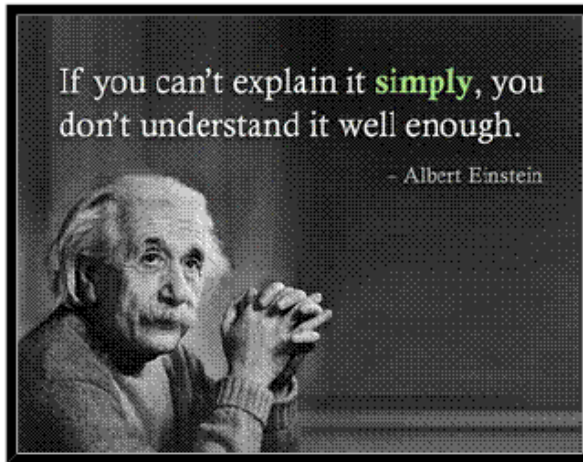


# Physics 596 Course Introduction, Fall '16

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## Physics 596

### Graduate Physics Orientation Fall 2016

*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 Instructors:

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

**Celia Elliott:** 215 Loomis, 244-7725 (departmental)

**Course Webpage:** <https://courses.physics.illinois.edu/phys596/fa2016/index.html>

# Our goals for you in Phys 596

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Introduce you to research opportunities in Physics, etc.

Help you connect with a research advisor (about 70% of course)

Help you improve your abilities in scientific communication

Methods for making your scientific writing and presentations more persuasive

Teach you how to navigate the scientific literature

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

Gain practice working in and leading a team

Collaboration is key in science

Provide details 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.

# Elements of Phys 596

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## 1. Help finding a research group

- Faculty research presentations throughout the semester

### Scheduled so far:

**Astrophysics:** Jeff Filippini, Telemachos Mouschovias, Joaquin Vieira

**Biological physics:** Aleksei Aksimentiev, Yann Chemla, Ting Lu, Klaus Schulten, Jun Song

**Condensed matter experiment:** Tai Chiang, Pinshane Huang, Alfred Hubler, Greg MacDougall, Peter Schiffer, Dale Van Harlingen

**Condensed matter computation/theory:** David Ceperley, Taylor Hughes, Tony Leggett, Nancy Makri, Smitha Vishveshwara, Lucas Wagner

**High energy:** Tom Faulkner

**Intermediate energy:** Liang Yang

# Elements of Phys 596

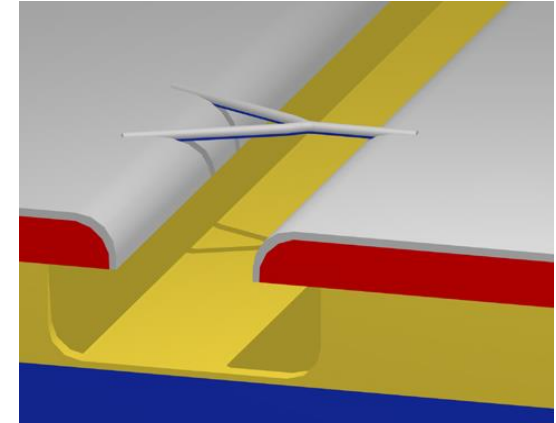
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## 2. Skills essential to researchers

### 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

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## 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
- Give effective scientific presentations
- Write effective scientific papers and abstracts

# Why is Persuasive Writing and Speaking Important in Science?

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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

**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

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## 4. Practice in collaboration: working in teams

Team	Student
1	Arias, Gilbert Bailey, Virginia Bandak, Dmytro Bolan, Kathleen
2	Bowers, John Cao, Yumeng (Goten) Ceyhan, Fikret Chang, Yueqing
3	Chapman, Joseph Du, Muyan Dubinkin, Oleg Ehrlich, Gabriel
4	Erickson, Cameron Goldman, Hart Gopalakrishnappa, Chandana Kish, Lazar
5	Kowalski, Nicholas Lee, Daeyoung Levy, Ryan Li, Min
6	Lin, Shan Lin, Yao-Yu Lu, Kannan Luo, Di

