



# How to Write for NSF: In Depth Tips

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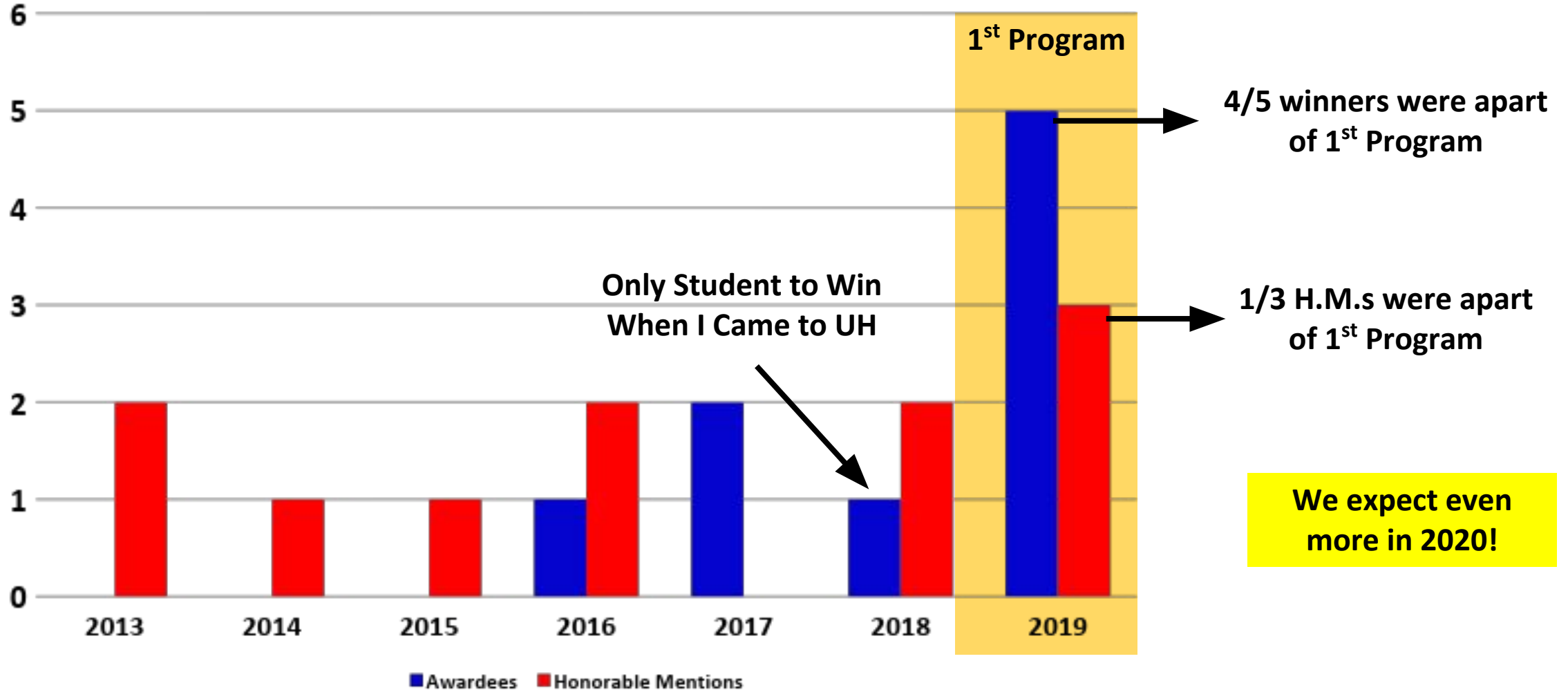
4/24/2019



# UH Statistics for NSF-GRFP: On the Rise!



Awards and Honorable Mentions 2013-2019



We expect even more in 2020!

