Maximizing Your Chances for NSF Funding Success

November 9, 2022

Presented by:

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Sponsored by:

Colorado State University
Warner College of Natural Resources

Purpose and Goals

- **Purpose:** Provide knowledge, insight, and strategies to maximize your chances of funding success from NSF

- **Goal:** Go "Beyond the Rules"
  - Best practices
  - Keys to success



- ✓ Organization and Structure
- ✓ Funding Opportunities
- ✓ Keys to success
- ✓ General grantsmanship and other best practices

Desired Outcomes

- Understand key differentiators of successful NSF proposals
- Align your research goals with NSF purpose and scope
- Improve your articulation of:
  - Intellectual Merit
  - Broader Impacts



Improve your chances of securing funding



Develop grantsmanship skills applicable to future proposals

…But *really*, what's the point of today?

- Many of you have submitted NSF grants before
  - Many of you may not have, but are here to take your first crack at it.
- How do you 'crack the code' of an agency with which you're unfamiliar?

☑**Quality science** is your job

☑My job is to help your grantsmanship enhance your funding chances

- *And not let grantsmanship issues get in the way of an otherwise excellent proposal!*

My long-term goal is to help you:

- **Win** your first NSF award
- **Increase** your odds of winning every future proposal you write
- **Develop** a new pipeline of funding to support your research

Maximizing your Chances of NSF Funding Success

9:00 – 9:20	**Introduction and Ground Rules**
9:20 – 10:00	**NSF Structure and Background**
10:00 – 10:20	**Planning your NSF Proposal**
10:20 – 10:30	Break
10:30 – 11:30	**Proposal Contents**
10:30 – 10:50	Intellectual Merit
10:50 – 11:10	Broader Impacts
11:10 – 11:15	Other Proposal Components
11:15 – 11:30	Review Process
11:30 – 12:00	**Grant Writing Best Practices**
12:00 – 1:00	**Fireside Chat / Brown Bag**
1:30 – 3:30	**One-on-one sessions**

Ground Rules



This is your time.

My goal is to be flexible and responsive to your needs!



Please, ask questions when they arise.

Chances are, someone else has the same question!



Please speak up!

Urban Venture Group, Inc. (UVG)

over
$1 BILLION
in proposal wins

Our Mission: To secure the capital needed to advance early-stage innovation

CLIENTS
Served

- Universities
  - New faculty
  - Mid-career
  - Large centers
- Large Enterprise
- Entrepreneurs
- Startups
- Private R&D
- Hospital Systems
- Incubators and VDOs
- State Agencies
- Federal Agencies

FIELDS
Served

Energy • Transportation
Environment

Education
Basic & Applied Research

Defense • Aerospace
Advanced Materials

Medical Device
Therapeutics • Healthcare

UVG Presenters



Burr Zimmerman, PhD
Principal

Leadership
Strategy
Agency Access



Deidre Torrey
Senior Program Manager

Proposal Writing
Strategy
Post-Award Management



Katie Repsher
Senior Program Manager

Proposal Management
Budgets
Compliance

CONFIDENTIAL

If You Remember Just One Slide Today…

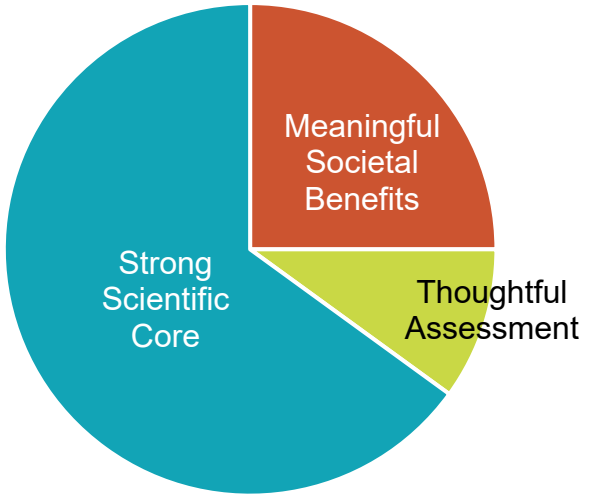
NSF Judges Submissions on Two Primary Merit Criteria:	**Intellectual Merit** Expand frontiers of science and create new scientific knowledge	1	**Broader Impacts** Broaden participation in STEM, Engage underserved populations, deliver societal benefits, measure your results	2

A Winning Approach:

Stay engaged with program staff

&

Strive for the right balance



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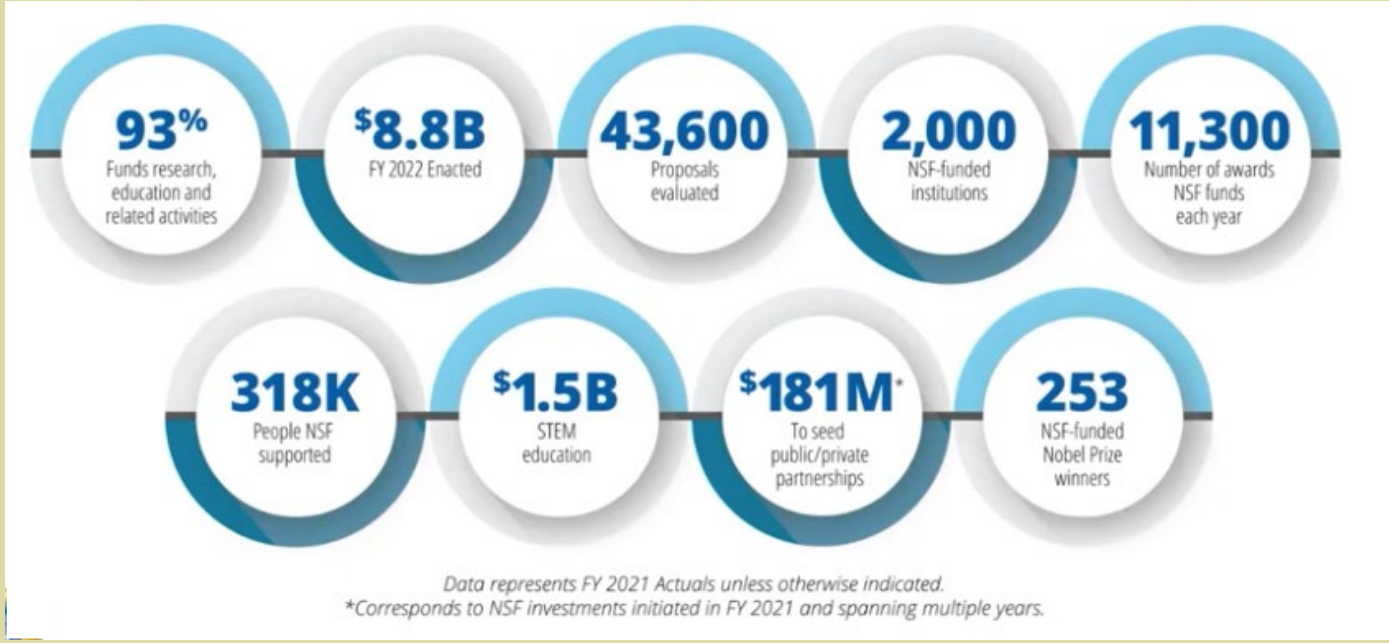


NSF Structure and Directorates

Learning Objective: Understand the structure and organizational units of NSF

NSF Overview

- **NSF Mission:** Promote science by investing in research to expand knowledge in science, engineering, and education.
  - NSF invests to increase the capacity of the U.S. to conduct research.



