

Reflections on the NSF CAREER Proposal

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Structure of my NSF CAREER Proposal

1. Project Preview

- ▶ Background and significance
 - ▶ What is this project trying to do?
 - ▶ Why is this significant?
- ▶ Key research challenges

2. Intellectual Merit

- ▶ Distill the key elements of the technical approach
- ▶ Concisely say why they are novel and why they are appropriate

3. Research Description

- ▶ Three thrusts with consistent organization
- ▶ For example: Prior work; research plan; preliminary results
- ▶ Validation plan

4. Integrating Research with Education

- ▶ Plans for K-12, undergraduate, graduate students

5. Broader Impacts

6. Results from Prior NSF Support

Choosing the Topic

- ▶ NSF CAREER proposal entails a 5-year plan
- ▶ Possible considerations about choosing the topic
 1. Exciting area
 2. Sufficiently broad
 3. Without much existing work
 4. Related or connected to the PI's previous research
 - ▶ Build upon existing strengths of the PI
 - ▶ Evidence about the PI's qualifications

Content Tips

- ▶ Both research and education plans need **specifics**
- ▶ Include sufficient details for a convincing plan
- ▶ Interlace forward looking ideas
- ▶ Some tasks can be more detailed, some others more open-ended
- ▶ Validation plans for both research and education
 - ▶ What actions can be taken to assess the success of the research and education plans?

Preliminary Results

- ▶ Preliminary results speak to the feasibility of the proposed approach
- ▶ They can be based on related prior work by the PI

Integrating Research with Education

- ▶ Education and outreach can be incorporated into existing programs at the PI's institution
 - ▶ Helps with eliminating logistics
- ▶ Consult with grant coordinators/specialists at PI's institution

Seek Feedback

- ▶ Seek feedback from Program Director
- ▶ Trusted colleagues or PhD/Post Doc advisor
- ▶ Existing resources at the PI's institution
 - ▶ Grant coordinators/specialists
 - ▶ Paid services

Start Early

- ▶ Several documents are needed in addition to the Project Description
- ▶ Formatting and content requirements
- ▶ Start early, especially when it comes to letters of collaboration
 - ▶ For example, if one seeks a letter from a school or school district, it is best to contact them quite a bit before the end of the school year
 - ▶ Collaborators may need to have a good understanding of the proposed project before they commit and sign the letter
 - ▶ Lead time for collaborators must be included in the planning
 - ▶ Likewise for quotes from vendors, if equipment is needed

In the Meantime

- ▶ Submit proposals to regular NSF programs
 - ▶ Including as Co-PI or Collaborative Proposals
 - ▶ Understand the process
- ▶ If funded, will produce stronger research results
 - ▶ Can be leveraged to build preliminary results for CAREER proposal
- ▶ Participation in NSF review panels is also very useful

Approach to Research

- ▶ Identify impactful and exciting research directions
 - ▶ Areas and problems the academia, industry, and government are working or proposing to work on
 - ▶ Service activities in professional organizations
- ▶ Work on some of these problems and establish an area of expertise

Reflection

I found that activities described in the previous 2 slides helped me write a successful NSF CAREER proposal, and particularly in the following aspects:

- ▶ Articulate why the research problem is significant
- ▶ Understand and clearly explain the motivation, context, and challenges
- ▶ Explain why the proposed approach is innovative
- ▶ Establish a set of research tools and results
- ▶ Improve my qualifications and increase the likelihood of the project success