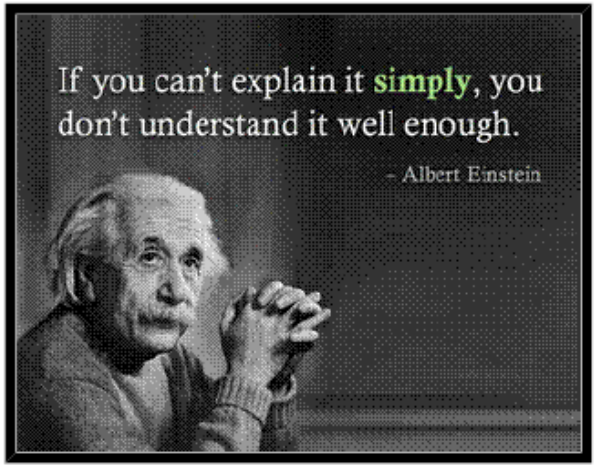
Physics 596 Course Introduction, Fall '25



Physics 596

Graduate Physics Orientation

Fall 2025

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: 227B Loomis, 333-2589

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

Course Webpage: https://courses.physics.illinois.edu/phys596/fa2025/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: Help Finding a Research Group

22 Faculty talks scheduled so far:

AMO/Quantum Information: Angela Kou, Paul Kwiat, Wolfgang Pfaff

Astrophysics/Gravitation/Cosmology: Antonios Tsokaros, Joaquin Vieira, Helvi Witek

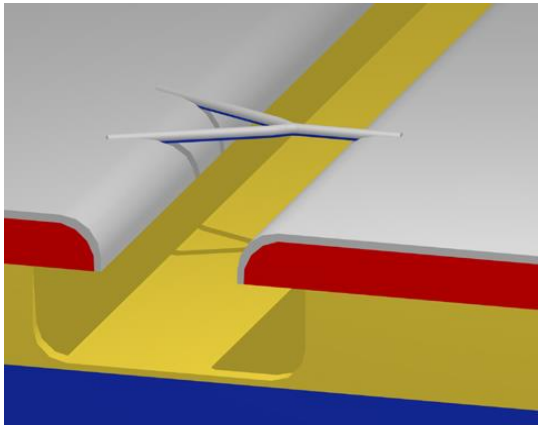
Biological physics computation and experiment: Alek Aksimentiev, Ido Golding, Hyun Youk

Condensed matter experiment: Lu Chen, Angela Kou, Vidya Madhavan, Fahad Mahmood, Pengjie Wang, Yingjie Zhang

Condensed matter computation/theory: Bryan Clark, Karin Dahmen, Rafael Fernandes, Taylor Hughes, Zan Luthey-Schulten, Lucas Wagner

High Energy Physics: Ben Hooberman, Tanner Trickle

Elements of Phys 596: Refine Research Skills



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

Practicing how to do what scientists do

- Writing referee reports
- Learning how the publication process works

*Scientific Ethics

- Discuss real life case studies

*Required by OVCR & NSF

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 and accessibility of your logical 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

$\Rightarrow$ we'll emphasize this in this class

Elements of Phys 596: Practice Collaboration

https://courses.physics.illinois.edu/phys596/fa2025/courseinfo.html

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	Shi	Kun	kuns2@illinois.edu

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

Lectures will be videotaped and posted on “Phys 596 Fall 2025” Channel on Media Space

https://courses.physics.illinois.edu/phys596/fa2025/syllabus.htm

Physics 596 Fall 2025 Channel on Media Space

Week	Date	Topics	Lectures	Assignments	Reading	Zoom/Video
1	Aug 29	**Introduction and course expectations** **Finding an advisor and tips for succeeding in grad school** **Discussion with Physics Grad Student Leadership of the Graduate Peer Mentoring (GPM) program**	slides slides	Major Group Assignment Create and present a group Journal Club PowerPoint talk + individual referee reports		Zoom Link Video Recording
2	Sep 5	**Research in Theoretical Condensed Matter Physics and Grad School Advice - Prof. Taylor Hughes** **Creating/giving a journal club presentation**	slides			Zoom Link Video Recording
3	Sep 12	**Science publication process and writing referee reports** **Research in Experimental Condensed Matter Physics - Prof. Pengjie Wang** **Research in Computational Biophysics - Prof. Alek Aksimentiev**	slides			Zoom Link Video Recording

