

2021 NSF Grad Fellowship Workshop

Workshop slides will be posted on the Physics Grad Blog:
<http://physics.illinois.edu/academics/graduates/blog/>

<https://courses.physics.illinois.edu/phys596/fa2021/fellowshipworkshop.html>

Fall 2021 We CU Community Engaged Scholars Program

September 2, 2021 Lance Cooper

Invitation for undergraduate and graduate students to participate in the Fall 2021 We CU Community Engaged Scholars program.

2021 Department of Physics Virtual NSF Fellowship Workshop on Sept. 15, 2021

September 2, 2021 Lance Cooper

Information about the 2021 Virtual NSF graduate fellowship workshop to be held from 6 - 8 p.m. on **Sept. 15, 2021**

2021 Physics Prelim/Final Exam Workshop Videotape Posted

September 2, 2021 Lance Cooper

Videotape of the 2021 Physics Prelim/Final Exam Workshop has been posted in the "Illinois Physics Graduate Students" Media Space Channel.

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Prospective Grad Info

- Departmental Info
- Demographic Info
- Illinois Physics Grad Brochure
- 2019 Grad Program Overview
- Grad Curriculum
- Admissions Requirements
- Domestic Admissions Criteria
- International Admissions Criteria
- Incoming Student Checklist
- 2021 Virtual Open House

Physics Workshops

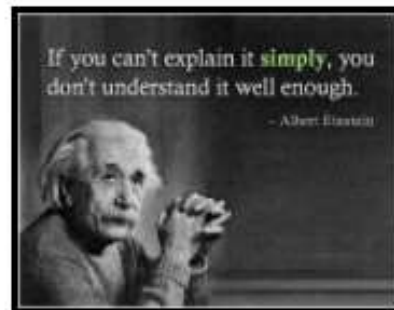
- Physics Careers Seminar
- Physics Careers Archive
- 2021 Microaggressions Workshop Video
- 2021 Microaggressions Workshop Slides
- Dear Culture Workshop Slides
- Fellowship Workshop Prelim/Final Workshop
- Scientific Poster Tips
- 1st Year Grad Student Orientation
- Rebecca's MyPhysics Talk
- Grad School Workshop



2021 NSF Grad Fellowship Workshop

2021 Fellowship Workshop Slides can be found here:

<https://courses.physics.illinois.edu/phys596/fa2021/fellowshipworkshop.html>



Physics 596

Graduate Physics Orientation
Fall 2021

The whole of science is nothing more than a refinement of everyday thinking. Albert Einstein, *Physics and Reality*, 1936



2021 Fellowship Workshop Videotape and Slides

- [Fall 2021 NSF Grad Fellowship Workshop Videotape](#)
- [NSF Proposal Guidelines and Tips](#)
- [2021 NSF Grad Research Fellowship Outreach Slides](#)
- [FastLane Help](#)



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2021 NSF Grad Fellowship Workshop

Illinois Physics Graduate Students Media Space Channel

The videotape of this workshop will be posted on the Illinois Physics Graduate Students Media Space Channel by tomorrow

The screenshot shows the Media Space Channel interface for Illinois Physics Graduate Students. The header is red with the 'media space Illinois' logo and navigation links: Home, Public Affairs, About Illinois, Colleges, Research, Student Life, and Campus Units. A search bar and user profile for S COOPER are also visible. The main content area features the channel title 'Illinois Physics Graduate Students' and a description: 'Content here is managed by the Illinois Physics Graduate Office and is open and available to the Illinois Physics Graduate Students.' A featured video thumbnail is titled 'From Quantum Info to (Robotics) Software Engineering' and is presented by Michelle Victoria. Below the video, channel statistics are shown: Private, 21 Media, 6 Members, 13 Subscribers, and Managers. A 'Subscribe' button is present. The bottom section includes a search bar for the channel, a 'Filters' button, and sorting options: 'Search In: All Fields' and 'Sort By: Creation Date - Descending'. An 'Add to Channel' button is also visible.

NSF Grad (and Other) Fellowships: Why Apply?

(1). Chances of getting an award are significant!

2016: 12% success rate (2000 awards)

2017: 15% success rate (2000 awards)

2018: 16% success rate (2000 awards)

2019: 16% success rate (2000 awards)

2020: 16% success rate (2000 awards)

2021: *2500 Awards anticipated*

(2). Application process is great preparation for:

Proposals you'll write later

Papers you'll write later

Sorting out your research interests

NSF Grad (and Other) Fellowships: Why Apply?

