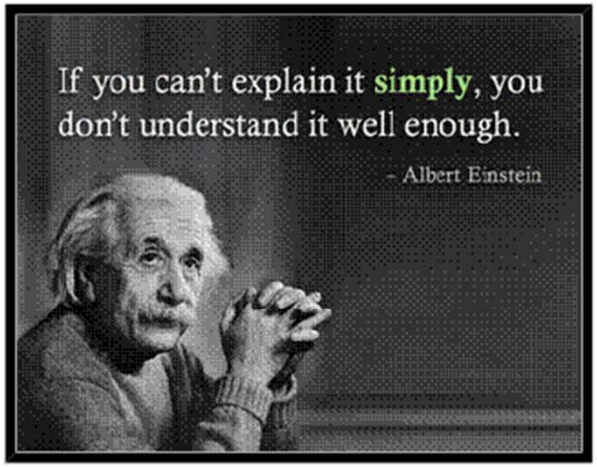
# Physics 596 Course Introduction, Fall '13




## Physics 596

**Graduate Physics Orientation**

**Fall 2013**

*The whole of science is nothing more than a refinement of everyday thinking.*

—Albert Einstein, Physics and Reality, 1936

Home | Course Info | Syllabus | Assignments | Resources

## Course Instructor:

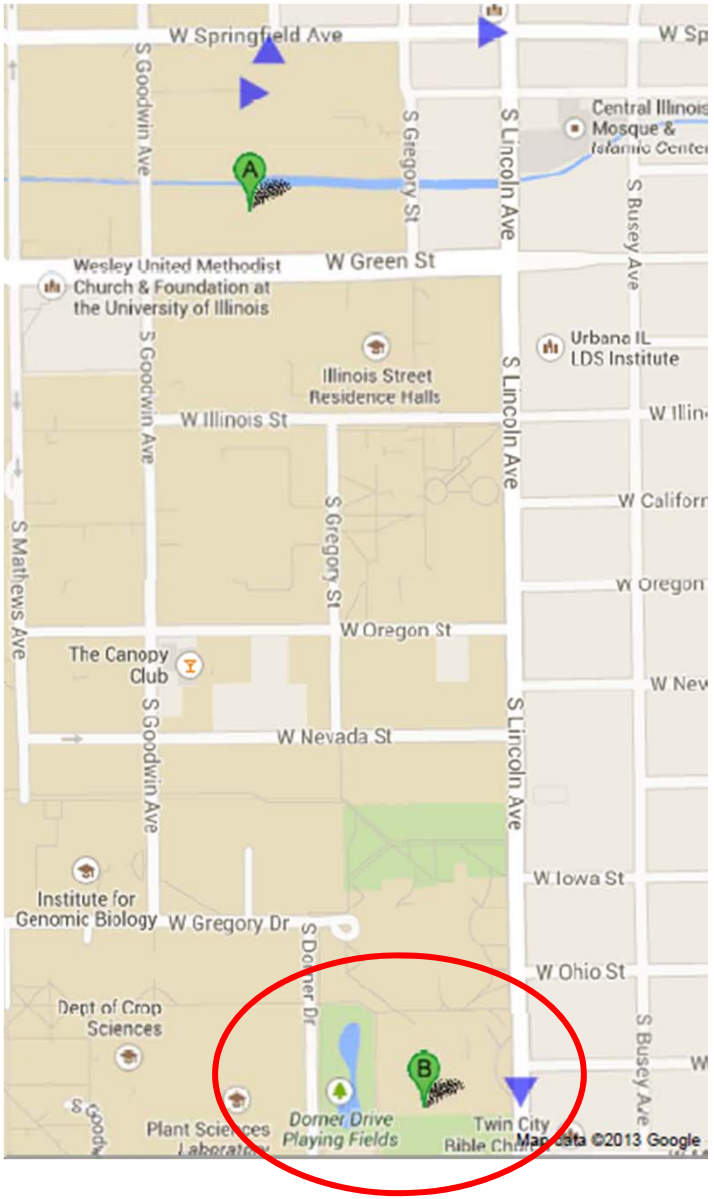
Lance Cooper: 218 MRL, 333-2589 (research)
227B Loomis, 333-8702 (departmental)

## Course webpage:

http://courses.physics.illinois.edu/phys596/

# Upcoming Events

- Departmental Picnic
  - Saturday, September 7, 4-7 PM, Illini Grove



# Upcoming Events

- Ellnora Guitar Festival
  - Wednesday, September 4 – Sunday, September 7, Krannert Performing Arts Center

# Our goals for you in Phys 596

## Introduce you to research opportunities in Physics, etc.

Help you connect with a research advisor!