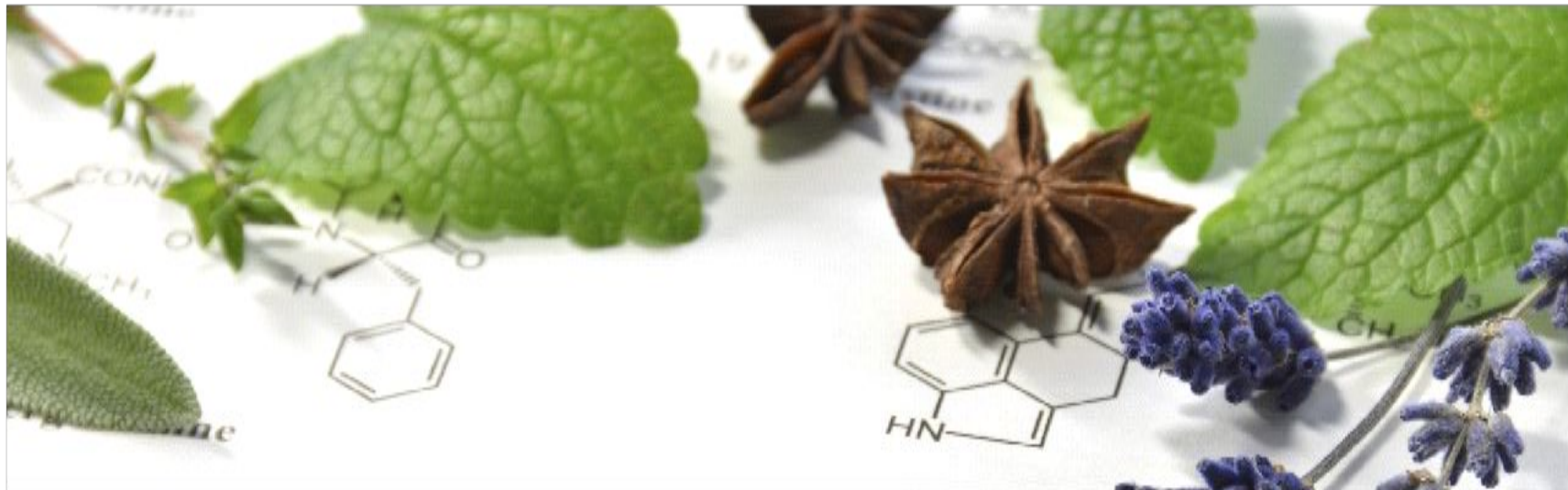


# National Science Foundation – Graduate Research Fellowship Program



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Search...



DISCLAIMER: *The opinions expressed in this presentation are solely our own, and they have not been approved by the NSF.*



# Program Overview



## Purpose

Ensure the vitality and diversity of the scientific and engineering workforce in the United States

## Supports

Outstanding students pursuing research-based master's and doctoral degrees in fields within NSF's mission.

**Can apply once as a graduate student (Year 1 or 2) and as an Undergraduate.**

## Provides

Award Winner - 3 yrs of support (\$34k/yr) for individuals who have demonstrated their potential for significant achievements in research (fund person). \$12k/yr for research expenses. (In a new funding cycle – could increase if approved again)

Honorable Mention – Recognition as a Competitive Applicant

## Due Dates for 2019

*Late October (References due 1 week later normally in November)*



# NSF-GRFP: The Application



- 1. Basic Information**
- 2. Personal statement, Relevant Background, Future Goals (3 pg limit)**
- 3. Proposed research statement (2 pg limit)**
- 4. Letters of recommendation (3 min)**
- 5. Academic transcripts (official)**



# NSF-GRFP: Basic Information



## 1. Basic Information

1. Panel that is most appropriate for reviewing application
2. Stage of your academic training (3 levels)
  - (a) senior undergraduate (**expectation lowest**)
  - (b) first year graduate student
  - (c) second year graduation student (**expectation highest**)
3. School(s) attended as an undergraduate
4. School attending as a graduate (or plan to attend)
5. Grade point averages at each institution (**no GRE**)
6. Demonstrated potential for research and excellence
7. Honors and awards
  - research participation
  - conference abstracts and/or publications
  - leadership activities (teaching, volunteering)
  - additional activities (balancing work)

**All this Information can be found  
in a well crafted Resume or CV**

## Why You Should Fill out Everything?

The applicant has his presented research at the 2014,2015, and 2016 ABRCMS Conferences. He has also presented at two different international conferences (one in France and one in MS). The applicant is currently a LSAMP Scholar (2016-2017) and was a MARC-USTART Scholar (2014-2015). The personal

This is a strong application from a 4.0 GPA student with a good fundamental preparation and a number of research experiences in several research laboratories (and different environments) as well as with a number of presentations under his belt. The research

**Reviewers do Read the Basic Information!**



# NSF-GRFP: The Writing



2. Personal statement (3 pg limit)
3. Proposed research statement (2 pg limit)

Read By Reviewer



**What They Look For:  
Intellectual Merit  
Broader Impacts**



# NSF-GRFP: The Writing (Common Questions)



- 2. Personal statement (3 pg limit)
- 3. Proposed research statement (2 pg limit)

Read By Reviewer



How Many Do They Receive?