(3). Three years of support from the NSF*!

\$34,000 stipend each year

\$12,000 educational allowance to institution

Provides you enormous flexibility in your research options!

*The three years of support can be spread out over five years

NSF Grad Fellowships: Supported Disciplines

Supported Disciplines:

All by 5 p.m. local time!

Life Sciences (Oct. 18, 2021)

Computer Science, Materials Research (Oct. 19, 2021)

Science, Technology, Engineering, and Math Education (STEM) – Research focused only (Oct. 19, 2021)

Engineering (Oct. 21, 2021)

Chemistry, Geosciences, Math (Oct. 22, 2021)

Physics and Astronomy (Oct. 22, 2021)

NOT supported:

MD/PhD programs; Medical; Education

NSF Grad Fellowships: Eligibility

- (1). U.S. citizens, nationals, permanent residents
- (2). Enrolled in accredited US institution by Summer or Fall 2022
- (3). Generally, a bachelor's degree earned prior to Fall 2022.

The following students are generally eligible:

- During the senior year of college
- During the first year of graduate school
- Prior to completing the Fall term in 2nd year of grad school.

Applicants must have completed no more than 1 academic year of graduate study as of the application deadline

You're ineligible:

- If you've obtained a graduate degree (e.g., an MS)
- If you've done more than 12 months of graduate work
(it's OK if you enrolled the summer before to do research!)

NSF Grad Fellowships: Comparison Groups

Level 1: Undergraduate seniors and baccalaureates never enrolled in graduate degree program

Level 2: First-year graduate students in *first* graduate degree program. Currently enrolled joint bachelor's-master's students who have completed 3 years in joint program

Level 3: Second-year graduate students (no more than one academic year completed in first graduate degree program). Current first-year doctoral students who went directly into doctoral program after completing joint bachelor's-master's degree

Level 4: Returning graduate students with >2 year interruption in graduate study; may have master's (no doctorates) or >1 academic year in graduate program; NOT ENROLLED in graduate program at application deadline

Newish Eligibility Requirement

NSF limits graduate students to only one application to the GRFP, submitted either in the first year **or** second year of grad school.

There is no change to the eligibility of undergrad students

Application Strategy

Should you apply for a 2022 NSF Grad Fellowship?

Eligible senior undergrads: YES

Eligible second-year grad students: YES

Eligible first-year grad students: Maybe NOT*

*The answer to this depends on whether you've been involved in significant research with your current (grad school) research adviser yet and on how you do academically during your first year of grad school

Choosing a Field of Study

Each major field has many sub-fields:

PHYSICS & ASTRONOMY

Artificial Intelligence

Astronomy and Astrophysics

Atomic, Molecular and Optical Physics

Computationally Intensive Research

Condensed Matter Physics

Nuclear Physics

Other (specify)

Particle Physics

Physics of Living Systems

Plasma Physics

Quantum Information Science

Solid State Physics

Theoretical Physics

Choose carefully!

- ***Choice determines expertise of reviewer***
- ***You can generally switch between subfields within a major field, but NOT between major fields***

Characteristics of Successful NSF GRFP Applications

Senior Undergrad Applicants:

Generally had high undergrad GPA (≥ 3.5)

Many had publications (both published and in preparation)

Generally had presentations and awards

1st-year Grad Applicants:

Generally had high undergrad GPA (≥ 3.6)

Many had publications (both published and in preparation)

Generally had presentations and awards

2nd-year Grad Applicants:

Generally had high 1st-year grad GPA (≥ 3.6)

Many had publications (both published and in preparation)

Most had presentations and/or awards

NSF Grad Fellowships: A Complete Application

(1). Personal, Relevant Background, and Future Goals Statement (3 pages maximum)

(2). Graduate Research Plan Statement (2 pages maximum)

(3). Transcripts, uploaded into FastLane

Redact personal information (e.g., SSN, date of birth, etc.) from transcripts before sending!

(4). **Three** letters of reference required. Must be received by **Oct. 29, 2021 (Friday) at 5 p.m., Eastern time**. Applications with only 2 letters will be reviewed, applications with fewer than 2 letters will be returned without review.