## Help you learn methods to write and speak persuasively

The scientific community tends to be skeptical, so your scientific writing and presentations must be convincing!

## Help you learn to navigate the scientific literature

Researching existing literature is critical for planning future work, writing proposals, writing papers, etc.

## Help you learn to work in and lead a team

Collaboration is key in science

## Provide insights into how the “world of science” works

e.g., how publication process works, what happens at scientific conferences, how to find advisors, how to write and research scientific papers/presentations, etc.

## $\Rightarrow$ Help you transition from undergraduate to graduate ‘mindset’

# Elements of Phys 596

1. Help finding a research group
   - Faculty research presentations throughout the semester

**Scheduled so far:**

Astrophysics theory: Brian Fields, Charles Gammie

Biological physics: Aleksei Aksimentiev, Nigel Goldenfeld, Taekjip Ha, Ting Lu, Klaus Schulten, Paul Selvin, Jun Song

Chemical physics theory: Sharon Hammes-Schiffer

Condensed matter experiment: Nadya Mason, Russ Giannetta, Laura Greene, Dale Van Harlingen

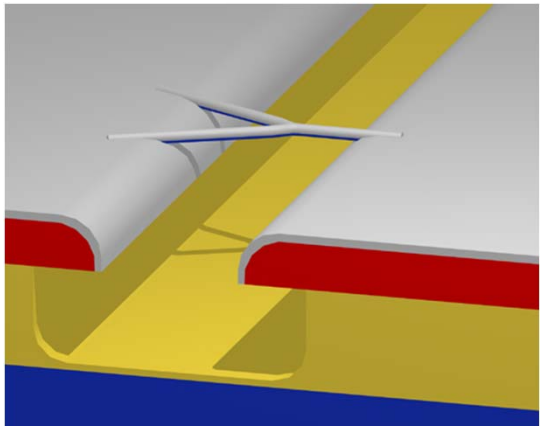
Condensed matter theory: Tony Leggett

High energy: Jessie Shelton

Medium energy: Matthias Perdekamp

# Elements of Phys 596

## 2. Skills essential to researchers



### Writing/Presentation Skills

- How to create and present journal club and research talks
- How to write persuasive scientific papers

### Scientific Scholarship

- How to use on-line databases useful for research

### Learning how to do what scientists do

- Learning to write referee reports
- Learning how the publication process works

### *Scientific Ethics

- Discuss real life case studies

*Required by OVCR & NSF

# Elements of Phys 596

3. Instruction and practice giving scientific presentations and writing scientific papers

- Create and present a journal club talk
- Write a referee report on your journal club paper
- We'll talk about how to design a scientific poster

# Why is Persuasive Writing and Speaking Important in Science?

A sample of what I wrote (or helped write) during the last year:

3 journal articles…

1 book chapter…

1 huge research proposal…

A large number of recommendation letters!…

~ 15 referee reports on manuscripts and proposals…

Several seminar talks, lecture notes, etc., etc.

This is typical of scientists!  We must write, write, write!

# Why is Persuasive Writing and Speaking Important in Science?

It's not just all about good data/calculations: you will be judged as much for the quality of your thinking and presentation as for the quality of your results

Scientists in general, *but physicists in particular*, are naturally skeptical ⇒ your results and ideas will not often be received without resistance, so your conclusions must be supported logically and persuasively

**It will be particularly important for you to communicate your results to non-experts**

- prelims and dissertation defenses
- proposals
- colloquia
- public lectures

⇒ we'll emphasize this in this class

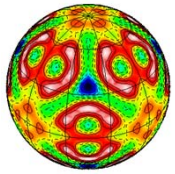
# Elements of Phys 596

## 4. Practice in collaboration: working in teams

| TEAM | Student |
|---|---|
| TEAM 1 | Aneja, Jyoti |
| | Busemeyer, Brian |
| | Cartolano, Melinda (Mindy) |
| | Casavant, David |
| TEAM 2 | Christensen, Brendt |
| | Coon, Matt |
| | Dutta, Souvik |
| TEAM 3 | Fraebel, David |
| | Gaidau, Cristian |
| | Gariepy, Allycia |
| | Garrido Menacho, Rita |
| TEAM 4 | Hlevyack, Joseph |
| | Jin, Hu |
| | Khader, Mazin |
| | Kim, Junhyung (Edward) |
| TEAM 5 | Kochkov, Dmitrii |
| | Kulinich, Yakov |
| | Lao, Yuyang |
| | Laracuente, Nicholas |
| TEAM 6 | Le, Brian |
| | Lee, Gloria |
| | Mickalide, Harry |
| | Moon, Woo Young |

