

NSF CAREER AWARDS



Is NSF a Good Fit for Your Research?

- STEM research
 - Does have a social, behavioral, economic component
- STEM education and workforce development
- Interdisciplinary collaborations in STEM
- International collaborations in STEM
- Activities to increase participation of women and minorities and other underrepresented groups in STEM



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CAMPUS RESEARCH DEVELOPMENT



General Tips

- NSF application guide entitled: **Proposal & Award Policies & Procedures Guide (PAPPG)**
(https://www.nsf.gov/pubs/policydocs/pappg18_1/index.jsp)
- PAPPG provides general guidance BUT also read **CAREER Program Solicitation** for any deviations from PAPPG:
<https://www.nsf.gov/pubs/2017/nsf17537/nsf17537.htm>
- More info can be found on the NSF CAREERs webpage, including webinars and FAQs:
https://www.nsf.gov/funding/pgm_summ.jsp?pims_id=503214
- Make sure you, RD staff, and grants admin read/follow entire PAPPG and solicitation guidance



General Tips

- Contact NSF Program Officer (PO) to discuss your research project and if it fits within scope of program of interest
 - Do not submit anything not requested from PAPPG and CAREER Solicitation unless OK'd by PO
- Look at successful CAREER applications



Eligibility

- Type of Career Development Award to support **tenure-track junior faculty** who exemplify role of teacher-scholars through outstanding research, excellent education, and the **integration of education and research within the context of NSF mission**
- Principal Investigator may not participate in more than 3 CAREER competitions.
- Minimum \$400K for 5 years



Basic Components

Document	Page Limit
Cover Page	--
Project Summary	1
Project Description	15
References Cited	--
NSF Biosketch for PI only	2
Budget (per yr and total)	--
Budget Justification	5
Current and Pending Support	--
Facilities, Equipment, and Other Resources	--
Supplemental Docs	
Department Letter	2
Data Management Plan (required)	2
Postdoctoral Mentoring Plan (if including postdoc)	1
Letters of Collaboration (adhere to template)	--
Collaborations and Affiliations Tables for senior personnel	--

Project Summary—1 Page

- 3 sections:
 - **Overview:** Opening 1-2 sentences introducing topic/problem, purpose of project, specific objectives of proposal and highlight methods employed to achieve objectives.
 - End with how you will **integrate education goals with research objectives**—goal of integration should echo through the entire proposal
 - **Intellectual merit:** What is currently known and what not known about topic/problem AND how proposed objectives will advance knowledge in field or across fields
 - **Broader impacts:** Summarize Education Plan and any other Broader Impact activities



Project Description

- A description of proposed research project, including:
 - preliminary supporting data where appropriate
 - specific objectives, methods, and procedures to be used
 - expected significance of the results
- A description of proposed educational activities and their intended impact
- A description of how the research and educational activities are integrated or synergistic
 - Remember, educational activities are the main broader impacts in CAREER Awards
- Results from prior NSF support



Project Description Organization

Main Sections:

- Introduction
- Research Objectives
- Background (more in-depth than Introduction)
- Summary of Intellectual Merit
- Research Plan
- Broader Impact--Education Plan with Evaluation
- Timeline
- Results From Prior NSF Support



Introduction

- Suggested length: 1-2 pages
 1. Introduce the problem
 2. Provide summary of background, including highlighting gaps
 3. Identify your long-term goal as faculty member and then state purpose of CAREER Award (focusing on the integration of research and education) to address problem
- Break these sections into sub-sections for flow, organization, and readability
- These 1-2 pages should provide readers clear understanding of your general research interest and how it will tie with your education interests



Research Objectives

- Research Objectives should focus on **1 project**
- Identify 2-4 main research objectives addressing gaps in knowledge you referred to in Intro.
 - Develop objectives feasible to complete within 5-year grant duration
 - Make sure they can be achievable by activities proposed in plan
- For any objective identified, have accompanying methods in Research Plan to accomplish objectives



Background

- Suggested length: 2-4 pages
- Purpose is to demonstrate (in more depth than Introduction) the relationship of proposed work to present state of knowledge in relevant field(s)
- Suggested content/organization:
 - Introduce relevant scholarly literature and your preliminary data leading up to proposal
 - Have final paragraph describing gaps
- Break into sub-sections for flow, organization, and readability



