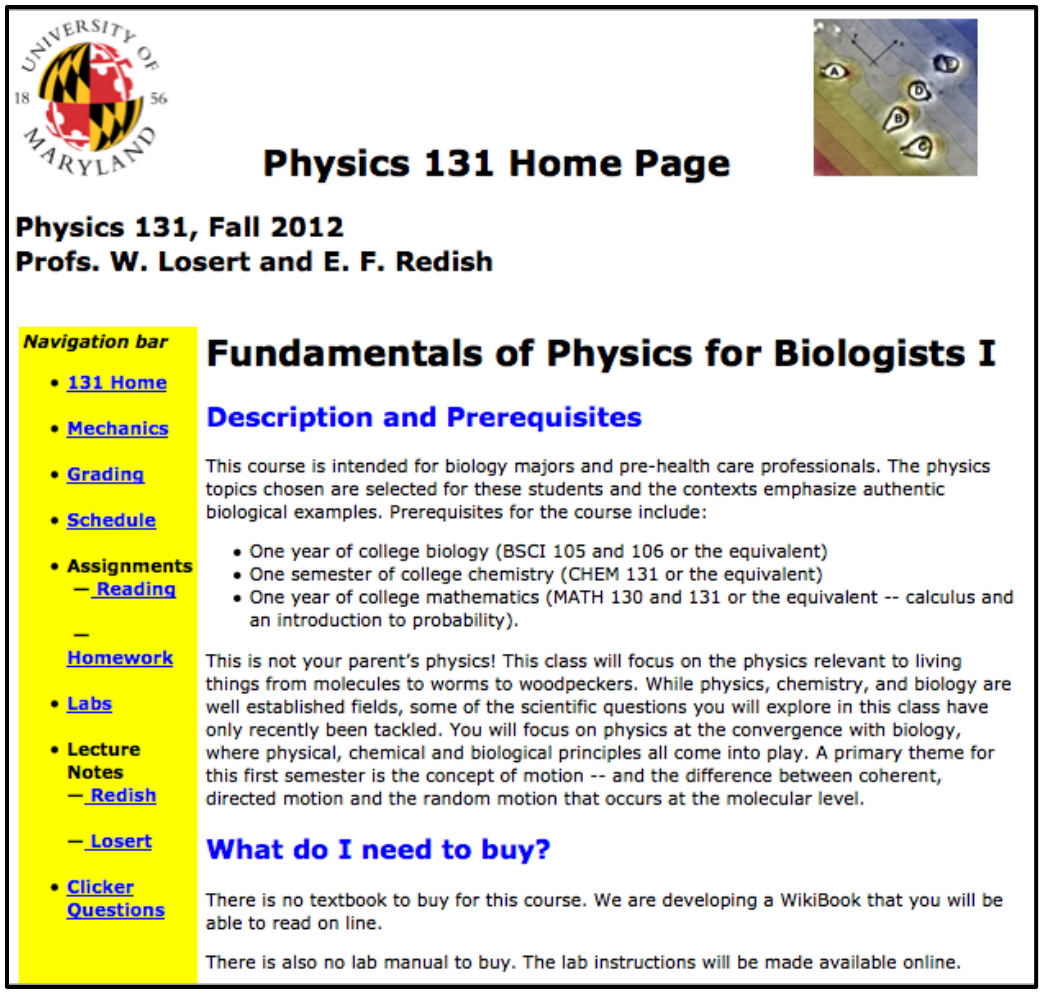
HHMI Project NEXUS

- The goal of this course is to provide you with the understanding of physics that you will need to help you understand advanced biology and (perhaps) medical school classes.
- It is in development so we will be seeking feedback from you to make sure that it works for you.
- Surveys
  (one online, one in recitation this week)

The class structure: our web pages

- Home page
  - What to buy
- Class structure
  - What to do

http://www.physics.umd.edu/courses/Phys131/fall2012/



Physics 131 Home Page

Physics 131, Fall 2012
Profs. W. Losert and E. F. Redish

Navigation bar

- 131 Home
- Mechanics
- Grading
- Schedule
- **Assignments**
  - Reading
  - Homework
- Labs
- **Lecture Notes**
  - Redish
  - Losert
- Clicker Questions

Fundamentals of Physics for Biologists I

Description and Prerequisites

This course is intended for biology majors and pre-health care professionals. The physics topics chosen are selected for these students and the contexts emphasize authentic biological examples. Prerequisites for the course include:

- One year of college biology (BSCI 105 and 106 or the equivalent)
- One semester of college chemistry (CHEM 131 or the equivalent)
- One year of college mathematics (MATH 130 and 131 or the equivalent -- calculus and an introduction to probability).

This is not your parent's physics! This class will focus on the physics relevant to living things from molecules to worms to woodpeckers. While physics, chemistry, and biology are well established fields, some of the scientific questions you will explore in this class have only recently been tackled. You will focus on physics at the convergence with biology, where physical, chemical and biological principles all come into play. A primary theme for this first semester is the concept of motion -- and the difference between coherent, directed motion and the random motion that occurs at the molecular level.

What do I need to buy?

