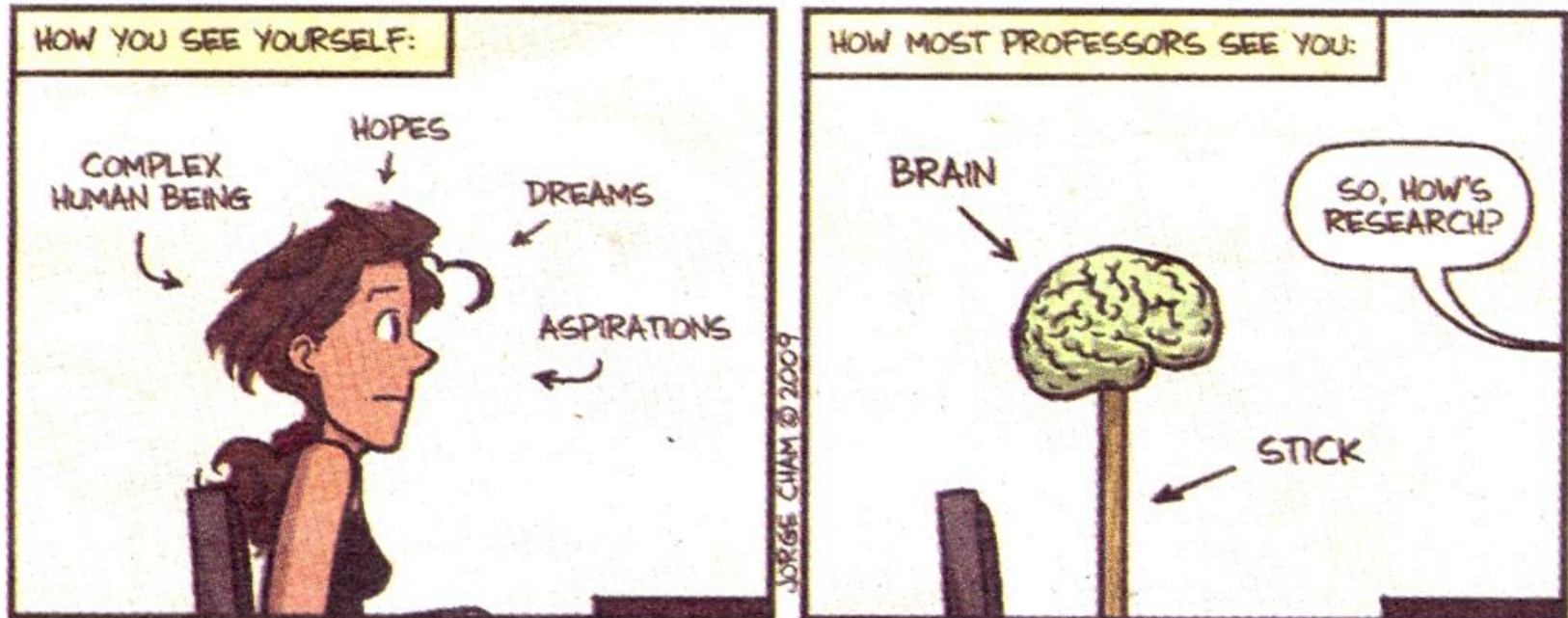


# Tips for finding an advisor

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# Finding an advisor

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- **What does an advisor do?**
  - Guides your PhD research
  - Generally funds your research
  - Is the main editor of your PhD thesis
  - Helps you make contact with others in the scientific community
- **How many advisors are there at UIUC?**

Approx. 70-80 professors supervise students for physics PhD (not just in Physics!! ~10% of Physics grad students do research in other departments!)
- **How many students are there here?**
  - Approx. 265 students are seeking physics PhD (most advanced grad students already have advisors)

# Key decisions you'll need to make

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## 1. What area of research interests you?

To be happy and successful in a longish (~5-6 years) grad school career, you **MUST** be driven by an important physics problem!

**Astrophysics** - Physical processes of planets, stars, galaxies,...

**Atomic and Molecular Physics** - Physics of atomic or molecular systems

**Biophysics** - Physical processes of biological molecules

**Condensed Matter** - Physics of materials, solid phases of matter

**Nuclear/Medium Energy Physics** - Physics of atomic nucleus, muons, protons, neutrons, other particles

**Particle/High Energy Physics** - Study fundamental constituents of matter

**Physics Education Research** - Study how we learn science concepts

**Quantum Information** - Study/Exploitation of quantum 'weirdness'

# Key decisions you'll need to make

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## 2. Do you want to be a theorist or an experimentalist?

To be happy and successful in a longish (~5-6 years) grad school career, you **also** MUST get some enjoyment from the more mundane day-to-day activities associated with your research, NOT just the “big picture” goal of your research...

### Theorists must enjoy:

Analytical calculations

Mathematics

Developing models

Programming

### Experimentalists must enjoy:

Equipment building and  
troubleshooting

Electronics

Data Acquisition and Analysis

Programming

# Key decisions you'll need to make

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2. Do you want to be a theorist or an experimentalist?