Summary of Intellectual Merit

- Suggested length: 2-4 paragraphs
- Describe how achieving objectives will **advance knowledge** within field or across NSF-relevant different fields
- Describe how project is innovative/transformational
- Describe roles and qualifications/expertise and access to relevant resources of PI
- Use sub-headings or font change to emphasize research advancements and transformational aspects (but be careful not to over **bold**, *italicize*, or underline)



Research Plan Organization

Modular	Unitary
<p>For each Objective, describe:</p> <ul style="list-style-type: none">• Preliminary studies (if applicable)• Research design• Study sample or population or data sources• Data collection procedures/experiments• Data analysis/hypotheses to test• Expected outcomes if objectives achieved• Potential Problems and Alternative Approaches	<ul style="list-style-type: none">• Preliminary studies (if applicable)• Research design• Study sample or population or data sources• Data collection procedures/experiments• Data analysis• Expected outcomes if objectives achieved• Potential Problems and Alternative Approaches

Suggested length: 5-7 pages



Determining Modular Vs. Unitary

- Use modular if each of your research objectives are using distinct research designs, data sources, analytic methods, etc.
- Use unitary if your research objectives are using the same research design, data source, analytic methods, etc.



Broader Impacts—Education Plan

- Educational plan activities can include:
 - Targeting K-12 students, undergraduates, graduate students, postdocs, and/or general public, but activities should be related to Research Plan
 - Training the next generation of scientists in your disciplinary area(s) (e.g., working on your CAREER project)
 - Designing innovative courses/curricula in STEM fields
 - Supporting teacher preparation/enhancement in STEM fields
 - Involving underrepresented students in STEM fields
 - Incorporating research activities proposed in CAREER into undergraduate or graduate STEM courses
 - Build on existing campus NSF-supported activities/educational projects
- Integration of research and teaching
 - **Not just a discussion about Broader Impacts (like in research grants)**
 - Link objectives of Research Plan with objectives of Educational Plan
 - **Integration** should demonstrate how your research will enhance learning and preparation for the student and/or teacher population of focus in CAREER Award



Education Plan Organization

Modular	Unitary
<ul style="list-style-type: none">• Identify educational objectives <p>For each Objective, describe:</p> <ul style="list-style-type: none">• Targeted group(s) for education• Educational activities or educational program (preliminary data on program, if applicable)• Expected outcomes of educational activities• Brief evaluation of educational program, if applicable (see Evaluation Plan slide for guidance)• How this educational objective integrates with 1 or more of Research Plan Objectives	<ul style="list-style-type: none">• Identify educational objectives• Targeted group(s) for education• Educational activities or educational program (preliminary data on program, if applicable)• Expected outcomes of educational activities• Brief evaluation of educational program, if applicable (see Evaluation Plan slide for guidance)• How each educational objective integrates with all Research Plan Objectives

Suggested length: 2-3 pages

Evaluation of Education Plan

- Purpose could be to test/assess **feasibility** of conducting program and/or **effectiveness/impact** of program
 - Formative and summative evaluation components
- Suggested length 2 pages or integrate within Educational Plan
- Use these resources to help develop evaluation plan:
 - Evaluation methods: <http://www.informalscience.org/sites/default/files/TheUserFriendlyGuide.pdf>
 - Educational research: <https://www.nsf.gov/pubs/2013/nsf13126/nsf13126.pdf>



Other Broader Impacts

- Identify any other Broader Impacts besides Education Plan (remembering that **Education Plan should be the main broader impact for an NSF CAREER award**)
- Other Broader Impacts could address:
 - Will results be disseminated broadly to enhance scientific and technological understanding?
 - What may be the benefits of the proposed activity to society?
- Campus resource for any assistance with Broader Impacts, in general:
<https://scienceandsociety.duke.edu/research/birc/>



Results from Prior NSF Support

- Indicate “not applicable” if no prior NSF support
- Follow PAPPG guidance on what to include for prior NSF awards listed
- Can be up to 5 pages within Project Description page limit



References Cited

- No page limit; only cite sources referred to in proposal
- **Do not use term, “et al,”** when listing co-authors; all names must be spelled out
- Use standard and consistent citation system