| | |
|---|---|
| TEAM 7 | Myers, Donovan |
| | Neulinger, Thomas |
| | Park, Junk Sik |
| | Petrica, Gabriel |
| TEAM 8 | Quiroz, Matthew |
| | Schlesier, Cristina |
| | Sethi, Astha |
| | Shapera, Ethan |
| TEAM 9 | Shapourian, Seyed Mohammad |
| | Song, Yifan |
| | Vandamme, Derek |
| | Villalonga Correa, Benjamin |
| TEAM 10 | Williams, Kiel |
| | Yoritomo, John |
| | Zeitler, Christopher |
| TEAM 11 | Zeng, JianCong |
| | Zhang, Matt |
| | Zhao, Chenchao |

http://courses.physics.illinois.edu/phys596/courseinfo.html



# Grading Policy

- Complete the assignments
- You'll critique each other's work. Your work won't be graded so much on content as on the fact that it has been completed *conscientiously*!
- Attendance is required!!

Don't worry about your grade in this class!!

⇒You'll do well if you complete the assignments

⇒ The skills you develop will be far more important than the grades you get here!!

# Our agenda

http://courses.physics.illinois.edu/phys596/

## Physics 596 - Course Syllabus - Fall 2013

(Syllabus is subject to change!)

| Week | Date | Topics | Lectures | Assignments | Reading |
|---|---|---|---|---|---|
| 1 | Aug 30 | Introduction and course expectations<br>How to find an advisor<br>Creating/giving a journal club presentation | slides<br>slides<br>slides | Major Group Assignment<br>Create and present a group Journal Club PowerPoint talk + individual referee reports | |
| 2 | Sep 6 | Research in Theoretical Astrophysics - Prof. Charles Gammie<br>Research in Theoretical Condensed Matter Physics - Prof. Tony Leggett<br>Tips for reading a scientific paper<br>Publication process; How to write a referee report | slides<br>slides | | |

# Our agenda (cont.)

| | | | | | |
|---|---|---|---|---|---|
| 3 | Sep 13 | Research in Experimental Biological Physics - Prof. Paul Selvin<br><br>How to use on-line scientific resources<br><br>On-line research with SCOPUS | slides<br><br>slides | mini-Assignment #1<br>On-line resource activities | Resource Activities<br><br>Prof. Casey Miller's (U. South Florida) advice on using scientific resources |
| 4 | Sep 20 | Research in Theoretical Biological Physics - Prof. Alek Aksimentiev<br><br>Research in Experimental Nuclear Physics - Prof. Matthias Perdekamp | | | |
| 5 | Sep 27 | Research in Theoretical Biological Physics - Prof. Klaus Schulten<br><br>How to write an abstract | slides | mini-Assignment #2<br>Write an abstract for selected paper | Abstract Papers |

# Our agenda (cont.)

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|---|---|---|---|---|---|
| 6 | Oct 4 | Research in Experimental Condensed Matter Physics - Prof. Nadya Mason<br><br>Research in Systems Biology - Prof. Nigel Goldenfeld<br><br>Research in Experimental Condensed Matter Physics - Prof. Russ Giannetta | | | |
| 7 | Oct 11 | Ethics in research | slides | | Ethics Case Studies |
| 8 | Oct 18 | Research in Theoretical High Energy Physics - Prof. Jessie Shelton<br><br>Research in Theoretical Biological Physics - Prof. Jun Song | | | |
| 9 | Oct 25 | Effective scientific presentations<br><br>Research in Theoretical Astrophysics - Prof. Brian Fields | slides | | |
| 10 | Nov 1 | Research in Experimental Condensed Matter Physics - Prof. Laura Greene<br><br>Creating a scientific poster | slides | | Scientific Poster Example/Template |

# Our agenda (cont.)

| | | | | | |
|---|---|---|---|---|---|
| 11 | Nov 8 | Research in Experimental Biological Physics - Prof. Taekjip Ha<br><br>Research in Biological Physics - Prof. Ting Lu (Bioengineering) | | | |
| 12 | Nov 15 | Journal club presentations | | | |
| | Nov 22 | THANKSGIVING BREAK | | | |
| 13 | Nov 29 | Journal club presentations (cont.) | | | |
| 14 | Dec 6 | Journal club presentations (cont.) | | | |