

General advice for writing research statements
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Your research statement should be about five pages long and should be divided into the following sections:

1. introduction
2. previous results, including discussion of methods and significance
3. plans for future research
4. bibliography

NSF PRF research statements require the following additional components:

1. explanation of how the fellowship activities will enhance your career development
2. justification of the choice of sponsoring scientist and host institution
3. separate section within the narrative that discusses the *broader impacts* of the proposed activities

NSF proposals also require a 1-page project summary, covering both the intellectual merit and the broader impact of the proposed project. Summaries of successful proposals are made public and are viewed by congressional staffers and such. They should be relatively accessible to an educated non-mathematician.

- **Intellectual Merit:** The Intellectual Merit criterion encompasses the potential to advance knowledge.
- **Broader Impacts:** The Broader Impacts criterion encompasses the potential to benefit society and contribute to the achievement of specific, desired societal outcomes.

NSF GRFP applications involve “Personal, Relevant Background and Future Goals” statement and “Graduate Research Plan” statement.

Merit Review Criteria and GRFP:

“For example, panelists evaluating applications submitted to the Graduate Research Fellowship Program may consider the following with respect to the Intellectual Merit Criterion: the potential of the applicant to advance knowledge based on a holistic analysis of the complete application, including the Personal, Relevant Background, and Future Goals Statement, Graduate Research Plan Statement, strength of the academic record, description of previous research experience or publication/presentations, and references. Panelists may consider the following with respect to the Broader Impacts Criterion: the potential of the applicant for future broader impacts as indicated by personal experiences, professional experiences, educational experiences and future plans.”

1. Introduction

- Many readers will only look at the introduction. You should use this section to capture their attention and to quickly convey where your work fits into mathematics.
- Place your work in a broader context, but not too broad. Think about the question: why did people start working on this topic? Then try to distill the answer to one or two sentences. It is great if you can mention some classical or well-known result in this broader context; your audience enjoys a reference to something they know.
- It is also good if you can teach the reader something, although necessarily something modest: try to make a new connection or give some new insight into something he or she may not have previously thought about.

2. Previous Results

- After motivating your work in the introduction, identify the primary challenges you encountered.
- Tell the reader what tools and techniques you used to overcome these challenges. This gives an idea of what expertise you have.
- Give applications of your results, if these exist. If you do not yet know any applications, think about it. If you think of something promising, include it in the next section.
- Your goal is not to convey your proof in its entirety; rather focus on the objectives above.

3. Plans for Future Research

- Start thinking well in advance about this section, and think hard. Writing this statement is a valuable opportunity to evaluate your work and map long-term plans. Discuss your ideas with your advisor.
- Be honest about what you know—don't bluff—but show willingness to learn new theories and techniques.
- Try to outline a program for the next three years. You should have at least one idea that is not a direct extension of your thesis.
- Show that *your* expertise is relevant to the problems you mention.

4. Bibliography

Be sure to properly cite the work of others. Readers will certainly appreciate if they are appropriately cited among your references, and some may be very cranky if they are not cited when they should be.

from “Tips for the Job Search: Applying for
Academic or Postdoctoral Positions”
by H.A. Lewis and J.S. Caughman
Notices of the AMS (October 2006)
1021-1026.

Statement of Research Interests: For all statements of research interests, it is useful to first explain the main context of your research in terms that a nonexpert can understand. Include some key results in the field and emphasize your own contributions, keeping in mind that a search committee must read through many applications.

If you are interested in a postdoctoral position, you will want to go into more detail about the specific research you have done. You should also give an indication of your future research plans: What will you do next, and do you have concrete plans for continuing your research away from the mentorship of your graduate advisor?

If you are applying to a school that does not have a graduate program but does value undergraduate research, list some ideas of how undergraduates can be incorporated into your research.

If there is a faculty member at the school who works in your area, be sure to mention any common points of interest and possibilities of collaboration.

Have some of your fellow graduate students and your advisor read your statement of research interests.

Professional Development Notes
by B. Nachtergaele
from a Fall 2006 Professional Development
Workshop at UC Davis
see galois.math.ucdavis.edu/UsefulGradInfo/

A research statement should be a balance of your research achievements and your future goals.

Writing a research statement:

- Give yourself enough time to think about it, plan on multiple drafts
- After each new research experience review and write a new research statement
- Demonstrate what you know: It's ok as a graduate student to have a limited scope of knowledge. Write about the things you know and leave it at that. People can tell when you expand beyond your limit of knowledge.
- Emphasize your accomplishments in the field.

It's all in the details:

- Write your name on your statement and everything in your packet. That way if anything gets separated you won't be confused with a different applicant.
- Limit of 3 pages. You can write more but be aware they won't read too much.
- Be concise, clear, and convincing.
- Make sure it is well-written: proofread, use spell check, check spell check, have someone else read it.

Why does this matter? Having a well-written statement demonstrates that you care and are interested/ serious about the application process. People (hiring committees) care about the details.

Keep your audience in mind: Your research statement should be written for a general audience (think student seminar). Even if you are applying for a position at a research school you must realize that the hiring committee (those that are reading your application) may be less specialized than your thesis committee. This is going to be the most important when you don't have a personal contact at the location and can't assume that you have someone speaking on your behalf. They are reading A LOT of applications. Don't give them the excuse to pass by yours.

- Provide context—explain some historical perspectives (1 paragraph at the most) and emphasize your personal contribution.
- Introduce basic notation, avoid being overly technical, and avoid providing basic definitions (you can assume basic mathematical knowledge).

Research Statements change based on the institution you are applying to:

- It's possible that you may want to write multiple statements. Different institutions will want different things emphasized.
- When you are looking at a school with less research emphasis you must keep in mind that the hiring committee might be more distant from the research experience. Be aware of this and make efforts to not alienate yourself from the committee.
- 4-year colleges want to see research activity that involves undergraduates. Gear your plan towards how your work could be done in short segments by undergraduates. This is where your teaching and research statement may overlap. It's ok to discuss mentoring and teaching undergrad research in your research statement.

Future Plans:

- It's ok to continue current work, but demonstrate ability to move forward.
- It's ok to plan on new work, but you need to demonstrate a knowledge of the subject and show ability to make progress
- Plan of attack: Don't share too much. You can mention if you've made any progress, and be prepared to discuss more details in the interview.

- You can describe some ambitious long-term goals, but avoid outrageous plans (don't propose to solve the Riemann hypothesis). Think about the timing aspect. Are you providing an idea that's too big or too small for a postdoc? Do you have enough work (or too much) to ensure tenure?
- Distinguish yourself; don't propose something that everyone else is proposing. Discuss your specific/ unique perspective on how to help in the field. It doesn't have to be revolutionary.

- It is common to propose something that is halfway done (that you are more or less sure you can do). But in mathematics people also want to see if you can step beyond the safe zone. Math doesn't involve a big money risk for equipment to try new ideas (Unlike equipment needed to do experimental biology lab work). In general there is less financial cost so the grant culture is more willing to try new ideas. With this in mind, it's ok to try a new direction without the promise of it working out.