

2017

# NSF CAREER Award: Writing Guide

Tips for Writing the Project Description

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# NSF CAREER Award: 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 we 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. Evaluation
  - f. Future steps
3. Education Plan
  - a. Overview/background/aims
  - b. Design and methods
  - c. Evaluation
  - d. Integration of research and education
4. Broader Impacts
5. Timeline
6. Results from Prior NSF Support

## **1. Objectives and Specific Aims**

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

- Try to fit this information 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; i.e., the aim should be outcome-oriented).
  - Limit yourself 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 doesn't turn out the way you expect, your entire proposal won't fail).
  - Link your specific aims to hypotheses, as appropriate.

- 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 them is such that it works best to present an integrated project where the two are interspersed 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 a 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.

Suggested format for this section:

#### **D. RESEARCH DESIGN AND METHODS**

Introductory paragraph to orient reviewer 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/Evaluation*

*D.1.d. Potential Pitfalls and Alternative Approaches*

When outlining your experimental plan:

- Base it on your specific aims—restate the aims and describe the flow of experiments for each aim.
- 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.
- Cite appropriate references.
- Describe the timeline and sequence of experiments.
- Talk about relevance to the field.

### 2.d. Expected Outcomes/Evaluation

- Describe how you will assess your research program.
- Consider linking this to your timeline and/or milestones.
- Describe future plans.
- Identify what others will be able to do with your research results.

### 2.e. 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.

### 3. Education Plan

Suggested length is 3-5 pages. Tips: Use first person, and refer to experiences that have informed your approach to education/teaching/mentoring.

#### 3.a. Overview/Background/Aims

Frame a big picture for your education plan. Include background, motivation, rationale, and aims for each major activity in the plan (e.g., Aim 1, Aim 2, Aim 3.). Suggest limiting to 3 major aims.

#### 3.b. Education design and methods

For each aim listed in 3a, describe the target audience, needs/gaps to be addressed, methods, resources (including personnel, partnerships, budget), and *measurable* desired outcomes (i.e., what would success look like?).

#### 3.c. Evaluation

- Describe how you will assess your education program.
- Consider linking this to your timeline.

Tip: Refer to the NSF User Friendly Handbook for Project Evaluation: [nsf.gov/pubs/2002/nsf02057/nsf02057.pdf](https://www.nsf.gov/pubs/2002/nsf02057/nsf02057.pdf)

#### 3.d. Integration of Research and Education

How will your research impact your education goals and how will your education activities feed back into your research?

### 4. Broader Impacts

You must include a separate section that addresses the Broader Impacts of your proposal.

- Must use the section heading "Broader Impacts" somewhere in your proposal.
- Describe the broader impacts that are intrinsic to your research, as well as those that result from your education activities.
- As an alternative to one section on broader impacts, you could have multiple sections throughout the proposal that are paired with each aim. In this case, be sure that you still create a separate section with the heading "Broader Impacts."

### 5. Timeline/Milestones

This is where you 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.
- Include key milestones for each education aim.

Task	Year 1	Year 2	Year 3	Year 4	Year 5
<b>Education Aim 1:</b> Improve scientific literacy of middle schoolers through development of <i>WhatsIt</i> and teacher workshops					
Plan, develop <i>WhatsIt</i> curriculum and activities					
Pilot, test, refine <i>WhatsIt</i> in Classroom A					
Implement <i>WhatsIt</i> in X, Y, Z middle schools					
<i>WhatsIt</i> teacher professional development workshops					

## 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) A listing of 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.)

If the project was recently awarded and therefore no new results exist, describe the major goals and broader impacts of the project.

## Supplementary Documentation

### Departmental Letter (2 pages)

The departmental letter demonstrates the department's support of your integrated research and education plan. The proposal must include one (and only one) letter from the your department head (or equivalent organizational official). If you have a joint appointment, the letter should be signed by both department heads.

Letter must include:

- An indication that your 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 support your and your professional development.
- A description of (a) the relationship between the CAREER project, your career goals and job responsibilities, and the goals of your department/organization, and (b) the ways in which the department head (or equivalent) will ensure the appropriate mentoring of you, in the context of your career development and your efforts to integrate research and education throughout the period of the award and beyond.
- A statement to the effect that you are 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.

### 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.

### 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>. 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/>.



### 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.

### Useful Resources

Please refer to our website for further guidance:

<http://vcresearch.berkeley.edu/brdo/nsf-faculty-early-career-development-program>