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The Personal, Relevant Background, and Future Goals Statement (3 pages max):

The **Personal, Relevant Background, and Future Goals Statement** is where you outline your professional development plans and career goals. In this essay, you describe how you envision graduate school preparing you for a career that allows you (i) to contribute to expanding scientific understanding and (ii) to broadly benefit society:

1. Describe your personal, educational, and/or professional experiences that motivate your decision to pursue a PhD in science
2. Include specific examples of research and/or professional activities in which you have participated.
3. Present a concise description of the activities, highlight the results and discuss how these activities have prepared you to seek a graduate degree
4. Specify your role in previous research activities, including the extent to which you worked independently and/or as part of a team
5. Describe your career aspirations and goals; describe in particular how your experiences shaped your goals.
6. Clearly address NSF's Merit Review Criteria – Intellectual Merit and Broader Impacts – in separate sections.

Questions to address in Personal, Relevant Background, and Future Goals Statement:

1. Why are you fascinated by your research area?
2. What examples of leadership skills and unique characteristics do you bring to your chosen field?
3. What personal and individual strengths do you have that make you a qualified applicant?
4. How will receiving the fellowship contribute to your career goals?
5. What are all of your applicable research experiences?
6. For each experience in (5), what were the key questions, methodologies, findings, and conclusions?
7. Did you work in a team and/or independently?
8. How did you assist in the analysis of results?
9. How did your activities address the Intellectual Merit and Broader Impacts criteria?

A survey of past successful Personal, Relevant Background, and Future Goals Statements had:

1. Specific opening Motivation/Inspiration Statements
2. Use of bold headings to highlight specific parts of the essay (e.g., Motivation, Outreach/Broader Impact Activities, Research Experiences, Future Plans/Directions, etc.)
3. Use of subheadings and paragraphing to separate different outreach activities and research experiences
4. In Outreach, statements of specific past activities and specific planned activities
5. In Research Experiences, statements of specific accomplishments and failures
6. Explicit statements of broader impact and intellectual merit of project
7. Summary: statements of long-term career goals and of how the NSF fellowship and your previous experiences will help you achieve career goals
8. References

Typical Structure of Successful Personal, Relevant Background, and Future Goals Statements:

Motivation/Inspiration

Outreach/Broader Impacts

Outreach Activity #1

Outreach Activity #2

Research Experiences

Research Exp #1

Research Exp #2

Future Plans

References

NSF Grad Fellowships: A Complete Application

- (1). Personal, Relevant Background, and Future Goals Statement (3 pages maximum)
- (2). Graduate Research Plan (2 pages maximum)
- (3). Transcripts, uploaded into FastLane
Redact personal information (e.g., SSN, date of birth, etc.) from transcripts before sending!
- (4). **Three** letters of reference required

The Graduate Research Plan (2 pages):

In this statement, you should present an original research topic that you would like to pursue in graduate school.

You should:

1. Describe the research area (What?), why this research is important (Why?), why you are ideally suited to conduct this research (Why You?), and how you plan to perform the research (How?).
2. Discuss unique resources to which you have access that may be needed for accomplishing the research goal (e.g., local or national facilities, collaborations, etc.)
3. Include important literature citations.
4. Address the potential of the research to advance knowledge and understanding within science as well as the potential for broader impacts on society.
5. **Important:** Communicate your research clearly for non-specialists! Avoid jargon and acronyms; spell out details; make your contributions to project clear

Questions to address in the **Graduate Research Plan**:

1. What issues in the scientific community are you most passionate about?
2. Do you possess the technical knowledge and skills necessary for conducting this work, and/or will you have sufficient mentoring and training to conduct the study?
3. Is your plan feasible for the allotted time and institutional resources available?
4. How will your proposed research contribute to the “big picture” outside the academic arena?
5. How does your proposed research address the Intellectual Merit and Broader Impacts criteria?

