What is special about our program?

- Great students and dedicated faculty
- Liberal Arts
- Flexibility:
  - Streams
  - Concentration
- Encourage students to find a way to make an impact using physics
Who are our majors?

27 Seniors: 15 physics concentrators, 5 astronomy, 1 each Bio, CS, Music, Chem, ECE, Imaging and Meteorology

Female/Male ratio: 40%

28+ Juniors

27+ Sophomores (more joining)

Students declare as Sophomores/Juniors

What do they do after Cornell?

Graduate Schools

Boston University -- Physics
Cal Tech -- Astrophysics
Cal Tech -- Physics
Colombia -- Physics
Cornell -- Applied Physics
Cornell -- Computer Science
Cornell -- Education
Cornell -- Operations
Cornell -- Research
Cornell -- Physics
Cambridge -- Mathematics
Duke -- Physics
Georgetown -- Medicine
Harvard -- Applied Physics
Harvard -- Physics
Max Planck Institute for Gravitational Physics
University of Chicago -- Law
University of Chicago -- Physics
University of Colorado at Boulder -- Applied Mathematics
University of Colorado at Boulder -- Physics
University of Washington -- Physics
Washington University in Saint Louis -- Physics
Wisconsin -- Astronomy
Wisconsin -- Physics
UC Santa Barbara -- Physics
UC Santa Cruz -- Physics
UC Berkeley -- Astronomy
UC Berkeley -- Physics
UC Irvine -- Physics
UC Los Angeles -- Physics
UC San Diego -- Electrical Engineering
UC Santa Cruz -- Physics
UC Berkeley -- Astronomy
UC Berkeley -- Physics
UC Irvine -- Physics
UC Los Angeles -- Physics

Private/Public Sector

Apple -- Software Engineer
Applied Materials -- Engineer
Booz Allen Hamilton -- Consultant
Cornell -- Lab Assistant
Cornell -- Research
Cornell LEPP -- Temp
Dana-Farber Cancer Institute -- Lab Technician
Dean & Company -- Analyst
Deloitte Consulting -- Analyst
Ernst and Young -- Financial Analyst
Ernst and Young -- Financial Analyst
Jet Propulsion Laboratory -- Associate Engineer
Lourdes Hospital -- Dosimetrist Assistant
M&S Engineering -- Hydrologist/CAD Technician
MIT Lincoln Laboratory -- Assistant Researcher
Stego Industries -- Regional Sales Manager
TRW -- General Engineer
US Dept of Energy -- Scientist
Weill Medical College -- Teaching Assistant
Yale Press -- Assistant

http://www.physics.cornell.edu/careers/outcomes/
What are our concerns

Community (recall: diverse directions of our majors)

- competitive vs collaborative
- inclusiveness
- helping students find right stream
- find ways for students to be integral part of department

Details (details matter)

- homework systems
- fine curricular issues (ex. which intro course gets thermodynamics)
- continuity
- interplay between Engineering Physics program and Physics
Give Students Resources

Info booklets
Posters Advertising Program
Info sessions
Clearly lay out course flowchart
Career guidance
SPS listserve
Web site
Clear directions on finding research
Remind them often why they love physics

In the absence of good information students invent their own (often misguided) narrative
Listen to students

Info sessions
• Beginning of year for freshmen
• Career Session in September

DUS meets one-on-one with all prospective majors

Invite Students to Lunch

Invite Students to Lunch

Online feedback
• Very effective in P1 101/2 (intro seq for life science students)
• GOOGLE docs works great

Gender Equity Conversation
(learned stuff which was not just about Gender Equity)
Inspire faculty to make efforts

Advertise Success

Cornell Department of Physics

Regularly discuss issues

Give them more personal contact with students

• Research
• Outreach
• Social
Give Students Responsibility

SPS

Research

Outreach

Helping with recruiting
- Meeting with prospectives
- Feedback on advertising material

Mentoring Opportunities

Teaching Opportunities

Opportunities to improve teaching labs
- Mixed results with having students help document existing labs
- Better results with having students help develop new labs
Big Success: study halls

Honors class (50 students)
Book room on Thurs. afternoon
(HW due on Friday)
TA available for 3 hours, faculty 1 hour

50% weekly participation
Good for morale and learning
Great collaborative process
Liked it more than “office hours”

(Same cohort responded poorly to cooperative learning exercises in recitation)
Multi-Projector - Interactive Pen Display Setup

- 1 PC
- 3 Projectors
- 1 interactive pen display
Motion Capture Labs

Make Strobe diagrams from 2D motion -- overlay frames of video

All analysis is manual (graphical finite differences)
In-lecture “Applications”

**Doppler Ultrasound Imaging**
- Used to image blood flow and flow profiles.
- **Flow velocity** $\propto$ **Doppler frequency shift**

**Blood flow in the carotid artery and jugular vein:**

**Blood flow in a healthy thyroid gland:**
Pre-lecture "Slideshows"

Homework assignments:
- Posted on web -- 2 weeks before due date (except for first assignment). Due every Friday in lecture. First HW due this Friday!

Cooperative Learning Problems/Tutorials:
- Assigned in recitation. You'll work on them in teams. Grading based on demonstrated effort.

Labs:
- First Lab: Feb 6. Pre-Lab questions must be completed by the start of each lab. Completion of all labs is mandatory.

Exams:
- Prelims: March 2, 7:30pm; April 6, 7:30pm
- Final: May 10

Collaboration on homework, and labs is strongly encouraged, but independently write up homework!

Trivia:

Proteins are made of amino acids, which contain nitrogen. What fraction of the nitrogen in your body has been through an ammonia factory?

Roughly 50%

Cartoons: