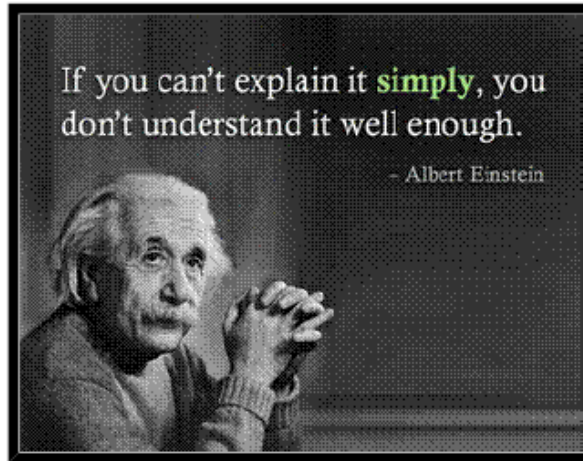


Physics 596 Course Introduction, Fall '18



Physics 596

Graduate Physics Orientation Fall 2018

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/fa2018/index.html>

Our goals for you in Phys 596

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

1. Help finding a research group

- Faculty research presentations throughout the semester

Scheduled so far:

Astrophysics: Gil Holder, Joaquin Vieira

AMO/Quantum Information: Bryce Gadway, Gina Lorenz

Biological physics: Alek Aksimentiev, Gabriel Juarez, Sangjin Kim, Ting Lu, Jun Song

Condensed matter experiment: Gaurav Bahl, Alexey Bezryadin, Tai Chiang, Vidya Madhavan, Nadya Mason, Yingjie Zhang

Condensed matter computation/theory: Barry Bradlyn, Karin Dahmen, Taylor Hughes, Lucas Wagner, Smitha Vishveshwara

Intermediate energy: Anne Sickles

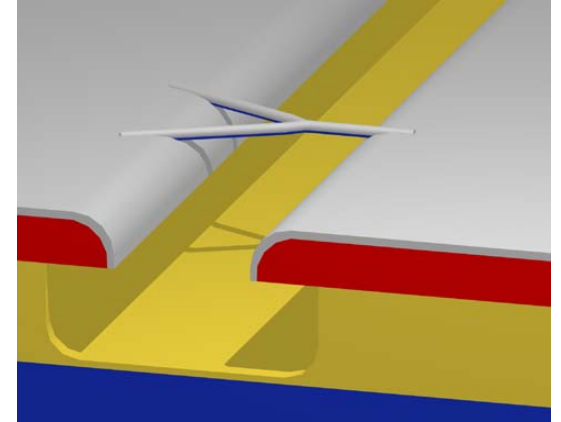
Elements of Phys 596

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

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

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	Last Name	First Name
1	Agrawal	Shraddha
	Baker	Carina
	Basa	Bora
	Beach	Alexander
2	Birchmier	Rachel
	Chalise	Darshan
	Conrad	Andrew
	Doolittle	Brian
3	Fredman	Nathan
	Futch	April
	Ganesan	Vishal
	Goswami	Shubhang
4	Guo	Xuefei
	Gysbers	Daniel
	Howland	Porter
	Huang	Zemin
5	Isaac	Samantha
	Kengle	Caitlin
	Kim	Dong Beom
	Langeslay	Blake

6	Leung	Ching Him
	Li	Zeqian
	Lin	Kuan-Sen
	Liu	Gengming
7	Liu	Zejun
	Lu	Chunyu
	Mansingh	Siddharth
	McKay	Robert
8	Meredith	Logan
	Mirasola	Anthony
	Montone	Jessica
	Mozaffari Shamsi	Tahereh
9	Raghavan	Arjun
	Shim	Soho
	Spina	Julia
	Troyer	Laura
10	Velkovsky	Ivan
	Wang	Xiaoning
	Wu	Junyi
	Wu	Tianhao
11	Yin	Shengzhu
	Zheng	Kai
	Ziemann	Matthew

<https://courses.physics.illinois.edu/phys596/fa2018/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 grade you get here!!

Our agenda

Physics 596 - Course Syllabus - Fall 2018

(Syllabus is subject to change!)

<https://courses.physics.illinois.edu/phys596/fa2018/syllabus.htm>

Week	Date	Topics	Lectures	Assignments	Reading
1	Aug 31	Introduction and course expectations How to find an advisor	slides slides	Major Group Assignment Create and present a group Journal Club PowerPoint talk + individual referee reports	
2	Sep 7	Research in Experimental Condensed Matter Physics - Prof. Yingjie Zhang Creating/giving a journal club presentation	slides		

Our agenda (cont.)

3	Sep 14	<p>Research in Theoretical Condensed Matter Physics - <u>Prof. Taylor Hughes</u></p> <p>How to use on-line scientific resources</p> <p>On-line research with SCOPUS</p>	<p>slides</p> <p>slides</p>	<p><u>mini-Assignment #1</u></p> <p>On-line resource activities</p>	<p>Resource Activities</p> <p>Prof. Casey Miller's (U. South Florida) advice on using scientific resources</p>
4	Sep 21	<p>Research in Theoretical Astrophysics, Gravitation, and Cosmology - <u>Prof. Gil Holder</u></p> <p>Research in Theoretical Condensed Matter Physics - <u>Prof. Barry Bradlyn</u></p> <p>Publication process; How to write a referee report</p>	<p>slides</p>		
5	Sep 28	<p>Research in Theoretical Condensed Matter Physics - <u>Prof. Karin Dahmen</u></p> <p>Research in Experimental AMO and Condensed Matter Physics - <u>Prof. Gina Lorenz</u></p> <p>How to write a scientific abstract</p>	<p>slides</p>	<p><u>mini-Assignment #2</u></p> <p>Write an abstract for selected paper</p>	<p>Abstract Papers</p>

Our agenda (cont.)

6	Oct 5	<p>Research in Experimental Condensed Matter Physics - Prof. Nadya Mason</p> <p>Research in Experimental Nuclear Physics - Prof. Anne Sickles</p> <p>Research in Experimental Astrophysics/Cosmology - Prof. Joaquin Vieira</p>			
7	Oct 12	<p>Research in Computational Condensed Matter Physics - Prof. Lucas Wagner</p> <p>Research in Experimental Condensed Matter Physics - Prof. Tai Chiang</p> <p>Research in Experimental Optomechanics and Microfluidics - Prof. Gaurav Bahl</p>			
8	Oct 19	<p>Ethics in research</p>	<p>slides</p>		<p>Ethics Case Studies</p>
9	Oct 26	<p>Research on Quantum Devices and Qubits - Prof. Alexey Bezryadin</p> <p>Research in Condensed Matter Theory - Prof. Smitha Vishveshwara</p> <p>Research in Cold Atom Gas Systems - Prof. Bryce Gadway</p>			

Our agenda (cont.)

10	Nov 2	<p>Research in Experimental Condensed Matter Physics - Prof. Vidya Madhavan</p> <p>Research in Computational/Theoretical Biological Physics - Prof. Jun Song</p> <p>Template for a journal club presentation</p>	slides		
11	Nov 9	<p>Research in Experimental Biological Physics - Prof. Gabriel Juarez</p> <p>Research in Computational Biological Physics - Prof. Aleksei Aksimentiev</p> <p>Research -</p>			
12	Nov 16	<p>Research in Computational Biophysics - Prof. Ting Lu</p> <p>Research -</p> <p>Research -</p>	Scientific Poster Example/Template		
	Nov 23	Thanksgiving Break			
13	Nov 30	Journal club presentations:			
14	Dec 7	<p>Research in Experimental Biophysics - Prof. Sangjin Kim</p> <p>Journal club presentations:</p>			