Proposal Development and Staying Focused
Proposal Preparation Instruction
Chapter II

- The Proposal & Award Policies & Procedures Guide (PAPPG) contains documents relating to NSF's proposal and award process. It has been designed for use by both our customer community and NSF staff and consists of two parts.
  - Part I is NSF’s proposal preparation and submission guidelines
  - Part II is NSF’s award and administration guidelines
Required Components

- Cover Sheet
- Project Summary
  - Merit Review: Intellectual Merit and Broader Impact Sections
- Project Description
  - Results from Prior NSF Support
- References Cited
- Biographical Sketch(es)
- Budget and Budget Justification
- Current and Pending Support
- Facilities, Equipment and other Resources

- Supplemental Documentation
  - Data Management Plan
  - Postdoctoral Mentoring Plan
  - Collaboration Letters
- Human Subjects: IRB*
- Vertebrate Animals: IACUC
- Single Copy Documents
  - Collaborators and Other Affiliations Information
Types of proposals

• Research (including CAREER)
• EAGER/RAPID/GOALI/RAISE
• Ideas Lab
• Conference
• Equipment/Infrastructure
• Travel
• FASED
EAGER Proposals

- Support exploratory work in early stages on untested, but potentially informative, research ideas or approaches
- Involve “high risk-high payoff” radically different approaches, applies new expertise, or engages novel disciplinary or interdisciplinary perspectives
- Focus on under-researched area
- Must contact Program Officer to discuss possible proposal
- Must link to one of the 6 programs previously named
- NCE and supplemental funding available per NSF policies and procedures
Determine Nature of Proposal

• Single institution collaborative
  – Sub-awards

• Multiple institution collaborative
  – Lead and Non-Lead submissions are different
  – Examine the PAPPG to identify the required components for each institution
  – Proposal title must begin with the words “Collaborative Research”
  – All institutions must submit separate annual reports describing their contributions.

• Not a collaborative
Project Planning

• Work within your own planning style, but PLAN BEFORE YOU WRITE!

• Start from your research and development idea or question and where you want to be at the end, then fill in the middle
  – What do we already know on this topic? What has already been developed and tested?
  – What resources are (or could be with funding) at your disposal – people, facilities, equipment, supplies?
  – What are your goals for the project when you are done?
More Project Planning

• Draft a month-by-month timetable
  – Be realistic about your time and that of others to devote to the project
  – Are the most important activities receiving the bulk of the time?
  – Maintain some flexibility
  – Remember factors that are out of your control (e.g., scheduling of major meetings)
Even More Project Planning

• How much will this cost?
• Major cost considerations:
  – Personnel including PI, graduate students, post docs, undergraduate students, consultants
  – Materials and supplies – get realistic quotes from vendors
  – Travel – including personnel travel to do the work (e.g., meeting with others) and for dissemination (e.g., presenting at conferences)
  – Indirect Costs
Remember…

• Proposal respond to a specific solicitation, announcement, description or the PAPPG.
• Choose the funding opportunity and the type of proposal you are writing based on your research.
• Ask if you need assistance choosing the best place to target your ideas.
Proposal Writing

• **Audience is KEY!**
  – Writing to reviewers and program officers
  – Audience is in your broad domain, but may not be in your subspecialty
  – Focus on what you are going to do
  – Make sure the most important things receive the most space
Sections of the Project Description

• Your research topic and its significance
• Review of the literature - foundations
• Project design specifically including
  – What you are going to do
  – Who you are going to meet with
  – When you are going to do the work
  – Motivation for why these are the right things to do
• Dissemination
Mechanism to Assess Success

• The Merit Review Elements require you to have a mechanism to assess success
• Unless the solicitation requires a particular mechanism (e.g., external evaluator), it is up to you to describe how you will assess the success of your project.
  – should focus on how the project is working, why the projects is working that way, and identify places to make it better
  – should also be responsive to the project’s needs
Resources

- Use an advisory committee well
  - Integrate this group into your evaluation plan so that they can provide feedback at key points in your work plan and for the outcomes of your project

- The Evaluation Center at Western Michigan University (http://www.wmich.edu/evalctr)
  - Checklists including how to hire an evaluator and what a budget should be
  - Evaluators who have indicated their expertise
  - Information to help you design an evaluation plan for an exploratory project
Dos and Don’ts

• **Title:** Keep your title concise (under 20 words), without acronyms, and informative and descriptive of the project. All LifeSTEM proposals must begin with *LifeSTEM*.

• **Compliance:** Make sure that the proposal is compliant – review the checklist in the PAPPG and keep the proposal within the page limits. Use the required font size, margin and pagination.

• **Presentation:** Spell check and grammar check the proposal. Do not repeat paragraphs. Proposals that are well-reasoned and well-written are better understood by reviewers.
Effective Titles

Effective

• Knowledge Assets to Support the Science Instruction of Elementary Teachers (ASSET)
• Collaborative Research: Targeted Infusion Project: Building a Learner-Centered Cyberlearning Environment in Computer-Aided Design Education
• Research Initiation Award: Development of New Halide-based Rare-Earth Scintillators

Not effective

• Hybrid/Future Power Technology (not informative)
• iCollaborate-MSE (includes an acronym and not informative)
• Demystifying Genomics – Opening Doors (not informative)
• Improving Research and Technology Experiences of VXU STEM Undergraduates (Includes institution name)
Budget

• Contact the Sponsored Research Office early and often
• Remember Indirect Costs and Fringe Benefit rates
• Budget and project description should match
  – PI and senior personnel time should reflect the effort on the project
    • Limited to 2 months across ALL NSF awards
    • Justification required for more than 2 months
  – Graduate students and undergraduate students
  – Post docs require a Post-doc mentoring plan
  – Remember to budget for fringe benefits
  – New rules on direct costs for clerical support
• **Non-personnel Budget costs**
  
  – Equipment is only for equipment that costs more than $5000
  
  – Travel must be itemized per trip, can include local costs
  
  – Participant support – “stipends or subsistence allowances, travel allowances, and registration fees paid to or on behalf of participants or trainees (but not employees) in connection with NSF-sponsored conferences or training projects.”

  • The number of participants to be supported must be entered in the parentheses on the proposal budget.

  • **Does not include:**
    – Undergraduate student workers
    – Research incentive payments
    – Conference speaker travel or honorarium
    – Costs of hosting the conference (e.g., room rental fees, supplies)

  • F&A are not allowed on participant support costs.
Subawards Budgets

- Comply with guidelines from prime institution
- When possible be included in the budget submitted by the prime institution
- Meet a need to the research being conducted
- Monitor activities of assigned tasks and activities
- Respond to request for information from prime institution regarding program, financial, and accountability, effectiveness of expenditures, and supports public confidence in management of government funds
**Current and Pending Support** (Required)  
This section of the proposal calls for information on all current and pending support for ongoing projects and proposals.

**Example from FastLane**
Text from the PAPPG

Sections of an NSF Proposal

Special Information and Supplementary Documentation

This segment should alert NSF officials to unusual circumstances that require special handling; more information can be found in the PAPPG, Chapter II.C.2.j.

j. Special Information and Supplementary Documentation

Except as specified below, special information and supplementary documentation must be included as part of the Project Description (or part of the budget justification), if it is relevant to determining the quality of the proposed work. Information submitted in the following areas is not considered part of the 15-page Project Description limitation. This Special Information and Supplementary Documentation section also is not considered an appendix. Specific guidance on the need for additional documentation may be obtained from the organization’s SPO or in the references cited below.

- Postdoctoral Researcher Mentoring Plan. Each proposal requesting funding to support postdoctoral researchers must upload a “Mentoring Plan” in the supplementary documentation section of FastLane, a description of the mentoring activities that will be provided for such individuals. In no more than one page, the mentoring plan must describe the mentoring that will be provided to all postdoctoral researchers supported by the project, regardless of whether they reside at the submitting organization, any subrecipient organization, or at any organization participating in a simultaneously submitted collaborative proposal. Proposers are advised that the mentoring plan must not be used to circumvent the 15-page Project Description limitation. See Chapter II.D.3 for additional information on collaborative proposals. Mentoring activities provided to postdoctoral researchers supported on the project will be evaluated under the Broader Impacts review criterion.

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.

- Plans for data management and sharing of the products of research. Proposals must include a document of no more than two pages uploaded under “Data Management Plan” in the supplementary documentation section of FastLane. This supplementary document should describe how the proposal will conform to NSF policy on the dissemination and sharing of research results (see Chapter XI.D.4), and may include:
  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 applicable).
Special Information and Supplementary Documentation

- Data Management Plans
- Letters of Collaboration
- Post doctoral Mentorin g Plans
A good proposal is based upon a sound idea, is well expressed, clearly describes the approaches to be used to pursue the idea, evaluates the findings, and disseminates the results.
Proposal Submission

• All proposals are ultimately submitted by your SRO
• If at all possible, use FastLane or Research.gov
• DO NOT wait until the last minute (see two bullets above)
• All notifications will be available to you via FastLane/Research.gov
• Remember to follow all compliance guidelines in the PAPPG, and the Solicitation, if appropriate.
NSF Merit Review Criteria
Program Officer Review

- Upon receipt at NSF, proposals are routed to the PI-designated program office.
- NSF staff conducts a preliminary review to ensure they are:
  - Complete;
  - Timely; and
  - Conform to proposal preparation requirements.
- NSF may not accept a proposal or may return it without review if it does not meet the requirements above.
- If the proposal is outside the scope of the program, the program officer usually tries his/her best to transfer it to the most appropriate program for evaluation.
Merit Review Criteria: Guiding Principles

• All NSF projects should be of the highest quality and have the potential to advance, if not transform, the frontiers of knowledge.

• NSF projects, in the aggregate, should contribute more broadly to achieving societal goals.

• Meaningful assessment and evaluation of NSF funded projects should be based on appropriate metrics, keeping in mind the likely correlation between the effect of broader impacts and the resources provided to implement projects.
NSB Report on Merit Review Criteria: Two Review Criteria

When evaluating NSF proposals, reviewers should consider what the proposers want to do, why they want to do it, how they plan to do it, how they will know if they succeed, and what benefits would accrue if the project is successful. These issues apply both to the technical aspects of the proposal and the way in which the project may make broader contributions. To that end, reviewers are asked to evaluate all proposals against two criteria:

• **Intellectual Merit:** The intellectual Merit criterion encompasses the potential to advance knowledge; and

• **Broader Impacts:** The Broader Impacts criterion encompasses the potential to benefit society and contribute to the achievement of specific, desired societal outcomes.

The following elements should be considered in the review for both criteria:

1. What is the potential for the proposed activity to:
   a. advance knowledge and understanding within its own field or across different fields (Intellectual Merit); and
   b. benefit society or advance desired societal outcomes (Broader Impacts)?

2. To what extent do the proposed activities suggest and explore creative, original, or potentially transformative concepts?

3. Is the plan for carrying out the proposed activities well-reasoned, well-organized, and based on a sound rationale? Does the plan incorporate a mechanism to assess success?

4. How well qualified is the individual, team, or institution to conduct the proposed activities?

5. Are there adequate resources available to the PI (either at the home institution or through collaborations) to carry out the proposed activities?
NSF values the advancement of scientific knowledge and activities that contribute to the achievement of societally relevant outcomes. Such outcomes include, but are not limited to:

- full participation of women, persons with disabilities, and underrepresented minorities in science, technology, engineering, and mathematics (STEM);
- improved STEM education and educator development at any level;
- increased public scientific literacy and public engagement with science and technology; improved well-being of individuals in society;
- development of a diverse, globally competitive STEM workforce;
- increased partnerships between academia, industry, and others;
- improved national security;
- increased economic competitiveness of the US; and
- enhanced infrastructure for research and education.
NSF Proposal & Award Process Timeline

- NSF Announces Opportunity
- Research & Educational Communities
- Submit

NSF Program Officer
- Ad Hoc
- Panel
- Combination
- Internal

Program Officer Analysis and Recommendations
- DD Concur

Can be returned without review/withdrawn

- Via DGA
- Organization

Proposal Receipt at NSF
- 90 Days
- Proposal Preparation

Proposal Receipt to DD Concurrency of PO Recommendation
- 6 Months

DD Concur
- Award

DGA Review & Process
- 30 Days
Review Format in FastLane

Reviewers provide feedback to NSF based on the Review Criteria and the Review Elements.

Review Criteria and Elements are available as reviewers provide feedback.

The following elements should be considered in the review for both criteria:

1. What is the potential for the proposed activity to advance knowledge and understanding within its own field or across different fields (Intellectual Merit)?
2. To what extent do the proposed activities suggest and explore creative, original, or potentially transformative concepts?
3. Is the plan for carrying out the proposed activities well-reasoned, well-organized, and based on a sound rationale? Does the plan incorporate a mechanism to assess success?
4. How well qualified is the individual, team, or institution to conduct the proposed activities?
5. Are there adequate resources available to the PI (either at the home institution or through collaborations) to carry out the proposed activities?

In the context of the five review elements, please evaluate the strengths and weaknesses of the proposal with respect to intellectual merit.

In the context of the five review elements, please evaluate the strengths and weaknesses of the proposal with respect to broader impacts.

Please evaluate the strengths and weaknesses of the proposal with respect to any additional solicitation-specific review criteria, if applicable.
Types of Reviews

• **Ad hoc**: Proposals sent out for review
  - *Ad hoc* reviewers usually have specific expertise in a field related to the proposal.
  - Some proposals may undergo *ad hoc* review only.
• **Panel**: Face-to-face sessions conducted by reviewers mainly at NSF but also in other settings
  - Panel reviewers usually have a broader scientific knowledge.
  - Some proposals may undergo only a panel review.
  - Some proposals may undergo reviews by multiple panels (especially for those proposals with crosscutting themes).
Types of Reviews

- **Combination:** Some proposals may undergo supplemental ad hoc reviews before or after a panel review.
- **Internal:** Review by NSF Program Officers only
  - Examples of internally reviewed proposals:
    - Proposals submitted to Rapid Response Research Grants (RAPID)
    - Proposals submitted to Early-concept Grants for Exploratory Research (EAGER)
    - Proposals submitted to Research Advanced by Interdisciplinary Science and Engineering (RAISE)
    - Proposals for conferences under $50,000
How are Reviewers Selected?

- **Types of Reviewers Recruited:**
  - Reviewers with specific content expertise
  - Reviewers with general science or education expertise

- **Sources of Reviewers:**
  - Program Officer’s knowledge of the research area
  - References listed in proposal
  - Recent professional society programs
  - Computer searches of S&E journal articles related to the proposal
  - Former reviewers
  - Reviewer recommendations included in proposal or sent by email

- Three or more external reviewers per proposal are selected.
What is the Role of the Reviewer?

- Review all proposal material and consider:
  - The two NSF merit review criteria and any program specific criteria.
  - The adequacy of the proposed project plan including the budget, resources, and timeline.
  - The priorities of the scientific field and of the NSF program.
  - The potential risks and benefits of the project.

- Make independent written comments on the quality of the proposal content.
What is the Role of the Review Panel?

• Discuss the merits of the proposal with the other panelists
• Write a summary based on that discussion
• Provide some indication of the relative merits of different proposals considered
Funding Decisions

• The merit review panel provides:
  ▪ Review of the proposal and a recommendation on funding.
  ▪ Feedback (strengths and weaknesses) to the proposers.

• NSF Program Officers make funding recommendations guided by program goals and portfolio considerations.

• NSF Division Directors either concur or reject the Program Officers’ funding recommendations.
Feedback from Merit Review

- Reviewer ratings (such as: E, V, G, F, P)
- Analysis of how well proposal addresses both review criteria: Intellectual Merit and Broader Impacts
- Proposal strengths and weaknesses
- Reasons for a declination (if applicable)

If you have any questions, contact the cognizant Program Officer
Documentation from Merit Review

- Verbatim copies of individual reviews, excluding reviewer identities
- Panel Summary or Summaries (if panel review was used)
- Context Statement (usually)
- PO to PI comments (formal or informal, written, email or verbal) as necessary to explain a decision
Examples of Reasons for Declines

- The proposal was not considered to be competitive based on the merit review criteria and the program office concurred.
- The proposal had flaws or issues identified by the program officer.
- The program funds were not adequate to fund all competitive proposals.
Possible Considerations for Funding a Competitive Proposal

- Addresses all review criteria
- Likely high impact
- Broadening participation
- Educational impact
- Impact on institution/state
- Special programmatic considerations (e.g. CAREER/RUI/EPSCoR)
- Other support for PI
- “Launching” versus “Maintaining”
- Portfolio balance
Issuing the Award

- NSF’s Division of Grants and Agreements (DGA) reviews the recommendation from the program office for business, financial, and policy implications.

- NSF’s grants and agreements officers make the official award as long as:
  - The institution has an adequate grants management capacity.
  - The PI/Co-PIs do not have overdue annual or final reports.
  - There are no other outstanding issues with the institution or PI.
Revisions and Resubmissions

- Points to consider:
  - Do the reviewers and the NSF Program Officer identify significant strengths in your proposal?
  - Can you address the weaknesses that reviewers and the Program Officer identified?
  - Are there other ways you or your colleagues think you can strengthen a resubmission?

Again, if you have questions, contact the cognizant Program Officer.