Physics 596 Fall 2025 Media Space Channel

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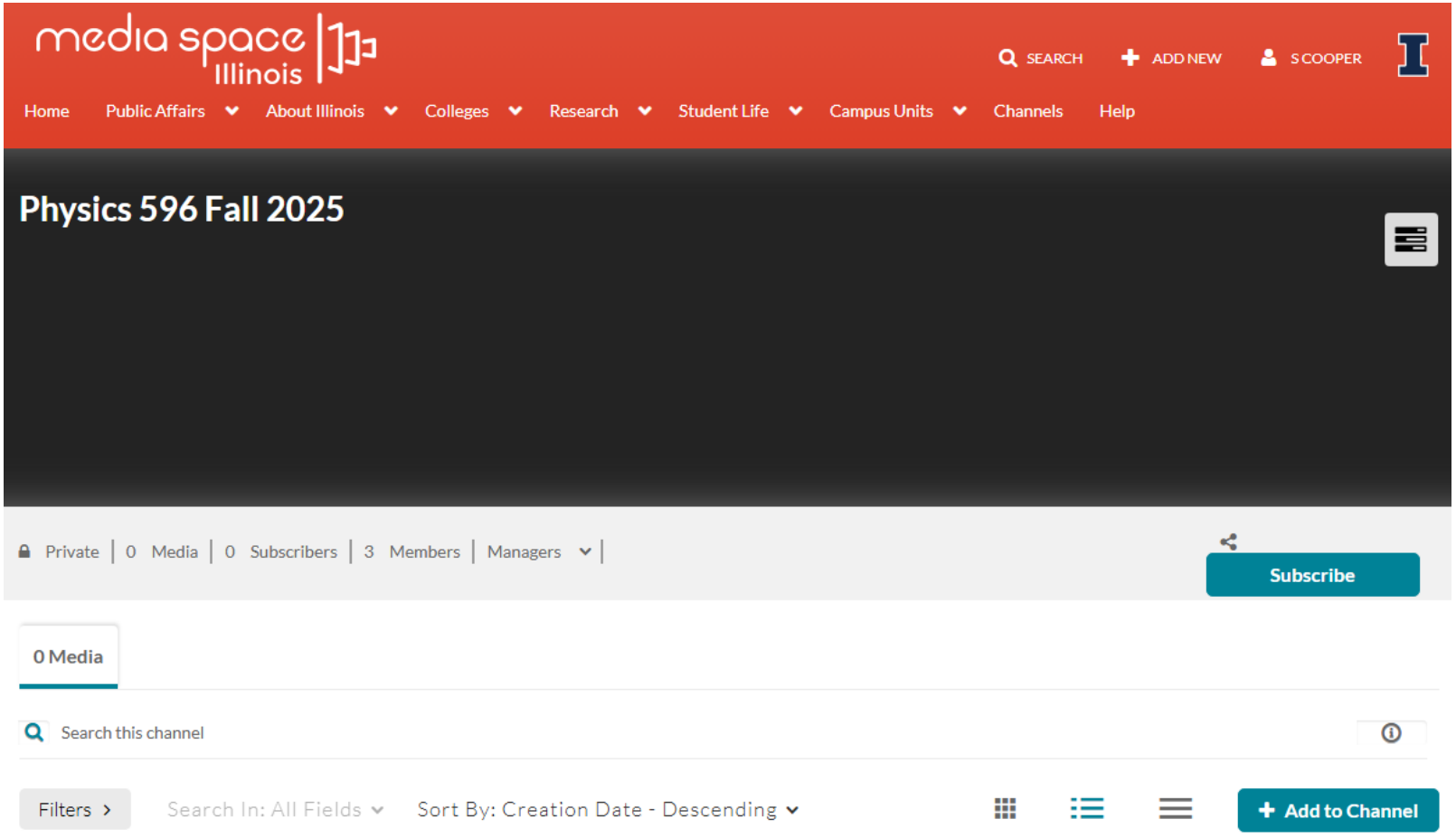

