NSF CAREER Award: Writing Guide

Tips for Writing the Project Description

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Per the RFA, the project description should include:

- a description of the proposed research project, including preliminary supporting data where appropriate, specific objectives, methods and procedures to be used, and expected significance of the results;
- a description of the proposed educational activities, including plans to evaluate their impact on students and other participants;
- a description of how the research and educational activities are integrated with one another; and
- results of prior NSF support, if applicable (if PI or co-PI on any grant in the last 5 years).

There is no prescribed format for the Project Description. You are required to have a section titled “Broader Impacts” and a section titled “Results from Prior NSF Support,” but there are no requirements as to where they should be placed in the Project Description. There are certain types of information that are useful to include in any proposal, and I have organized them into a suggested format below. Use the format that works best for your project and allows you to tell the story that you wish to tell.

**Suggested structure for the Project Description:**

1. Objectives/Specific Aims/Goals
2. Research Plan
   a. Background information
   b. Preliminary data
   c. Methods
   d. Potential pitfalls and alternative approaches
   e. Timeline
   f. Evaluation
   g. Future steps
3. Education Plan
4. Broader Impacts
5. Results from Prior NSF Support

**1. Objectives and Specific Aims**

Other names for these: goals, research thrusts, etc. You can call these whatever you like or whatever is most used in your field.

- Try to fit this on one page.
- Start with a brief problem statement to introduce your research question and state why it is important.
- Put the solution to your research question in context of your overall, long-term career objectives.
- Identify the specific objective for the present proposal.
- Describe your overall hypothesis for your specific objective.
- List your specific aims for how you will accomplish the objectives of your proposal.
  - Each aim is to find out information, not to do a method (a method supports an aim, but is not the purpose of the aim).
  - Limit them to 2-4 aims.
  - Be declarative (use short bullet points).
  - Make sure aims are not inter-dependent but supportive of each other (i.e., make sure that if the first step of your proposal fails, your entire proposal won’t fail).
  - Link your specific aims to hypotheses.
- Close this section with a statement on your expected outcomes, emphasizing the project’s innovation.
- It can be very useful to try to diagram your objective and aims.
2. Research Plan
Note: The research and educational activities do not need to be addressed separately if the relationship between the two is such that the presentation of the integrated project is better served by interspersing the two throughout the Project Description.

2.a. Background and Significance
This section lets you:
1. Orient reader to your subject, providing scientific background and context.
2. Establish the importance and novelty of your project.
3. Show your knowledge of the area through a solid review and objective citation of prior related work.
4. Reveal that you are aware of opportunities, gaps, and roadblocks in your field.
5. Persuade the reviewers to become invested in your work by showing how your research matters for the field and their own research.

Write this section in nontechnical terms for the broader audience.

2.b. Preliminary Results/Studies/Data/Feasibility
This is the place to highlight your own preliminary data, showing your ability to develop and test hypotheses, design rigorous experiments, perform experimental techniques, and analyze and interpret data.

• Illustrate the relevance of your preliminary data to your specific aims/goals and how it relates to your proposed research plan.
• Use high quality graphics and tables to illustrate your data and results.

2.c. Research Design and Methods
This is generally the longest section of the research plan, where you develop the details of your project.

• This section is not just about methods but design.
• When outlining your experimental plan:
  o Base it on your specific aims—restate the aims and describe the flow of experiments under each aim.
  o Describe methodology for each aim, establishing your expertise with the approach by linking back to your preliminary studies and assessing the strengths and limitations of your approach.
  o Cite appropriate references.
  o Describe the timeline and sequence of experiments.
  o Talk about relevance to the field.

Suggested format for this section:

D. RESEARCH DESIGN AND METHODS
Introductory paragraph to orient reviewer as to what you plan to do.
D.1. Aim 1. Repeat Specific Aim from page 1.
D.1.a. Hypothesis and Rationale.
D.1.b. Experimental Plan.
D.1.c. Expected Outcomes
D.1.d. Potential Pitfalls and Alternative Approaches

To address Potential Pitfalls and Alternative Approaches:
• Discuss the limitations of each approach you are proposing and how they may affect your results and data.
• Call attention to potential difficulties and propose alternatives you will use if a technique is inadequate or the results are inconclusive.
• Describe potential pitfalls and what you will do if they occur.
• State what you will do if results are negative, how negative findings will also advance the field, and what you will do next.
2.e. **Evaluation**
- Describe how you will assess your research program.
- Consider linking this to your timeline and/or milestones.

2.f. **Timeline/Milestones:**
This is where you can show how everything will fit together.
- Propose an appropriate amount of work for the funding period. Reviewers are sensitive to proposals that seem “overly ambitious.”
- Provide a diagram of your timeline over the funding period, showing when you will hit certain milestones, or provide a list of milestones you will achieve in each year.

2.e. **Future steps**
- Tell the reviewers what your next steps will be.
- Identify what others will be able to do with your research results.

3. **Education Plan**
See "Broader Impacts Toolkit" from Kate Spohr on the BRDO website.