- *NSF is an independent federal agency.*
  - *Founded in 1950*
- *NSF is funded by, and reports to, the U.S. Congress.*

Scope of NSF Funding

NSF funds research and education in most fields of science and engineering.

- Grants, cooperative agreements
- Over 3,000 different recipients
- Universities, K-12 schools, businesses, other research and science organizations

Outside of NSF scope:

- Technical assistance, pilot plants, research requiring security classification, commercial development, market research, human health research, animal models of human diseases.

NSF Proposal Volume / Win Rate

- 41,000 proposals submitted to NSF annually
- 11,000 proposals are funded annually
- ***About 25% funding rate***

- 15,000 applications for graduate and postdoctoral fellowships
- 2,000 Graduate fellowships are funded annually

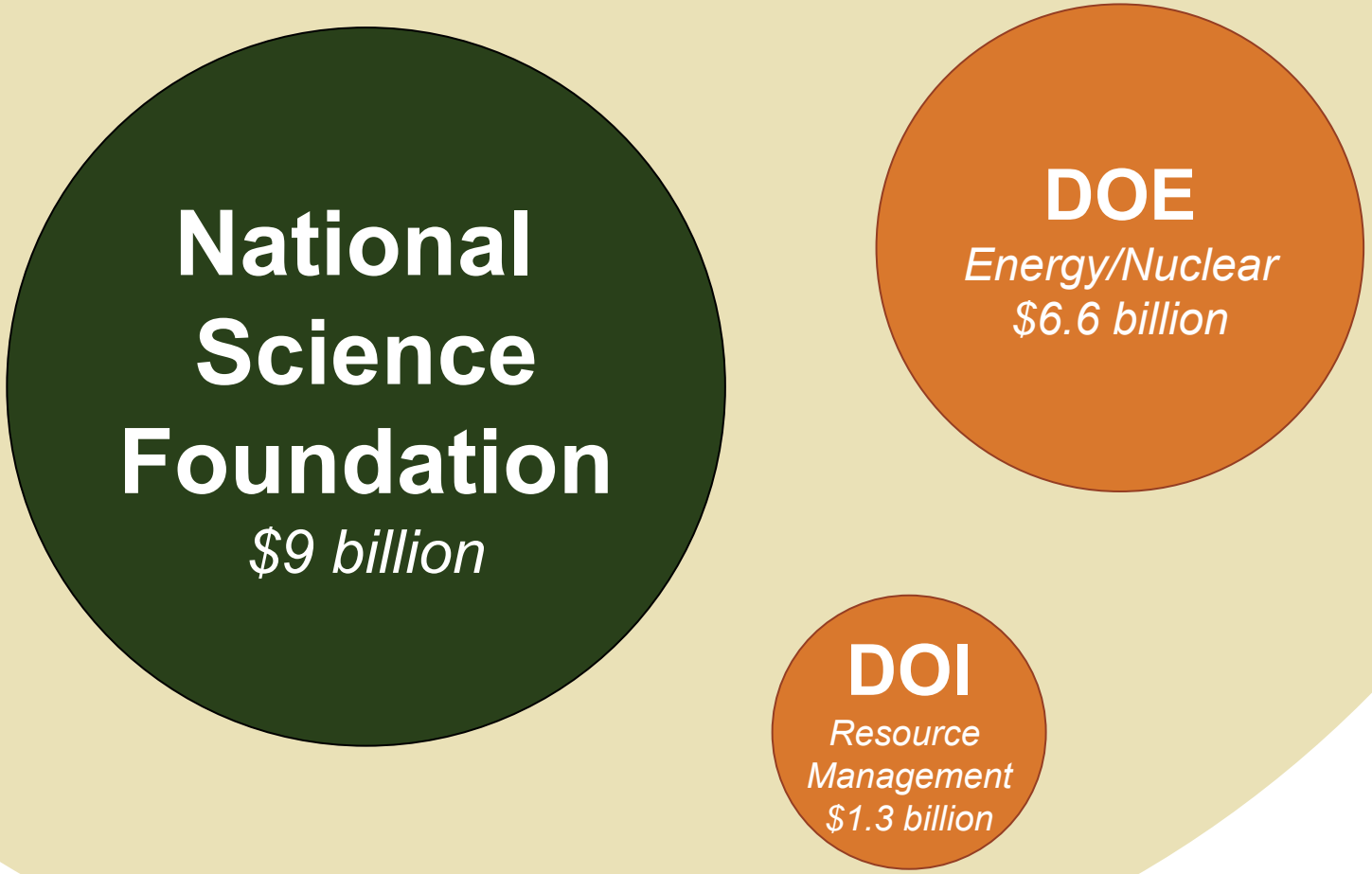


NSF Peer Review is the Process for Making Awards



- NSF Reviews are conducted by advisors from the scientific and engineering communities
- These volunteers serve on formal committees or as ad hoc reviewers of proposals.
- Approximately 50,000 scientists and engineers serve as peer reviewers each year.
- NSF staff members who are experts in a certain field or area make award recommendations
  - Principal Investigators (PIs) receive unattributed verbatim copies of peer reviews.