Biographical Sketch

- Only need your (as PI) biosketch
- 2 page limit and specific template
- Sub-sections
 - Contact information
 - Professional preparation
 - Academic/professional appointments (starting with most recent)
 - 5 Products or Publications most closely related to proposal (If only publications included, heading, "Publications," may be used for this section)
 - 5 Other significant products/publications
 - Synergist activities (up to 5 examples)
- Indicate “Not applicable” for any sub-section if that is the case



Budget/Budget Justification

- Award amount = total budget (directs + indirects [aka F&A])
- Provide itemized budget for total budget and yearly
 - Check PAPPG and CAREER solicitation for any budget restrictions
- Budget usually in 1-yr increments
- Justify what is budgeted (up to 5 pages)
- **Seek help from and start to work EARLY with departmental grants administrator**



Current and Pending Support

- Must be submitted (even if no salary support received from project)
- Must include current proposal as “pending”



Facilities, Equipment, Other Resources

- Describe resources directly applicable to proposal in these categories:
 - Laboratory
 - Clinical
 - Animal
 - Computer
 - Office
 - Major Equipment
 - Other resources (e.g., outside Duke)
- Collect boilerplate language for each to customize the resources for your proposal



Data Management Plan (DMP)

- 2-page limit
- Describes how proposal will conform to NSF policy on dissemination and sharing of research results
- If your project will not generate data that can be archived and shared, you must submit a statement stating that in this section.
- Check PAPPG on what to include in DMP
- Several DMP templates tailored to Directorate
- Resources to help you develop DMP:
 - Duke Libraries can help: <https://library.duke.edu/data/data-management/planning>
 - DMP online tool: <https://dmptool.org/>
 - Example DMP:
https://www.dataone.org/sites/all/documents/DMP_MaunaLoa_Formatted.pdf



Postdoctoral Mentoring Plan

- 1 page
- Only include if requesting funding to support postdoc(s) on grant
- Describes mentoring provided to all postdocs supported by project, at Duke or at another institution
- Suggest mentioning supporting postdocs in Broader Impacts of Project Description, then expand in this plan
- Mentoring activity examples:
 - Guidance on career choices
 - Grant writing workshops
 - Assistance with publications/presentations
 - Guidance on ways to improve teaching and mentoring skills
 - Guidance on how to effectively collaborate with researchers from diverse backgrounds and disciplinary areas
 - Responsible Conduct of Research (RCR) training
(<http://www.nsf.gov/bfa/dias/policy/rcr.jsp>)
at Duke: (<https://ors.duke.edu/responsible-conduct-research-orientation>)



Letters From Collaborating Institutions

- Letter(s) from institutions describing their involvement in your project and/or facilities or resources that will be used by you
- “Letters of collaboration should be limited to stating intent to collaborate/provide resources and should not contain endorsements or evaluation of proposed project”
 - NOT letters of support
- CAREER solicitation has template for these letters



Collaborators and Other Affiliations Information Tables

- Excel spreadsheet template for identifying collaborators and other affiliations
- Purpose is to help manage reviewer selection



NSF Review Criteria

- Standard NSF review criteria apply to CAREER Awards
- Reviewers use these questions to holistically evaluate full proposal:
 1. What is the potential for the proposed activity to:
 - a) Advance knowledge (**Intellectual Merit**)
 - b) Benefit society or advance desired societal outcomes (**Broader Impacts**)?
 2. Are proposed activities potentially transformative (both IM and BI)?
 3. Is plan reasonable and feasible? Plan to assess success?
 4. How well qualified is individual, team, or organization to conduct the proposed activities?
 5. Are there adequate resources available to PI to carry out proposed activities?



NSF Review Process

Merit Review Process

Click the square buttons to find out more information about the review process.

Download a printable version of the Merit Review Process Illustration. [PDF \(21K\)](#)



Phase description: https://www.nsf.gov/bfa/dias/policy/merit_review/illustration.pdf



Final Thoughts

NSF CAREER Awards, while having the same basic components (“framework”), are very tailored to the individual scientist. Certain projects may require editing of the approach described above to ensure the project is adequately/appropriately described.

Please contact OCRD, research development professionals from your unit, or other resources on campus if you have questions or concerns.

OCRD contact: Lauren Gee, lauren.gee@duke.edu