4. **Broader Impacts**
You must include a separate section that addresses the Broader Impacts of your proposal.
- Must use the section heading "Broader Impacts."
- Describe how the research and educational activities are integrated with one another.
- As an alternative to one section on your broader impacts, you could have multiple sections throughout the proposal that are paired with the programmatic elements. In this case, be sure that you create a separate section with the heading "Broader Impacts."

5. **Results from Prior NSF Support**
Describe support from past 5 years per GPG instructions. If you have none, write “Not applicable.”
- Use this format:
  (a) The NSF award number, amount and period of support.
  (b) The title of the project.
  (c) A summary of the results of the completed work, including accomplishments, supported by the award. The results must be separately described under two distinct headings: Intellectual Merit and Broader Impacts.
  (d) The publications resulting from the NSF award.
  (e) Evidence of research products and their availability, including, but not limited to: data, publications, samples, physical collections, software, and models, as described in any Data Management Plan.
  (f) Write "Not applicable." (This section is for if the proposal is for renewed support.)

**Supplementary Documentation**

**Departmental Letter (2 pages)**
The departmental letter demonstrates the department’s support of the integrated research and education plan of the CAREER awardee. The proposal must include one (and only one) letter from the PI’s department head (or equivalent organizational official).

Letter must include:
- An indication that the PI’s proposed CAREER research and education activities are supported by and integrated into the educational and research goals of the department and the organization, and that the department is committed to the support and professional development of the PI.
- A description of (a) the relationship between the CAREER project, the PI’s career goals and job responsibilities, and the goals of his/her department/organization, and (b) the ways in which the department head (or equivalent) will ensure the appropriate mentoring of the PI, in the context of the PI’s
career development and his/her efforts to integrate research and education throughout the period of the award and beyond.

- A statement to the effect that the PI is eligible for the CAREER program.
- The department head's name and title below the signature.

**Letters of Collaboration (1 page each)**

- These letters may ONLY say:
  - "If the proposal submitted by Dr. [insert the full name of the Principal Investigator] entitled [insert the proposal title] is selected for funding by the NSF, it is my intent to collaborate and/or commit resources as detailed in the Project Description."
  - The letter(s) should NOT include a personal endorsement or recommendation of the investigator.
  - The project description should document the nature and need for all collaborations.
  - Deviating from these instructions may result in your proposal being returned without review.

**Postdoctoral Mentoring Plan (1 page)**

- If you are requesting support for a postdoc, you will need to describe how mentoring activities will be provided for him or her.
- Examples of mentoring activities include, but are not limited to: career counseling; training in preparation of grant proposals, publications and presentations; guidance on ways to improve teaching and mentoring skills; guidance on how to effectively collaborate with researchers from diverse backgrounds and disciplinary areas; and training in responsible professional practices.

**Data Management Plan (2 pages)**

The general information that is included in these plans is:

1. the types of data, samples, physical collections, software, curriculum materials, and other materials to be produced in the course of the project;
2. the standards to be used for data and metadata format and content (where existing standards are absent or deemed inadequate, this should be documented along with any proposed solutions or remedies);
3. policies for access and sharing including provisions for appropriate protection of privacy, confidentiality, security, intellectual property, or other rights or requirements;
4. policies and provisions for re-use, re-distribution, and the production of derivatives; and
5. plans for archiving data, samples, and other research products, and for preservation of access to them.

Some directorates and divisions have their own instructions, available at [http://www.nsf.gov/bfa/dias/policy/dmp.jsp](http://www.nsf.gov/bfa/dias/policy/dmp.jsp). If there is no separate policy, follow the GPG.

An excellent tool for creating data management plans has been created by the UC Library system. The Data Management Plan Tool (DMPTool) is available at: [https://dmptool.org/](https://dmptool.org/).
Biosketch
Use this format; check the GPG for more complete instructions:

(a) Professional Preparation
Undergraduate Institution(s)    Location    Major    Degree & Year
Graduate Institution(s)        Location    Major    Degree & Year
Postdoctoral Institution(s)    Location    Area     Inclusive Dates (years)

(b) Appointments
A list, in reverse chronological order, of all the individual’s academic/professional appointments beginning with the current appointment.

(c) Products
List:
(i) up to five products most closely related to the proposed project; and
(ii) up to five other significant products, whether or not related to the proposed project.

(d) Synergistic Activities
A list of up to five examples that demonstrate the broader impact of the individual’s professional and scholarly activities that focuses on the integration and transfer of knowledge as well as its creation.

(e) Collaborators & Other Affiliations
- Collaborators and Co-Editors
- Graduate Advisors and Postdoctoral Sponsor (list here your advisors)
- Thesis Advisor and Postgraduate-Scholar Sponsor (list here those whom you have advised: all of your graduate students plus your postdocs from the last 5 years; include their current affiliations)

Facilities, Equipment, and Other Resources
• This section of the proposal is used to assess the adequacy of the resources available to perform the effort proposed to satisfy both Intellectual Merit and Broader Impacts review criteria.
• Proposers should describe only those resources that are directly applicable.
• Proposers should include an aggregated description of the internal and external resources (both physical and personnel) that the organization and its collaborators will provide to the project, should it be funded.
• The description should be narrative in nature and must not include any quantifiable financial information.