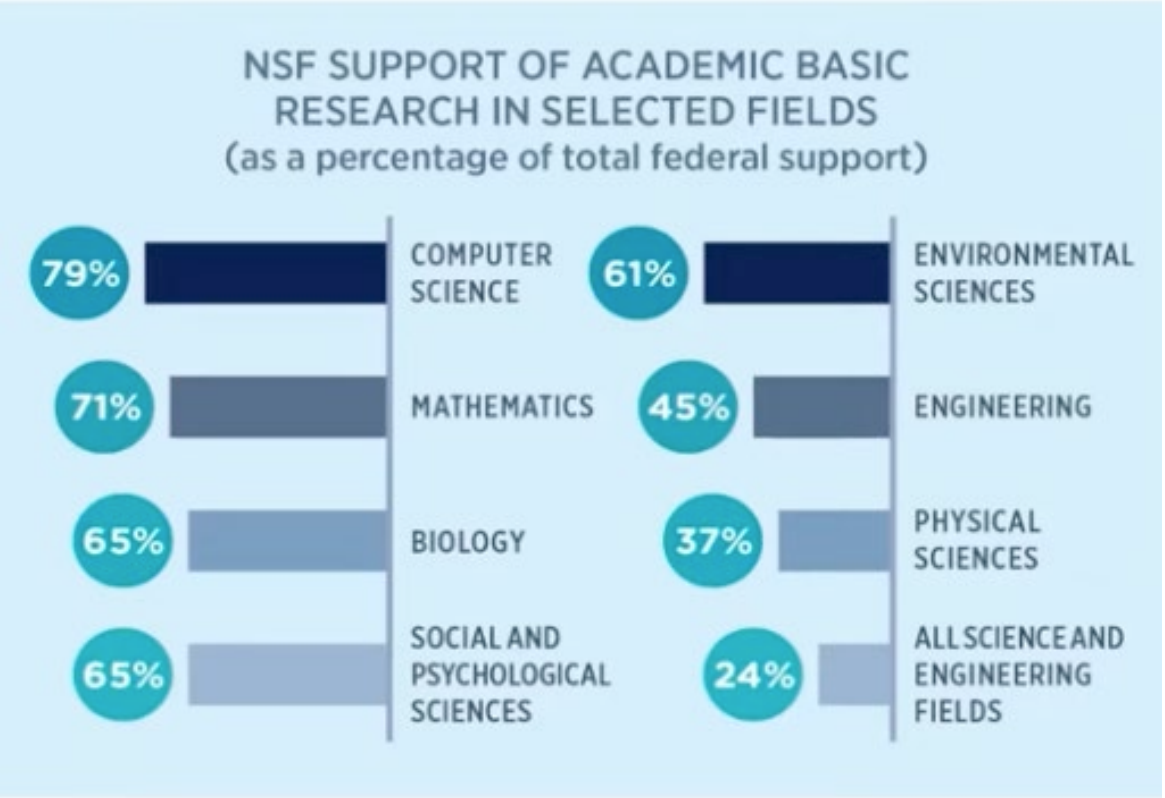
NSF is a major Basic Science Research funder



NIH
$40 billion

NSF Background

- Basic science research is primarily funded by NSF
- Driver of the U.S. economy
- Enhance national security
- Advance knowledge to sustain global leadership
- 93% of NSF budget funds extramural research



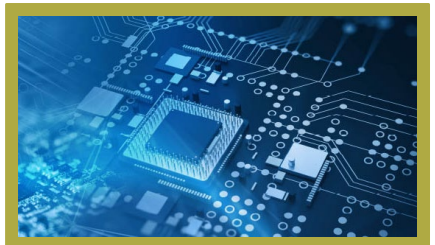
*Biology and Psychological Sciences exclude NIH

NSF Directorates

- NSF maintains divisions and offices organized by discipline/field
- NSF is structured much like an institution of higher education



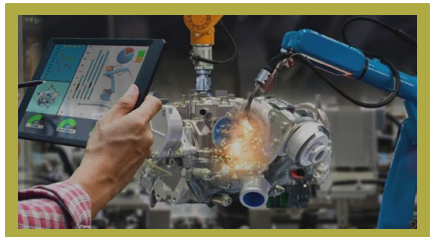
Biological Sciences (BIO)



Computer & Information Science & Engineering (CISE)



STEM Education (EDU)



Engineering (ENG)



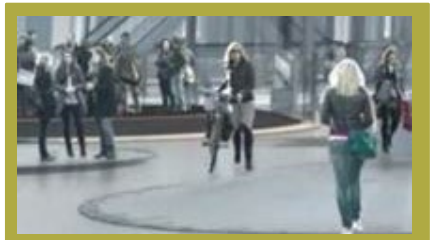
Geosciences (GEO)



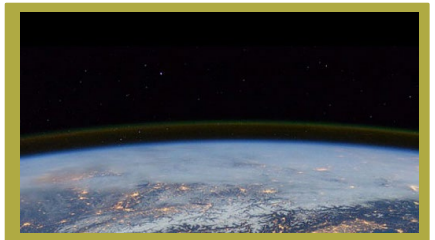
Mathematical & Physical Sciences (MPS)



Integrative Activities (OD/OIA)



Social, Behavioral, & Economic Sciences (SBE)



International Science & Engineering (ISE)



Technology, Innovation, & Partnerships (TIP)

Essential Reading: NSF PAPPG



- Proposal & Award Policies & Procedures Guide (PAPPG)
- The PAPPG is a set of documents describing NSF's proposal and award processes

- NSF also maintains standard award conditions
  - Based on 2 CFR §200, "Uniform Administrative Requirements, Cost Principles, and Audit Requirements for Federal Awards"

NSF Proposal Types

- **Research** (see Chapter II, Sections A through C)
- **Planning** (see Chapter II.E.1)
- Rapid Response Research (**RAPID**) (see Ch. II.E.2)
- Early-concept Grants for Exploratory Research (**EAGER**) (see Chapter II.E.3)
- Research Advanced by Interdisciplinary Science and Engineering (**RAISE**) (see Chapter II.E.4)

- Grant Opportunities for Academic Liaison with Industry (**GOALI**) (see Chapter II.E.5)
- **Ideas Lab** (see Chapter II.E.6)
- Facilitation Awards for Scientists and Engineers with Disabilities (**FASED**) (see Chapter II.E.7)
- Career-Life Balance (**CLB**) Supplemental Funding Requests (see Chapter II.E.8)

- **Conference** (see Chapter II.E.9)
- **Equipment** (see Chapter II.E.10)
- **Travel** (see Chapter II.E.11)
- **Center** (see relevant funding opportunity)
- **Research Infrastructure** (see relevant funding opportunity
- **Fellowship** (see relevant funding opportunity)

NSF CAREER Awards

- Faculty Early Career Development Program ("CAREER" awards)
  - For early-career tenure-track faculty
- Program focus on integration of research and education
- 5-year period
- ONE proposal per annual competition
  - A PI may not participate in more than 3 CAREER competitions

NSF especially encourages applications from:

- *Women*
- *Underrepresented minority groups*
- *Persons with disabilities*

Award Details

- Type of Award: Standard Grant or Continuing Grant
- Duration: 5 years
- Number of Awards: 500
- Funding Amount: $250,000,000
- Minimum Award: $400,000
  - Awards for proposals to the Directorate for Biological Sciences (BIO), the Directorate for Engineering (ENG), or the Office of Polar Programs (OPP) are expected to total a minimum of $500,000 for the 5-year duration.
- Proposal Deadline: Fourth Monday in July, Annually

Investigator Eligibility Criteria

- **NSF-Alignment**
  - Must hold a doctoral degree in a field supported by NSF
  - Research in an NSF-supported area of science, engineering, or education
- **Research and Educational Appointment**
  - At least a 50% tenure-track (or equivalent) assistant professor (or equivalent title)
  - The appointment must have research and educational responsibilities
  - Associate/Adjunct (with or without tenure) are *not* eligible for a CAREER award
- **CAREER History**
  - Must have not previously received a CAREER award
  - OK to have prior/concurrent Federal support
  - Co-PIs are not allowed in CAREER proposals

Key Features of a CAREER Proposal

- CAREER is different from standard research proposals
  - You are proposing a career and education plan for the next 5+ years
  - ***This plan must be transformative to the field!***
- Key Considerations:
  - What is the big picture question you want to answer over the course of your career? How do you plan to achieve that?
  - What educational goals do you have for your career? How will you integrate your research and educational goals?
- Show how you are uniquely suited to do this work
- Focus on your VISION – how this award sets the stage for your career as an independent, successful investigator

How NSF CAREER differs from other NSF Programs

CAREER Proposals

- Broad in scale and scope
- Strategic foundation for a research career (5+ Years)
- Emphasis on integration of research and education
- Supports research with broad, diverse potential for impact to the field

Investigator-Initiated Proposals

- Focused in scale and scope
- Nearer-term focused on advancing scientific knowledge
- Primary emphasis on scientific merit, secondary on education
- Supports research with more focused potential for impact

NSF Centers

- There are many different NSF Centers
  - *“Centers”: Collections of partners and projects of a scale and scope larger than traditional research grants*
- May involve many PIs, Co-Is, and institutional partners
- May require cost share or other investment

Characteristics of NSF Centers:

- Emphasize convergence and multidisciplinarity
- May include non-academic partners such as industry and government
- Substantial focus on Broader Impacts including education, training, broadening participation, and accelerating innovation

Examples of NSF Centers

Center	Name	Focus
CCI	Centers for Chemical Innovation	Solving fundamental chemical research challenges
ERC	Engineering Research Centers	Convergent, high-risk, high-payoff research on engineered systems, technology, and education
ENGINES	Regional Innovation Engines	Develop coalitions of academia, industry, government to create regional “innovation ecosystems” to drive use-inspired research, technology translation, and workforce development.
STC	Science & Technology Centers	Exceptionally innovative, complex research and education projects that require large-scale, long-term awards
MRSEC	Materials Research Science and Engineering Centers	Materials research and education of a scope and complexity requiring the scale, synergy, and multidisciplinarity of a campus-based research center
IUCRC	Industry-University Cooperative Research Centers	Accelerate the impact of basic research through close relationships between industry, academia, and government
EPSCoR	Established Program to Stimulate Competitive Research	Enhance the research competitiveness of targeted jurisdictions (state, territory or commonwealth) by strengthening STEM capacity

NSF Infrastructure Grants

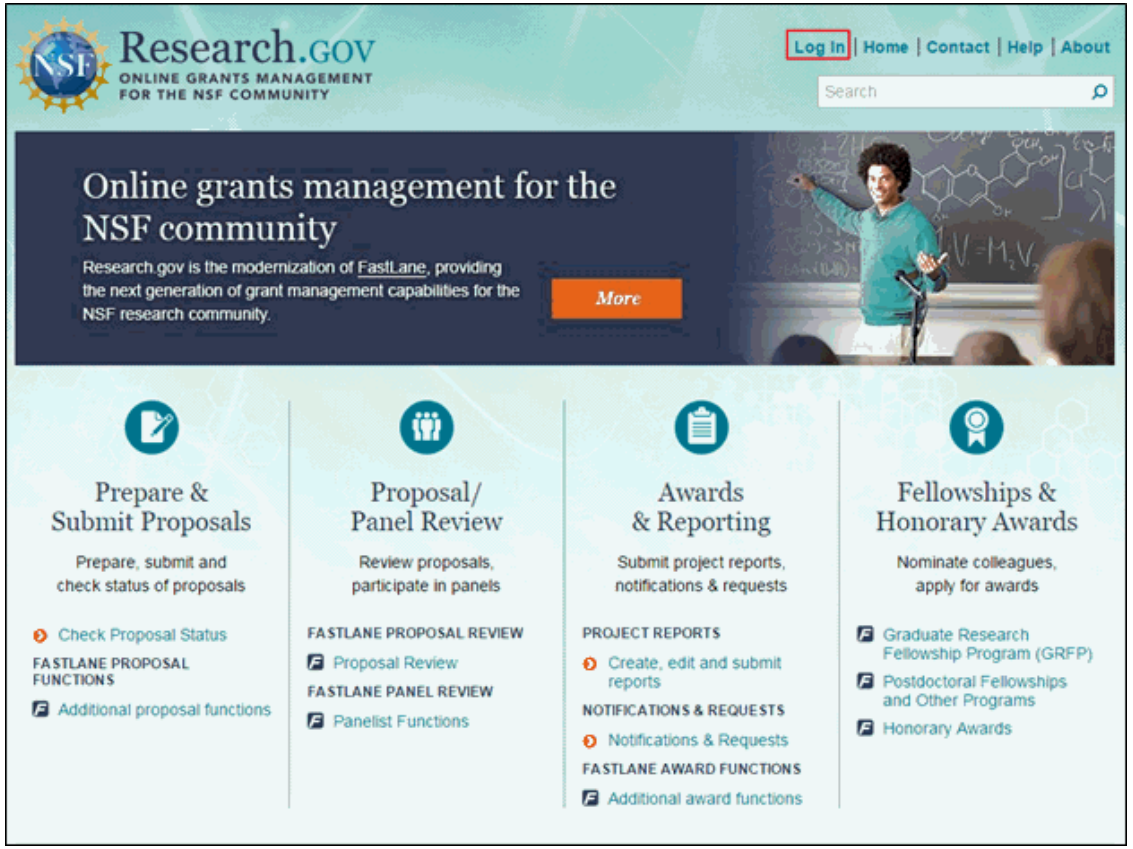
- Although NSF does not support construction, they do provide funding for major research instrumentation and supporting infrastructure
- Often NSF Infrastructure programs have multiple tiers or levels (including planning and smaller/larger funding levels)
- Highly competitive; often only a few are awarded
- Typically have the highest funding levels

Examples of NSF Infrastructure Grants

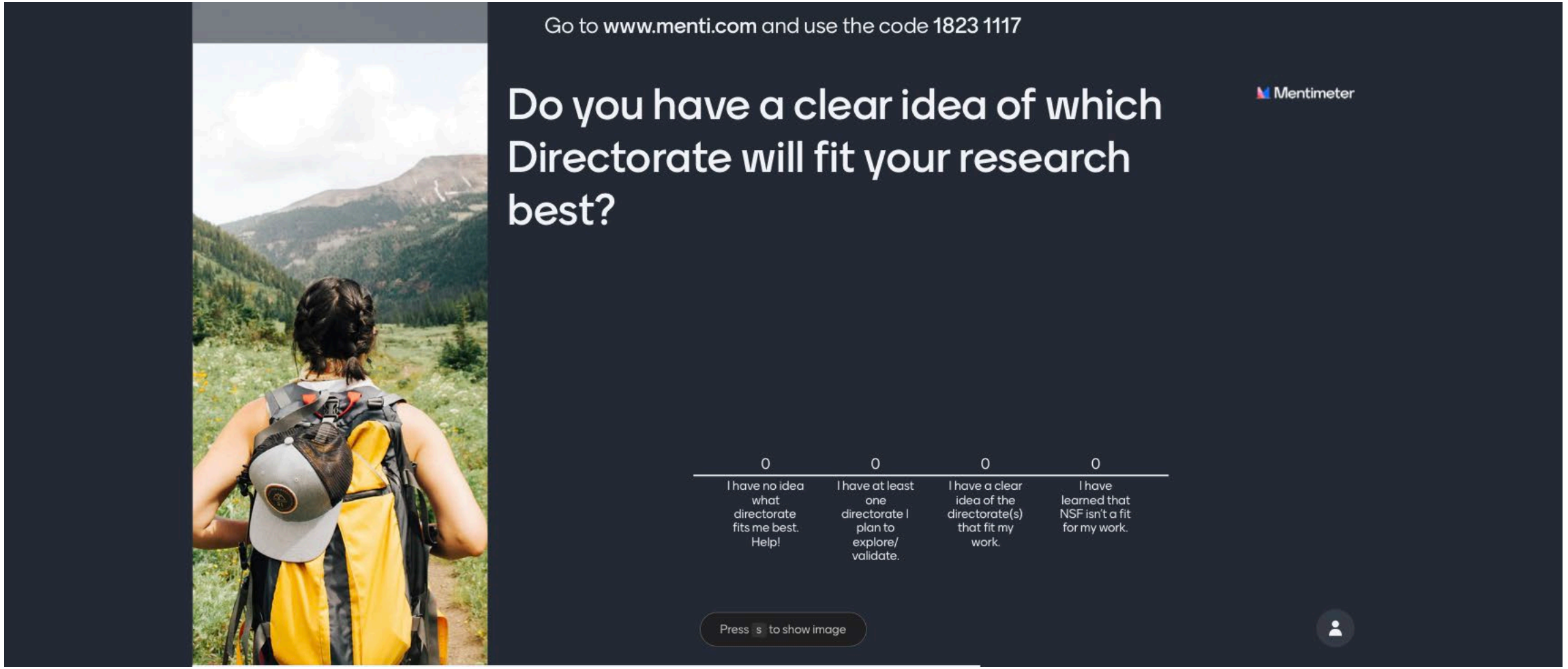
Center	Name	Focus
MRI	Major Research Instrumentation	Acquisition of major state-of-the-art instrumentation, to catalyze research and research training by a diverse workforce of scientists, engineers, and graduate and undergraduate students
MSRI	Mid-Scale Research Infrastructure	Mid-scale implementation projects include equipment, instrumentation, cyberinfrastructure, broadly used large scale datasets, and the personnel needed to successfully commission the project.
SAI	Strengthening America's Infrastructure	Stimulate human-centered fundamental and potentially transformative research focused on socioeconomic vitality and broad quality of life improvement, integrating expertise across all science and engineering disciplines.
CCRI	CISE Community Research Infrastructure	Supports diverse communities of CISE researchers pursuing focused research agendas in computer and information science and engineering. Planning, Medium and Grand levels.

NSF's New Submission Portal - Research.gov

- NSF is transitioning new proposals to Research.gov from FastLane
- Offers improved user interface, simplified permissions, expanded compliance checking, and on-screen references to PAPPG
- Last day to submit new proposals in FastLane: January 27, 2023
- Last day to download FastLane submitted proposals: September 29, 2023



Survey: www.menti.com 1823 1117



If You Remember Just One Slide Today…

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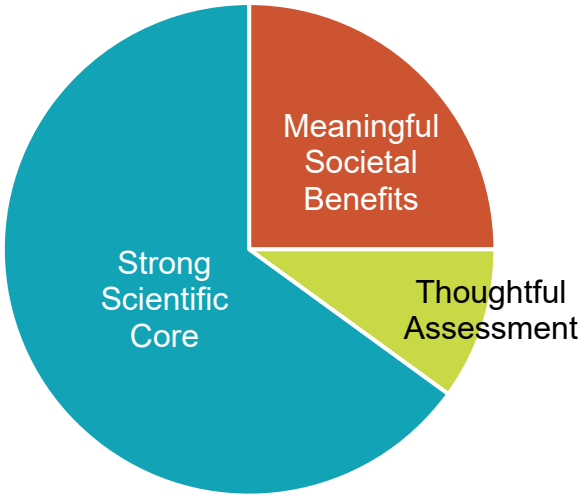
A Winning Approach:



Stay engaged with program staff

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Strive for the right balance



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Planning for your NSF Proposal

Learning Objective: Develop skills and best practices to validate your research project idea before you begin writing your proposal.

Steps to Planning your NSF Proposal

1. Develop project concept
2. Identify NSF program/contact for your project
3. Validate with search of NSF.gov award database
4. Create Project Summary Draft
5. Contact Program Officer
6. Incorporate feedback and redraft

Key to Success: Validate your Project Concept

Goal: Align your research with NSF portfolios and priorities

- *Seek understanding of NSF priorities*
- *Identify the appropriate NSF Directorate, Division, or Office*
- *Write a strong Project Summary before you start the Project Description*



WOULD NSF FUND YOUR RESEARCH?

- Seek input from NSF POs, peers, and colleagues
- Understand how your project is unique compared to the latest research in your field
- Search existing/previous NSF grants to understand NSF priorities

NSF Has Only Two Merit Criteria!

Intellectual Merit

- Why is the work scientifically important?
- How well-qualified are the PI and key personnel?
- How will the project transform knowledge or research?
- Is the project well-planned and organized?
- Do you have the resources you need for the project to be successful?

Broader Impacts

- What are the societal benefits of the work?
- Does the project broaden participation in STEM fields?
- Does the project reach under-represented groups?
- Will the project contribute to research or education infrastructure?
- Will you disseminate your findings broadly?

You need both!

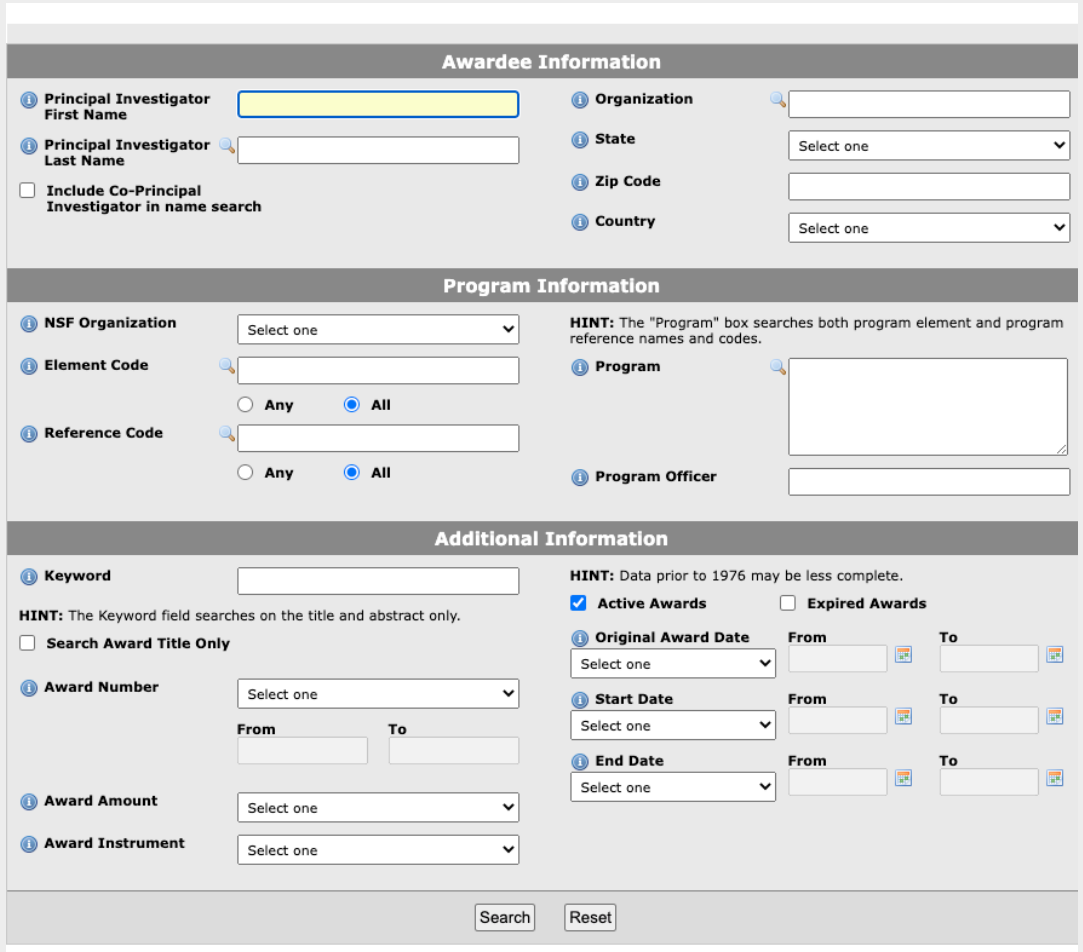
Information Gathering: NSF Award Search

Search awards to:

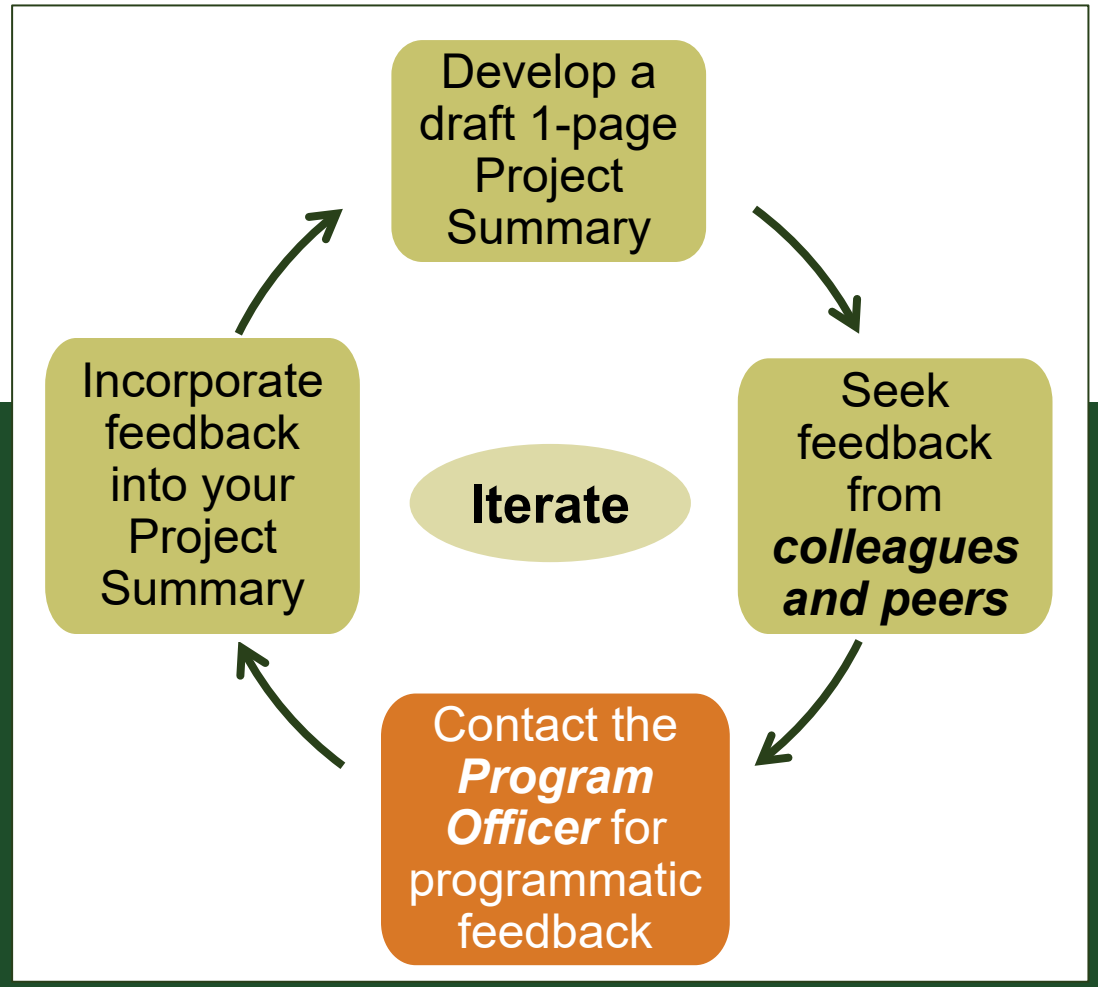
- Review projects in your field
- Determine uniqueness of project
- Identify program and program officer

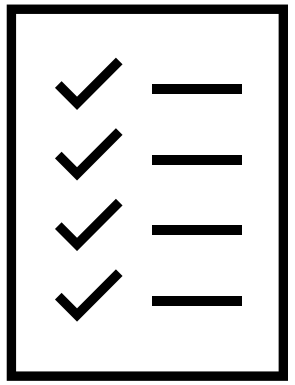
✓ **Tips:**

- Use advanced search to fine tune
- Look for awards given to respected experts in your field
- Explore program portfolios by searching for all recent awards within the Division or Office



Drafting a Project Summary





Project Summary includes:

1. Project Overview
2. Intellectual Merit
3. Broader Impacts

- While developing your draft Project Summary, seek feedback from colleagues and peers
- When you have finalized the Project Summary, proceed with creating the Project Description

UVG

Small-Group Activity

Pair up!

Speaker (2-3 minutes)

1. **Describe a research concept that you might propose to NSF.**
   - What new knowledge will be created?
   - What barrier or scientific challenge will be overcome and why is this important to society?
   - How does this research align with NSF goals?
2. **Explain the Broader Impacts of your research.**
   - How will you broaden participation in STEM fields?
   - How will your research connect to the community?
   - How will you assess the success of your broader impacts?

Listener – Provide feedback

- Was the message clear?
- Did you understand the context and importance?
- Was it compelling?



"Conversation" by ProSymbols, from Noun Project

Switch & Repeat

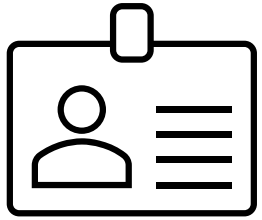
Assessment

- What did you learn?
- What was unexpected?

Worksheet

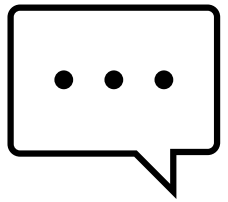
		Addressed?		
Area	**Goal**	**Yes**	**Somewhat**	**No**
Intellectual Merit	Did the speaker explain the scientific knowledge to be created?			
	Did you understand why this research is important to society?			
	Does this align with NSF priorities in terms of U.S. economy, security, or discovery?			
Broader Impacts	Did the speaker describe how the research would have an impact beyond this project?			
	Will the research broaden participation in STEM fields?			
	Did the speaker explain how the research would impact communities?			
	Were the assessment criteria explained?			

Contacting your Program Officer (PO)



Find your PO

- Do you have a contact already?
- All contact information can be found on NSF.gov
- Identify the program that most closely aligns with your research



Contact your PO

- Introduce yourself and your field of research by email
- Request a time to speak
- Offer to send Project Summary
- Follow up with a phone call

How to Get the Most Out of Your PO Conversation



Be Prepared!

- Prepare an agenda with specific questions to ask
- Have backup information ready (Biosketch, Preliminary Data) and ready to send



Put Your Best Foot Forward!

- Communicate clearly, follow-up, follow through
- Do your homework (know the state of the art).
- Be honest (about your goals, strengths, weaknesses, and questions).



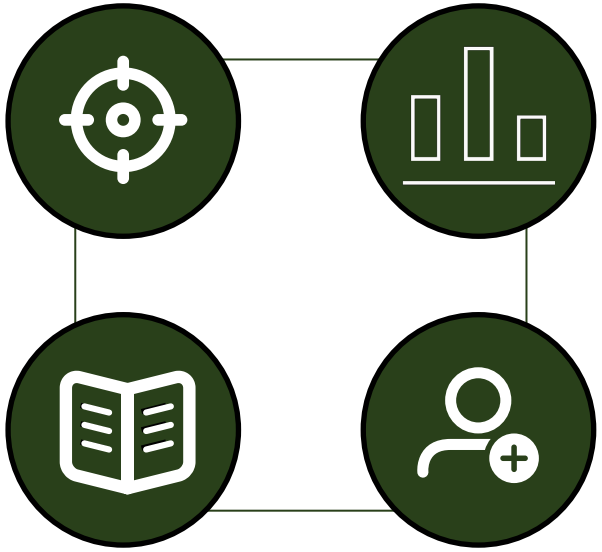
Explicitly Seek Feedback

- Get them talking – the more you talk, the less information you'll receive
- It is the PO's job to talk to you.
- Be respectful, respect your PO's time, don't demand

Example Questions for Your PO

Are the scope and timeline appropriate?

Is additional feasibility data needed?



Are there any other relevant works/citations I should consider?

Do you see any expertise missing from the proposal team?



Vague questions produce misleading answers. Avoid "fishing" expeditions.

- ~~*What do you think?*~~
- ~~*Do you have any advice?*~~

TOO BROAD!

Data image created by Popular from Noun Project

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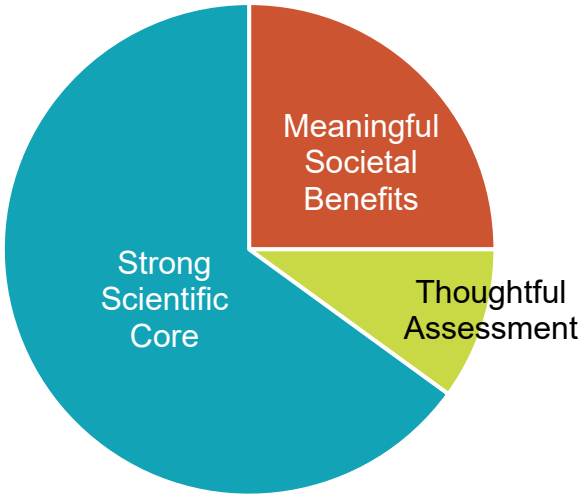
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NSF Proposal Contents

Learning Objective: Understand the different components of an NSF proposal and keys to success for each.

Typical NSF Proposal Contents

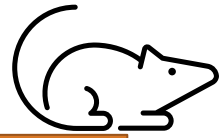
Always follow solicitation rules/guidelines!

- Cover Sheet
- *Project Summary (1 page)*
- Table of Contents
- *Project Description (often 15 page maximum – see solicitation)*
- References Cited
- Biographical Sketches
- Budget
- Budget Justification *(5 pages for each partner/subawardee)*
- Current and Pending Support
- Facilities, Equipment, and Other Resources
- Supplementary Information
  - Postdoctoral Mentoring Plan *(if required)*
  - Data Management Plan
  - Collaborative Arrangements
  - Location-specific justifications

Titling Your Proposal

Your title should be:

1) **M**eaningful
2) **O**utcome-oriented
3) **U**nderstandable
4) **S**imple
5) **E**ffective



M.O.U.S.E.