A survey of past successful **Graduate Research Plans** had:

1. A clear statement of a Hypothesis to be tested or an Objective to be achieved
2. Use of bold headings to highlight specific parts of the essay (e.g., Introduction/Background/Motivation, Research Plan/Proposed Research, Intellectual Merit, Broader Impacts, Research Methodology, Anticipated Results, etc.)
3. Use of subheadings and paragraphing to separate different proposed activities
4. Use of underlining and bold lettering to highlight key phrases in paragraphs
5. Explicit statements of broader impact and intellectual merit of project
6. Specific details about different stages of various research plans
7. Specific statements of expected outcomes if research is successful
8. Specific statements of preliminary results, if available
9. A timeline detailing roughly when different parts of the project would be completed
10. References

Typical Structure of Successful Graduate Research Plans:

Introduction/Background/Hypothesis

Proposed Research/Objectives

Project #1

Project #2

Intellectual Merit

Broader Impacts

Anticipated Results

References

NSF Grad Fellowships: Key Review Criteria

The Two Key NSF Review Criteria:

1. **Intellectual Merit** – the potential of the research to advance knowledge
2. **Broader Impacts** – the potential of the research to benefit society

All proposals must address both of these review criteria!!

“When evaluating NSF proposals, reviewers will be asked to consider what the proposers want to do, why they want to do it, how they plan to do it, how they will know if they succeed, and what benefits could accrue if the project is successful. These issues apply both to the technical aspects of the proposal and the way in which the project may make broader contributions. To that end, reviewers will be asked to evaluate all proposals against two criteria, **intellectual merit** and **broader impacts**.”

From “NSF Proposal Processing and Review” instructions:

https://www.nsf.gov/pubs/policydocs/pappg19_1/pappg_3.jsp

NSF Review Criteria: Intellectual Merit

Intellectual Merit is a statement about your intellectual ability to conduct scholarly research and to advance knowledge, including the ability to:

1. Plan and conduct research
2. Work both independently and as a member of a team
3. Interpret and communicate research (e.g., analyze data, read the literature, communicate your results to others, etc.)
4. Take initiative, solve problems, persist through impediments.

Assessment of Intellectual Merit

The **Intellectual Merit** of your proposal will be judged based upon your:

1. Academic performance; awards and honors
2. Communication skills (i.e., well-written proposal!, previous publications and presentations)
3. Evidence of independence and creativity
4. Publication/presentation record
5. Soundness of your research plan
6. Quality of references
7. Extent of your research experience
8. Your access to essential resources and personnel for the work proposed

NSF Review Criteria: Broader Impacts

Broader Impacts is a statement about both your potential impact on society and the potential impact of your research on society:

1. Integrate research and education, and assure that your findings will be communicated broadly and to as wide an audience as possible
2. Encourage diversity, broaden opportunities, and enable participation of all citizens – particularly underrepresented groups – in science and research
3. Enhance scientific and technical understanding
4. Benefit society and contribute to ***specific***, desired societal outcomes

Assessment of Broader Impacts

The **Broader Impacts** of your proposal will be judged based upon your:

1. Prior accomplishments, previous outreach work, etc.
2. Integration of research and education
3. Potential to reach diverse audiences
4. Potential to impact society
5. Community outreach
6. Leadership potential

Document Formatting (Important!)

1. Read solicitation carefully and follow all formatting rules!

<https://www.nsf.gov/pubs/2021/nsf21602/nsf21602.htm>

The essays must be written:

- using standard 8.5" x 11" page size
- 12-point, Times New Roman
- 1" margins on all sides
- must be single spaced (~5 lines per inch)
- Do not use line spacing options such as “exactly 12 point” that are less than single spaced
- Only references and footnotes may be a smaller font, no less than 10-point Times New Roman.

***Note:** Be aware that some Word-to-pdf and LaTeX-to-PDF converters shrink the text area on the page, giving larger margins and smaller font sizes and line spacings. Please print your documents to check the margin sizes and line spacings to make sure!

Document Formatting (continued...)

1. Read solicitation carefully and follow all formatting rules!

<https://www.nsf.gov/pubs/2021/nsf21602/nsf21602.htm>

- The **Personal, Relevant Background, and Future Goals Statement** has a maximum length of 3 pages, and the **Graduate Research Plan** has a maximum length of 2 pages (including all references, citations, charts, figures, and images).

Failure to comply fully with these requirements will eliminate the application from consideration by review panels.

Additionally, applications that are incomplete (missing required transcripts and/or reference letters, or that do not have "submitted" status by the application deadline) are ineligible for panel review.

NSF Grad Fellowships: A Complete Application

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(2). Graduate Research Plan (2 pages maximum)

(3). Transcripts, uploaded into FastLane

Redact personal information (e.g., SSN, date of birth, etc.) from transcripts before sending!