Bookmark and subscribe to get posting notifications

Our agenda

Zoom links to the lectures can be found here for students attending remotely, but we'd prefer you attend in person if possible

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Our agenda

Links to lecture videotapes on the Phys 596 Media Space channel can be accessed here

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Our agenda

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Research lectures by faculty looking for students (in blue)

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Our agenda

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Professional development activities and lectures (in brown)

Physics 596 Fall 2025 Channel on Media Space

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1	Aug 29	**Introduction and course expectations** **Finding an advisor and tips for succeeding in grad school** **Discussion with Physics Grad Student Leadership of the Graduate Peer Mentoring (GPM) program**	slides slides	Major Group Assignment Create and present a group Journal Club PowerPoint talk + individual referee reports		Zoom Link Video Recording
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3	Sep 12	**Science publication process and writing referee reports** **Research in Experimental Condensed Matter Physics - Prof. Pengjie Wang** **Research in Computational Biophysics - Prof. Alek Aksimentiev**	slides			Zoom Link Video Recording

Our agenda (cont.)

https://courses.physics.illinois.edu/phys596/fa2025/syllabus.htm

4	Sep 19	**Research in Theoretical Condensed Matter Physics - Prof. Rafael Fernandes** **Research in Experimental and Computational Biophysics - Prof. Hyun Youk** **Research in Experimental Condensed Matter Physics - Prof. Lu Chen**				Zoom Link Video Recording
5	Sep 26	**Using on-line scientific resources** **Research in Theoretical and Computational Astrophysics - Prof. Helvi Witek** **Research in Computational Condensed Matter and Quantum Information - Prof. Bryan Clark**	slides	mini-Assignment #1 On-line resource activities	Resource Activities Celia's scientific database guide Casey Miller's scientific resource advice	Zoom Link Video Recording
6	Oct 3	**Research in Experimental Biophysics - Prof. Ido Golding** **Research in Experimental Condensed Matter Physics - Prof. Fahad Mahmood** **Research in Computational Condensed Matter Physics - Prof. Lucas Wagner**				Zoom Link Video Recording

Our agenda (cont.)

Scientific ethics training required by OVCR Office

7	Oct 10	**Ethics in research**	slides		Ethics Case Studies	Zoom Link Video Recording
8	Oct 17	**Research in Experimental Condensed Matter Physics - Prof. Vidya Madhavan** **Research in Theoretical Soft Condensed Matter Physics - Prof. Karin Dahmen** **Research in Experimental Quantum Information - Prof. Wolfgang Pfaff**				Zoom Link Video Recording
9	Oct 24	**Writing Scientific Abstracts** **Research in High Energy Theory - Prof. Tanner Trickle** **Research in Theoretical Biophysical Chemistry - Prof. Zan Luthey-Schulten**	slides	mini-Assignment #2 Write an abstract for selected paper	Abstract Papers	Zoom Link Video Recording
10	Oct 31	**Research in Experimental Quantum Information and Photonics - Prof. Paul Kwiat** **Research in Experimental High Energy Physics - Prof. Ben Hooberman** **Research in Experimental Condensed Matter and Quantum Information - Prof. Angela Kou**				Zoom Link Video Recording

Our agenda (cont.)

Team journal club presentations

10	Oct 31	**Research in Experimental Quantum Information and Photonics - Prof. Paul Kwiat** **Research in Experimental High Energy Physics - Prof. Ben Hooberman** **Research in Experimental Condensed Matter and Quantum Information - Prof. Angela Kou**				Zoom Link Video Recording
11	Nov 7	**Tips for Effective Scientific Communication** **Research in Theoretical Astrophysics - Prof. Antonios Tsokaros** **Research in Experimental Complex Interfaces and Molecular Systems - Prof. Yingjie Zhang**	slides			Zoom Link Video Recording
12	Nov 14	**Journal club presentations:** **Research in Observational Cosmology - Prof. Joaquin Vieira**	Oral Presentation Evaluation Form			Zoom Link Video Recording
13	Nov 21	**Journal club presentations:**	Oral Presentation Evaluation Form			Zoom Link Video Recording
	Nov 28	**Thanksgiving Break**				
14	Dec 5	**Journal club presentations:**	Oral Presentation Evaluation Form			Zoom Link Video Recording