How Long Will My Application Get?

How Long Do They Have?

Are They In My Field?

How Many Reviewers Do I Get?

**What They Look For:  
Intellectual Merit  
Broader Impacts**

Which is More Important?





# NSF-GRFP: The Writing (Common Questions)



- 2. Personal statement (3 pg limit)
- 3. Proposed research statement (2 pg limit)

Read By Reviewer



How Many Do They Receive?

**~40**

How Long Will My Application Get?

**Depends (~20 min)**

How Long Do They Have?

**2-3 Weeks**

**What They Look For:  
Intellectual Merit  
Broader Impacts**

Are They In My Field?  
**Yes (Not Specific Area)**

How Many Reviewers Do I Get?

**3**

Which is More Important?  
**Both Equally Important**



# NSF-GRFP: The Rubric



Intellectual Merit Rating	Comments	Broader Impacts Rating	Comments	Summary
Poor - 1 Fair - 2 Good - 3 Very Good -4 Excellent – 5		Poor - 1 Fair - 2 Good - 3 Very Good -4 Excellent – 5		

**What Would You Put in the Rubric?**



# NSF-GRFP: Intellectual Merit Rubric



## **Past evidence** of success (personal statement):

1. academic excellence (GPA)
2. research participation (academic and summer)
3. research contributions (posters, presentations, publications)
4. leadership & innovation (beyond coursework)
5. persistence (balancing many activities, overcoming challenges)

## **Future evidence** for success (proposed research):

1. interesting/important question addressed
2. knowledge within proposed area
3. creativity and originality
4. institutional match for studies is relevant
5. leadership & innovation
6. strong communication skills



# NSF-GRFP: Broader Impacts Rubric



## Multiple Ways to Show Broader Impacts

1. **Benefit of research**: Need to explain how your studies will benefit society in terms of the research knowledge (project data), tools (new software/methods), and research education (people). **Research Statement**
2. Identification of a social problem (education) within the US and a description of **activities that integrate research training with a solution** to that challenge (outreach/service). **Research Statement**
3. **Long-term benefits of supporting you** as they relate to societal challenges. How will your outreach and service activities overcome the challenge that you describe? **Personal Statement**
4. **Potential for leadership and innovation** in the future. Applicants are uniformly strong, so why are you likely to be a leader among your peers? Past evidence for contributions as evidence. **Basic info, Personal Statement, Research Statement**

Note: NSF is funding individuals, not a 3 year plan so make sure to provide evidence for **sincerity/depth** in your plans as they relate to broader impacts (do not just ✓ the box because required)



# NSF-GRFP: Before Writing



## Questions To Consider Before Writing

Why are you fascinated by your research area?

What examples of leadership skills and unique characteristics do you bring to your chosen field?

What personal and individual strengths do you have that make you a qualified applicant?

How will receiving the fellowship contribute to your career goals?

What are all of your applicable experiences?

For each experience, what were the key questions, methodology, findings, and conclusions?

Did you work in a team and/or independently?

How did you assist in the analysis of results?

How much time are you willing to invest into this?

*How did your activities address the Intellectual Merit and Broader Impacts criteria?*



# Personal Statement Overview



Outline your educational and professional development plans and career goals. How do you envision graduate school preparing you for a career that allows you to contribute to expanding scientific understanding as well as broadly benefit society?

## **LIMIT: 3 PAGES**

NSF Fellows are expected to become globally engaged knowledge experts and leaders who can contribute significantly to research, education, and innovations in science and engineering. The purpose of this statement is to demonstrate your potential to satisfy this requirement.



# Personal Statement Overview



## Important questions to ask yourself before writing the 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 experiences?
6. For each experience, what did you find, conclude, and which skills did you learn?
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?



# Personal Statement Overview



- Describe your personal, educational and/or professional experiences that motivate your decision to pursue advanced study in a STEM field.
- Include specific examples of any research and/or professional activities in which you have participated.
- Present a concise description of the activities, highlight the results and discuss how these activities have prepared you to seek a graduate degree.
- Specify your role in the activity including the extent to which you worked independently and/or as part of a team.
- Describe the contributions of your activity to advancing knowledge in STEM fields as well as the potential for broader societal impacts (See Solicitation, Section VI, for more information about Broader Impacts).





# Research Statement Overview



Prompt: “Present an original research topic that you would like to pursue in graduate school. Describe the research idea, your general approach, as well as any unique resources that may be needed for accomplishing the research goal”

**LIMIT: 2 PAGES**



# Research Statement Overview



**Significance.** Describe the significance of the research challenge that your idea will help overcome. Convey impact on society.