(4). **Three** letters of reference required

- Institutional letterhead if possible
- Two-page limit
- 12-point Times New Roman in body of letter
- Name and title of reference writer
- Department and institutional organization

Transcripts

- (1). All applicants must submit a BS degree transcript
- (2). Transcripts are required for all institutions listed
- (3). Graduate transcripts for all graduate degree enrollment

1st-year grad students: if no grad transcript is available,
upload class schedule or enrollment verification
- (4). Official or unofficial transcripts accepted

NSF Grad Fellowships: A Complete Application

(1). Personal, Relevant Background, and Future Goals Statement (3 pages maximum)

(2). Graduate Research Plan (2 pages maximum)

(3). Transcripts, uploaded into FastLane

Redact personal information (e.g., SSN, date of birth, etc.) from transcripts before sending!

(4). **Three** letters of reference required

- Institutional letterhead if possible
- Two-page limit
- 12-point Times New Roman in body of letter
- Name and title of reference writer
- Department and institutional organization

Reference Letters:

(due 5 p.m. Eastern Time, Oct. 29, 2021)

1. Must submit **three** letters (they will accept just 2 letters, and you can submit up to five letters, rank ordered)
2. Give your letter writers sufficient time to prepare strong letters
3. They should know you both personally and as a researcher (i.e., be able to address your research abilities/accomplishments)
4. Give your letter writers copies of your CV and application materials addressing Intellectual Merit and Broader Impacts (reference letters are supposed to reflect both your “intellectual merit” and “broader impacts”)
5. Make sure your letter writers are informed of the formatting requirements for their letters (see previous slide)

Make sure ALL letters arrive by the deadline!! You can track letter submission via FastLane

Tips for Preparing a Competitive Application

1. Read solicitation carefully and abide by all rules!

<https://www.nsf.gov/pubs/2021/nsf21602/nsf21602.htm>

2. Make sure to address the Intellectual Merit and Broader Impacts criteria

3. Have someone proof read your proposals for grammatical and spelling errors (Celia and I can do this!)

4. If possible, associate yourself with a research group here, to increase authenticity of your proposal

5. Devise real educational outreach components, preferably attached to existing programs

6. Regularly check status of reference letters

7. Make sure to press “Submit” button!

NSF Grad Fellowship Precompetition

Eligibility: You must be eligible for and plan to submit applications to the NSF Grad Fellowship program

Application Requirements: Following two (2) components of the NSF grad fellowship application: (i) Personal, Relevant Background, and Future Goals Statement (3 pages); and (ii) Graduate Research Plan (2 pages)

NSF Grad Fellowship Precompetition Timeline:

5 p.m., Oct. 4, 2021: NSF Grad Fellowship pre-competition applications are due

Oct. 11, 2021: Competition awards announced and feedback on applications provided to students

Oct. 22, 2021: Deadline for submitting full applications to NSF

For more information, see grad physics blog post:

<https://physics.illinois.edu/academics/graduates/blog/41392>

Lessons from Past Precompetitions:

Problems with the Proposal as a Whole:

Submitted after the deadline

Incorrect font (Times New Roman) and font size (12)

Essays longer than maximum limit

Problems with the Personal, Relevant Goals, and Future Goals Statement:

No motivation for proposed research, no statement of research interests or what makes student especially suited for research

No statement of career goals and how the fellowship will impact those goals

Essays longer than maximum limit

Lessons from Past Precompetitions:

Problems with the Personal, Relevant Goals, and Future Goals Statement (cont.):

Not suitable for a general audience (too technical, no big picture)

No indication of how various previous experiences impact your ability to be successful in future research

No statement of how previous collaborations, publications, poster presentations, etc., influence your future plans

Lessons from Past Precompetitions:

Problems with the Graduate Research Plan:

Didn't address the What, How, Why, Why You, How Long, and Benefits Questions.

Research not described in an accessible manner (too many undefined technical terms, acronyms, etc.)

Didn't address Intellectual Merit or Broader Impacts criteria

Didn't address how past experiences/training make student ideally suited to conducting research proposed

No references!

For More Information

Information: www.nsf.gov/grfp and www.nsfgrfp.org

Apply at: www.fastlane.nsf.gov/grfp/