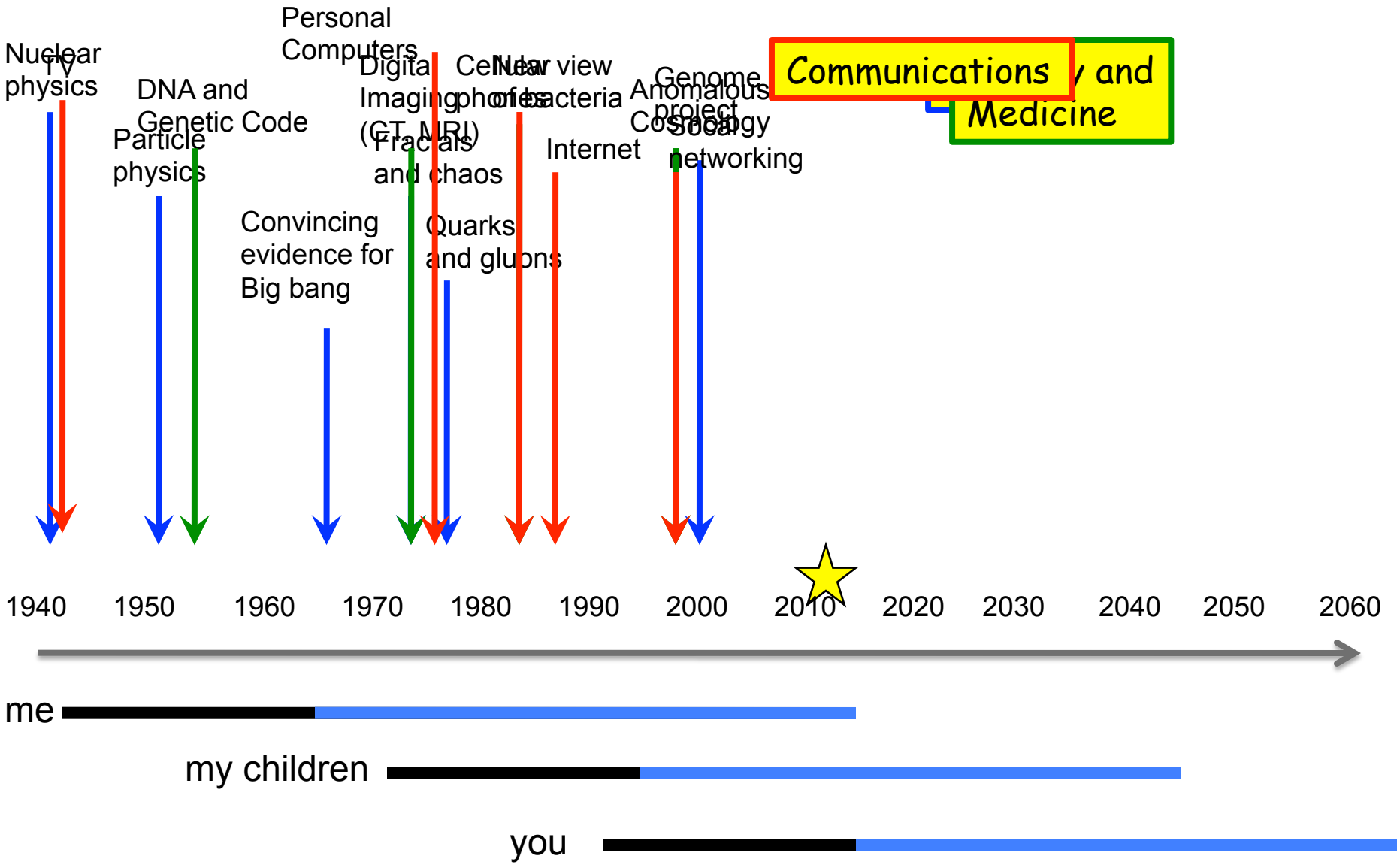
There is no textbook to buy for this course. We are developing a WikiBook that you will be able to read on line.

There is also no lab manual to buy. The lab instructions will be made available online.

Lab/Recitation

- Go to your recitation and lab section next week to
  - do a pre-test survey
  - get your picture taken
  - MasteringPhysics
  - ImageJ
- Do the online survey.
- Labs begin on 9/11.

Time Line


Nuclear physics
TV
DNA and Genetic Code
Particle physics
Personal Computers
Digital Imaging (CT, MRI)
Fractals and chaos
Convincing evidence for Big bang
Quarks and gluons
Cellular phones
Near view of bacteria
Internet
Genome project
Anomalous Cosmology
Social networking
Communications
Medicine
1940
1950
1960
1970
1980
1990
2000
2010
2020
2030
2040
2050
2060
me
my children
you

Adaptive expertise

- The rapid pace of change in science implies that critical skills for scientists (and health-care professionals) in the next few decades will be
  - the ability to continue to learn
  - the ability to understand the implications of new discoveries
  - the ability to integrate new tools and knowledge into their practice of science.

Learning to think scientifically

- Sometimes you're fighting your own brain!
  - We often assume an immediate recall ("one-step thinking") is right – and the quicker and easier the recall the more we trust it!
  - We often don't pay attention to the right things!
  - We often assume our intuition is correct but don't check that it makes sense with what we see (or with other things we know)!