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
  – 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