Are you interested in elements of both experiment and theory?

“Computational” Physicists must enjoy:

Mathematics

Developing and testing models

Programming and troubleshooting code

# What Do Students Do at Illinois?

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- About 35% of students do theory, 65% do experiment
- Of the students who change (theory to experiment) or (experiment to theory), most started in theory and change to experiment

If you want to have elements of both theory and experiment in your research, generally speaking, it's probably a little easier to do theory as an experimentalist than to do experiments as a theorist (try computational physics if you like programming!).

# Key decisions you'll need to make

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## 3. What *style* of research/advisor interests you?

- Large collaborative project vs. Small individual project  
(high energy/nuclear vs. condensed matter/biophysics)
- Pure subfield vs Interdisciplinary research
- “Hands on” advisor vs. “Hands off” advisor
- New project/lab vs Established project/lab

# How can you tell what research you like?

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- You just know
- Based upon classes you liked best or did well in
- From undergraduate research projects you liked or didn't like
- By seminars you see that inspired you (or didn't!)

Take advantage of this first semester/year to identify research areas that interest you:

- Attend seminars/colloquia:

<http://physics.illinois.edu/events/seminar-listing.asp>

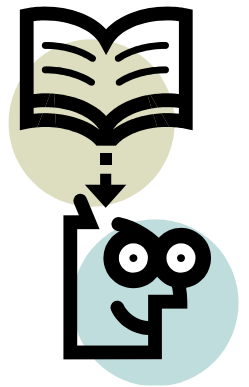
- Explore the research websites:

<http://physics.illinois.edu/research/>

- Talk with faculty: <http://physics.illinois.edu/people/>

- Look for grad blog research postings:

<http://physics.illinois.edu/grad/posts.asp>





# What advisors are looking for

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## Experimental advisors:

- Most experimental advisors would like, but don't require, laboratory experience...i.e., they will generally train you
- Those building a new lab – and those with more sophisticated experiments -- may want more experimental background in a new student
- In general, experimental advisors are less grade conscious and much less concerned with how you did on the qual
- They're less concerned with which courses you've taken, e.g., the Biophysicists/Condensed Matter/AMO experimentalists will accept you in their groups even if you have no Biology/Condensed Matter/AMO experience
- Will generally start you in the group with intro projects

# What advisors are looking for

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## Theory advisors:

- Theory advisors are generally more grade-conscious, more likely to check qual results
- May want you to have more advanced courses (e.g., **quantum field theory**, etc.) before taking you as a student
- Generally want a strong math background
- Will generally evaluate you with “starter” problems before accepting you into the group
- Keep in mind that many theory groups (particularly in condensed matter) have many students and may be difficult to break into

# Some Tips

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- Don't be too "calculating" about your decision: **research can be hard sometimes, so find something that excites/inspires you!!**
- Don't forget about opportunities outside the physics department (**Materials Science, Chemistry, Electrical Engineering, etc.**)
- Explore a little...don't assume you're sure you know what you want to do: **keep an open mind as you're watching the different research presentations in Phys 596**
- Don't assume a faculty member isn't looking for students if he/she doesn't give a 596 talk!
- Your quality of life has a definite impact on the quality of research you can do, so find an advisor and group environment you are comfortable with

# More Tips

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- Be a little practical: To do experimental research, it helps to have some mechanical aptitude. To do theoretical research, it helps to be strong analytically.
- Physics 597, Independent Study is a course and you'll get a grade! Take it seriously!
- If you start out in a group and are not happy, it is expected that you may switch, and switching is common
- The level of commitment increases with time in the group and with the degree to which you are supported by your advisor's research grants
- If you want advice on how to negotiate a group change, contact me

# Goals and Time frames

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- **Goal:** start an independent study with an advisor (Physics 597)
- **Time frames:**
  - Hang around the lab/group by Fall 2015 or Spring 2016
  - Try to start formally with a group by no later than Summer 2016

# How to find an advisor

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- Identify potential advisors
  - Look over their research pages on <http://physics.illinois.edu/research/>
  - Go to their seminars
  - Send them an e-mail to ask if you can meet to talk about their research
  - Talk with grad students of potential advisors to find out about style of research and group environment

# Questions to ask a potential advisor

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- Is he/she taking students? If “no”, then when will they take on students?
- Are the advisor’s research projects collaborative (multiple students), or does every student have his/her own project?
- Will you be expected to build a new apparatus (or write new code, perform a new calculation, etc.), or will you jump into the middle of a well-developed project that follows up another student’s research?
- Is it likely you’ll be constantly funded during your time with the group, or will you be expected to TA periodically?

# How to find an advisor

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- Once you've identified an advisor you're interested in, get your foot in the door
  - Ask about attending group meetings
  - Ask about getting involved with small projects, even if you're not funded
  - Start early (this semester, if possible, or next semester at the latest!)
  - There is no commitment (on either side) for you to stay with a group!

Research opportunities generally don't come to you...you need to be proactive and track down opportunities. Start early and get over any shyness!