7	Luu, Alan Lv, Yinchuan Lynch, Michael Mattson, Gregory
8	Miller, August Miller, Timothy Nakib, Mayisha Nguyen, Viviana
9	Oh, Junseok Olivares Rodriguez, Jorge Pathak, Shivesh Rhyno, Brendan Douglas Romero, Anabel
10	Shaw, Elle Sohal, Ramanjit Subramanyan, Varsha Velury, Saavanth
11	Vetaw, Gregory Wei, Wei Weiner, Zachary Wong, George
12	Yeo, Luke Yuan, Jimmy Zhang, Lizhong Zhang, Xiaoyu Zhong, Dewen

[https://courses.physic  
s.illinois.edu/phys596/f  
a2016/courseinfo.html](https://courses.physic.s.illinois.edu/phys596/fa2016/courseinfo.html)

# Grading Policy

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- 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 grade you get here!!





# Our agenda (cont.)

3	Sep 9	<p><b>Research in Experimental Condensed Matter Physics - Prof. Greg MacDougall</b></p> <p><b>Research in Experimental Astrophysics - Prof. Joaquin Vieira</b></p> <p><b>How to use on-line scientific resources</b></p> <p><b>On-line research with SCOPUS</b></p>	<p><a href="#">slides</a></p> <p><a href="#">slides</a></p>	<p><a href="#">mini-Assignment #1</a></p> <p>On-line resource activities</p>	<p><a href="#">Resource Activities</a></p> <p><a href="#">Prof. Casey Miller's (U. South Florida) advice on using scientific resources</a></p>
4	Sep 16	<p><b>Research in Computational Biological Physics - Prof. Alek Aksimentiev</b></p> <p><b>Research in Computational Condensed Matter Physics - Prof. David Ceperley</b></p> <p><b>Research in Computational Condensed Matter Physics - Prof. Lucas Wagner</b></p>			
5	Sep 23	<p><b>Research in Computational/Theoretical Biological Physics - Prof. Jun Song</b></p> <p><b>Research in Medium Energy and Nuclear Physics - Prof. Liang Yang</b></p> <p><b>How to write a scientific abstract</b></p>	<p><a href="#">slides</a></p>	<p><a href="#">mini-Assignment #2</a></p> <p>Write an abstract for selected paper</p>	<p><a href="#">Abstract Papers</a></p>

# Our agenda (cont.)

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6	Sep 30	<p><b>Research in Experimental Condensed Matter Physics - Prof. Peter Schiffer</b></p> <p><b>Research in Theoretical Condensed Matter Physics - Prof. Smitha Vishveshwara</b></p> <p><b>Research in Theoretical Astrophysics - Prof. Telemachos Mouschovias</b></p>			
7	Oct 7	<p><b>Research in Experimental Biological Physics - Prof. Yann Chemla</b></p> <p><b>Research in Complex Systems - Prof. Alfred Hubler</b></p>			
8	Oct 14	<p><b>Ethics in research</b></p>	<p><a href="#">slides</a></p>		<p><a href="#">Ethics Case Studies</a></p>
9	Oct 21	<p><b>Research in Experimental Condensed Matter Physics - Prof. Tai Chiang</b></p> <p><b>Research in Experimental Condensed Matter Physics - Prof. Dale Van Harlingen</b></p>			

# Our agenda (cont.)

10	Oct. 28	<b>Research in Theoretical Condensed Matter Physics - Prof. Tony Leggett</b> <b>Research in Experimental Astrophysics - Prof. Jeff Filippini</b> <b>Giving effective scientific presentations</b>	<a href="#">slides</a>		
11	Nov 4	<b>Research in Computational Biological Physics - Prof. Klaus Schulten</b> <b>Research in Theoretical High Energy/Condensed Matter Physics - Prof. Tom Faulkner</b> <b>Research in Theoretical Chemical Physics - Prof. Nancy Makri</b>			
12	Nov 11	<b>Research in Computational Biological Physics - Prof. Ting Lu</b> <b>Journal club presentations:</b>		<a href="#">Scientific Poster Example/Template</a>	
13	Nov 18	<b>Journal club presentations:</b>			
	Nov 25	<b>THANKSGIVING BREAK</b>			
14	Dec 2	<b>Journal club presentations:</b>			