## ■ Theme Music: John Coltrane

***Welcome***

## ■ Cartoon: Lynn Johnston

***For Better or for Worse***

# Recitations and Labs

- No lab this week or next.
- Go to your recitation section this week to
  - do a pre-test survey
  - get your picture taken
- Regular labs and recitations (tutorials) begin on 9/13.

# Buy?

☑ BUY a lab/tutorial manual.

☑ BUY a clicker

- Bring it to every class.
- Register it at http://my.umd.edu under the *Academics and Testudo* tab


☑ BUY Mastering Physics

- The on-line HW product.

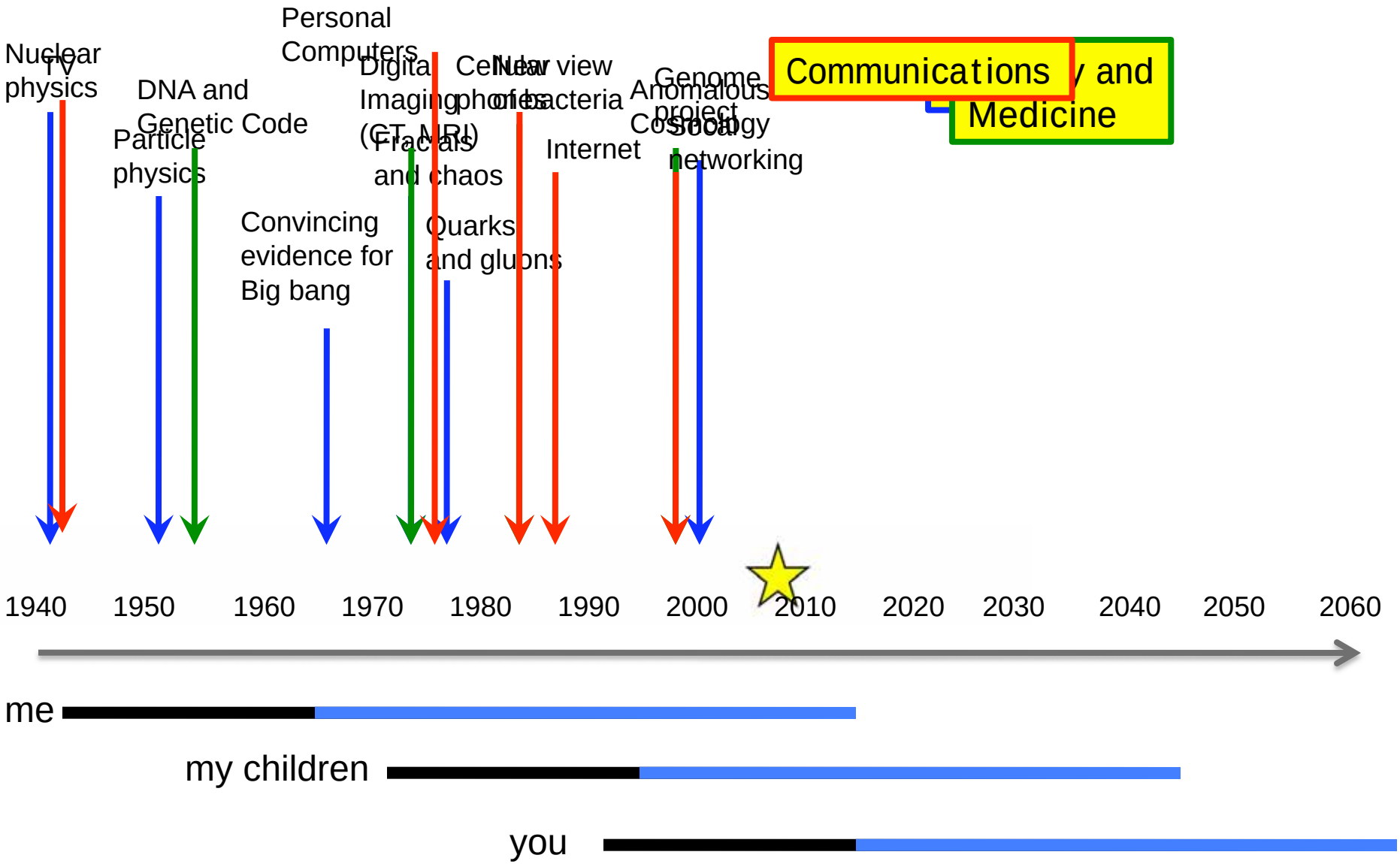
☐ You do not have to buy a text.
If you want one, you might like

- Touger,
- Knight et al.,
- Cummings et al. (available to this class on-line)

# This class is designed to help you develop a deeper understanding of science. Why?

- "Adaptive expertise"
- Self-preservation (both mine and yours)
- Why not? Physics is a good place to do this!