**Point of departure.** Explain what the current state of science is at it relates to the research problem you are describing.

**Novelty.** How will you go beyond what has been done?

**Aims/Experimental design.** Describe the specific objectives/goals of your research idea, and explain your plan to achieve these.

**BI.** Convey concisely how you will integrate your research efforts with activities related to broader impacts

**Figures.** Visuals are often included to help convey ideas. (Spend time on these! Poor figures can doom even a good proposal.)



# Letters of Recommendation



Choose your letter writers carefully. Give them plenty of time to prepare the letter, and lots of information to build on. They should be able to address:

- Academic record (provide)
- Intellectual capacity
- Research record & ability to carry out independent research (point out anything that they are not familiar with)
- If publications, applicant's contribution to that work. (provide)
- Originality
- Creativity
- Leadership ability (give examples!)
- Motivation and chances of success for graduate research
- Unusual or extraordinary circumstances (discuss in detail if needed)



# Tip 1: Writing Clearly



Good writing requires multiple drafts and plenty of time.

## *Understand Your Rhetorical Situation*

- Who is my audience?
- This is your chance to clarify anything that is not in your application.
- What terms are familiar and which are uncommon.
- What is necessary to discuss with limited words?

“The scariest moment is always just before you start.”

“Write with the door closed, rewrite with the door open.”

— Stephen King, *On Writing: A Memoir of the Craft*



# Tip 2: Organizing Your Writing



## Personal Statement:

- Chronological
- List of importance

## Research Statement:

- Specific Aims
- Broader Impacts
- Intellectual Merit



# Tip 3: Graphics and Figures



Graphics and figures can convey more than words.

Allows you to break up a wall of text.

Use easy to read text and sharp color choices.

Use professional software



# Tip 4: Who to Involve in Revisions



Work with your advisor.

Seek thoughts from people outside of your field.

Use the writing center.

Write with friends who are also applying.

Reach out to other professors.



# Tip 5: Have All Documents Compliment One Another



Things should be echoed throughout all documents that help reinforce your statements and provide credibility.

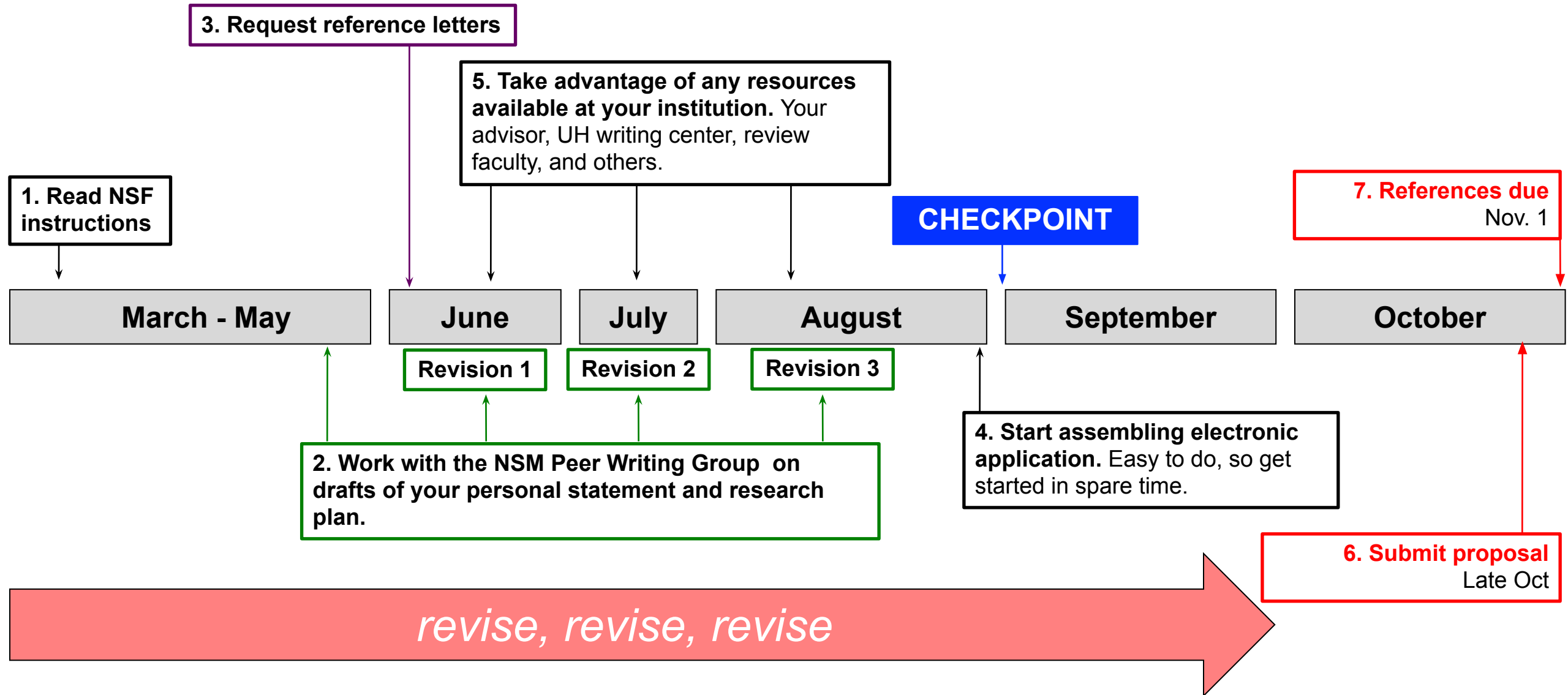
Examples:

- If you write in your application that you have a publication in the works (submitted), then make sure your letter of recommendation addresses this.
- If you write about having interest in helping people, your resume should include programs or events that you participated in that highlight this.
- If your research statement is addressing techniques that are necessary for your work, your personal statement should bring up instances where you used these techniques.





# Proposed Timeline





# The Review Process



**Size.** A few dozen scientists from academia, national labs and/or industry. Number depends upon applicant pool size. The panels created to represent a diverse population.

**Topic areas.** Sorted by disciplines (physics, chemistry, and biology) and specialties of each field (biophysics, development).

**Diversity.** Come from all types of institutions (private and public, large and small, primarily research and undergraduate) and are at different career stages (assistant, associate or full professors).

**State of mind.** Reviews are done remotely by skype, which leads to scoring primarily based on essay quality (hence the need for polished, clear essays).

**Values.** Highly diverse values, which reflect the spectrum found within scientific community, so weighting given to different NSF criteria (IM and BI) can vary tremendously.



# The Review Process



**Constraints when reviewing.** Panelists are not allowed to obtain external data from the internet. They may call upon their own knowledge of a research field and the schools and/or research programs mentioned in an application.

**Conflicts of interest.** Panelist may NOT: (i) review application from own institution or from student who is planning future studies there, and (ii) review an application of someone with whom they have an existing relationship or other conflict of interest. Panelists sign a conflict of interest statement agreeing to abide by these rules.



# The Review Process



**First ranking.** After three reads, applications are ranked based on average Z score and some percentage are triaged. Amount triaged is set by NSF based upon funding.

**Discussion.** Any applications with large variability in scores are discussed to make sure that the different views are considered by all reviewers. Scores can be revised at this point.

**Second ranking.** Once the discussion ends, applications are reported based on z scores and placed into four quality groups.

QG1 = highest priority to fund

QG2 = some awarded, some honorable mention

QG3 = honorable mention

QG4 = receive nothing

**Group discussion.** At this stage the panel has a group discussion where they re-rank candidate if they feel it is appropriate for any reason.

**Final ranked list.** NSF determines which QG2 get an award and verify that the awardees are eligible. Selections in QG2 are used to help NSF achieve different aspects of diversity.



# The Review Process - Feedback



The comments represent critical assessment of your application relative to a very strong applicant pool, and feedback that will be useful for your career and future submissions.

Funding. Typically 2,000 funded (15-20% success rate in recent years)

Note that many more individuals are deserving of NSF awards than will actually receive them. There simply isn't enough money to fund all worthy applications.



# Should I Apply This Year



**Undergraduates:** Yes there is nothing to lose. You can also get valuable feedback.

**2<sup>nd</sup> Year Graduate Students:** If you haven't applied, this is your last shot.

**1<sup>st</sup> Year Graduate Students:** Questions to think about before you decide.

- Will I be a much stronger applicant next year?
- Am I going to submit my work soon in time for next year?
- Is my application strong right now?
- Have I talked to my advisor about this?
- Can I write about broader impacts?
- What am I afraid will prevent me from winning? Can I change that with a years time?

Either way, you should act as if you are applying and then re-evaluate your application once its complete.



# Questions?

UNIVERSITY OF  
**HOUSTON**