

# **Teaching and Mentoring Students**

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# Teaching: The contradictions

- Teaching students is why you are here, right?
  - Otherwise you would be at a research lab (?)
- Teaching can be very rewarding
  - But it can also be very frustrating
- “A university would be a great place except for the students”
- Teaching takes time, but how else are you going to get students to help with your research?

# How much effort to spend?

- **Great teaching won't get you tenure**
  - **But awful teaching will get you fired**
- **Spend enough time**
  - **To do well and be fair**
  - **To satisfy yourself**
- **Don't allow teaching to crowd out your research**

# **Courses to teach: Which and how many**

- **Focus on what you are good at**
- **Resist being drawn out of your area**
- **Get teaching release for research vitality**
- **Resist excessive new course preparation**
  - **Rerun courses (But not to excess)**

# What is undergraduate education about?

- **Communicate to students**
  - **Sense of excitement**
  - **Importance of the ideas**
- **Challenge the hacker culture**
- **Get them interested in graduate education**
  - **If they are capable**
- **Encourage females and minorities**

# What is graduate education about?

- **Training to do independent research**
  - Independent, critical thinking
- **Inculcation of the scientific method**
  - Hypothesis formation
  - Experimentation to validate hypotheses
- **Clear scientific exposition**
  - In writing
  - In speaking

# The Joy of Mentoring Grad Students

- **Good grad students will**
  - **Spread your message**
  - **Challenge you**
  - **Facilitate your own growth**
  - **Help you keep up with the literature**
  - **Be a source of new ideas (some may be good!)**
  - **Connect you to your colleagues**
    - **In your department**
    - **In the larger community**
  - **Connect you to other students**

# The Agony of Weak Grad Students

- They can
  - Sop up huge amounts of your time
  - Frustrate you
  - Antagonize you
  - Waste your money
  - Waste your good ideas
  - Write and speak poorly
- It is hard to know when to give up on them
  - Seek the advice of a senior colleague
  - Be humane: there are other things in life

# What is a PhD Program

- **Teaching the scientific method**
  - “Learn by doing”
  - **Emphasize hypothesis formation/evaluation**
- **NOT writing a big piece of software**
  - **SW is usually the experimental apparatus**
- **Challenge students to understand this**
  - **Repeatedly**
- **Emphasize clear exposition**

# The Sublime

- **Sending a well trained student off to a successful career is:**
  - **A boon to society**
  - **A triumph for your department and university**
  - **A source of enormous personal satisfaction**