# 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
networking
Communications
and
Medicine
1940
1950
1960
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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.

# Why physics?

- Physics is a good place to develop some general scientific skills associated with deeper learning and adaptive expertise.
- It connects with things you know from everyday experience.
- It helps develop tools of general value.
  - Quantification of experience
  - Multiple representations
  - Coherence
  - Mechanism
  - Building physical intuition

# Class Info

- Webpages
  - *http://www.physics.umd.edu/courses/Phys121/Redish/*
- Blackboard
  - *https://elms.umd.edu/*
- Listserve
  - *phys121-02all-fal10@coursemail.umd.edu*

Main course info. Lots of good stuff.

For your eyes only.

If you haven't gotten any emails from me yet, see me!

# Homework

- Three kinds
  - Online – typically a few exercises and online activities + about 4 (of my own) problems in MP. The one due Friday is just familiarizing yourself with the interface (but it's worth points).
  - Friday lecture – one long problem to write up on paper.
  - Tutorial HW – short, due in Tutorial.
- Work with others! But…
- Course Center!

# Tutorials

- Discussion sections are run as group-learning sessions with worksheets.
- They will help to build difficult concepts and clarify confusing topics.
- They will focus on helping you understand, evaluate, and refine your intuitions.
- Tutorial HW a quick review of Tutorial ideas. (expect to spend ~15-30 min)
  - Graded 0-1 on ~5 elements.
  - Hand in at tutorial section

# Labs

- Labs are required!
  Try very hard not to miss any.
  It will be difficult to make up missed labs.
- Labs will be non-traditional and will run over two weeks (4 hours)
- You will work in groups of 4
  and create one lab report per group
- You will design, carry out, analyze,
  and present your results to the class.
- You will use *Excel* to analyze your data.

# Theme of the Laboratory: Understanding Measurement

- Although we will be using physics concepts learned in lecture, reading, and tutorial in lab, demonstrating their correctness will NOT be the point of the lab.
- The goal of the laboratory will be to have you learn to think about measurement and data.
  - How does you goal affect your experimental design?
  - How does your experimental design affect your data?
  - How trustworthy is your data?
  - Why should someone believe your result?
  - When are two results "close enough" that we can say they agree?
  - When two results differ, how can we decide what is the correct answer?

# Exams

- Two midsemester exams and one final.
- Exams will be about thinking, not memorizing.
- Midsemester exams
  - Given on Friday
  - Returned on Monday and gone over in class
- Written regrade requests encouraged
- Makeup exams the following Thursday (out of class) for anyone who wants, but…

# Exams will include…

- A multiple-choice or short answer set of questions on translating representations (~25-30%)
- Two problems to work out and explain – typically with symbols, not numbers (~50%)
- An essay question (~10%)
- An estimation problem (~15%).

# Grading

| | |
|---|---|
| ■ Hour exams (100 pts) | 200 |
| ■ Quizzes (about) | 100 |
| ■ Final exam (200 pts) | 200 |
| ■ Homework (scaled to) | 200 |
| ■ Lab (scaled to) | 200 |
| ■ Participation | 100 |
| ■ **Total** | **1000** |

Estimate: A ~ (85 ± 3)% , B ~ (75 ± 3)%, C ~ (65 ± 3)%

# Small barriers

- In this class there can be lots of small barriers that we need to take down.
- Most are not a big deal – they can be made sense of and cleared up in a couple of hours of work, thinking, and practice.
- But previous experience and phobias can make them hard to remove.
- The presence of a lot of these barriers can cause a lot of trouble.  Clean up as many as you can!

*Don't be afraid to come in and say, "I'm confused about fractions" – or anything else!*