Example: “Conserving water resources and riparian biodiversity in a changing desert climate”



- Titles are used to justify awards and budgets
- Titles are shared with members of Congress

→ Write titles for a lay audience

Project Summary (1 page)



Overview

Scientific foundation for your work, the transformative opportunity

Frame the overall research and impact (not just methods)

Image created by Adrien Coquet from Noun Project



Intellectual Merit

How the project is creative, original, or transformative

Qualifications of the PI, team, environment

Potential to advance knowledge

Image created by IconMark from Noun Project



Broader Impacts

The potential of the project for education, broadening participation, information dissemination, **and** societal impacts

Image created by Nithinan Tatah from Noun Project

The Project Summary is copied and pasted into form fields.
It can only be uploaded as a pdf if special characters are required

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Project Description: Intellectual Merit

Learning Objective: Convey a thorough and well-articulated research plan

Typical Organization of an NSF Project Description

Example/Typical – format not specified by NSF
Always follow solicitation rules and guidelines!

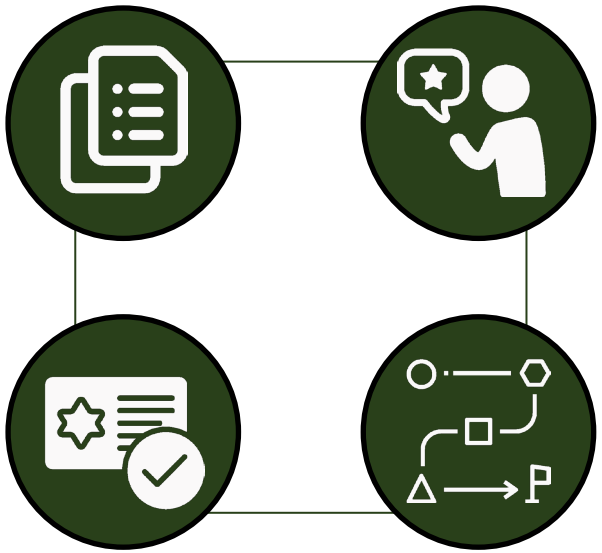
Section	Purpose
Background and Introduction	Summarize the project goals, Intellectual Merit, and Broader Impacts; Includes background literature
Objectives	Succinct listing of goals/outcomes
Preliminary Data	Data showing your team's capabilities and establishing the feasibility of your proposed work
Methodology	Detailed description of methods, experimental conditions, equipment, procedures, and other details necessary to understand your research approach and assess the validity of your research proposal
Timeline and Responsibilities	Schedule, personnel, and locations of work to be performed
Broader Impacts	*See separate discussion for details*
Results from Prior NSF Support	Demonstrate quality and productivity of your past NSF-funded work

Introduction & Summary

Frame your reader's mind by repeating key elements

Similar to the Project Summary

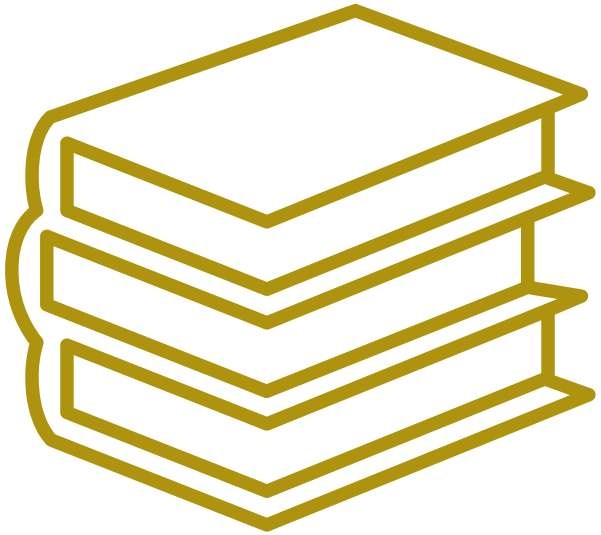
Clearly state Intellectual Merit and Broader Impacts



Describe why this scientific question is important

Summarize research method and goals

Background (“Literature Review”)



Set the stage for the research you will propose

Provide background on the current scope of knowledge in the field

- Select relevant and recent publications
- Make the content interesting, not too dense or overwhelming
- Include information intentionally; it might be true but that does not mean it belongs in the document (“head-fake”)
  - Each work cited should relate specifically to your hypothesis, work plan, or broader impacts

Objectives

- List 3-5 (usually) major planned outcomes of your work
- This is not a long section; a simple list
  - Can contain sub-goals (hierarchical)
- Outcome-oriented
  - Describe what you will accomplish, not simply actions you will perform
  - Ideally include measurable success criteria
- Short: Often ½ page or less

How Specific Should Your Objectives Be?

“Directional”

- More acceptable for fundamental research and long-term strategic projects
- Examples:
  - “Create a paradigm shift in the field of forestry management by exploring the effects of climate change in CO”
  - Design and optimize the model using new analysis methods”

“Outcome-Oriented”

- Preferred for development projects, infrastructure, and innovation-focused efforts
- Examples
  - Determine the analytical precision of the advanced HPLC method
  - Model the effect of temperature perturbations on lake biomass
  - Create an innovation advisory board of 12 investors and corporate leaders

Qualifications and Resources of your Team

- Why are the PI and collaborators the best team to take on this project?
- Describe advantages of any collaborations (scientific, outreach)
- Describe any specific facilities, equipment, or other resources that improve the chances of success of the project
- Discuss your history of (successful) collaboration

Methodology

- This is often the longest section of the project description
- Describe how you will perform the work
- Demonstrate your expertise
- Organize according to your objectives

- Details to Include:
  - Experimental Design
  - Laboratory or Computational Methods
  - Experimental Conditions
  - Key Equipment
  - Procedures
  - Expected results
  - Statistical considerations
  - Risks and Mitigations

Make your readers job easier: use explicit subheadings for each item!

Results from Prior NSF Work

- Succinct list of past NSF support
  - Awards with end date in the past five years
  - Current funding, including no cost extensions
- The following information must be provided:
  - NSF award number, amount and period of support;
  - Project title
- Summary of the results of the completed work, under two distinct headings: Intellectual Merit and Broader Impacts;
- Publications resulting from the award
- Research products (data, samples, physical collections, models)



If You Remember Just One Slide Today…

NSF Judges Submissions on Two Primary Merit Criteria:	**Intellectual Merit** Expand frontiers of science and create new scientific knowledge	1	**Broader Impacts** Broaden participation in STEM, Engage underserved populations, deliver societal benefits, measure your results	2

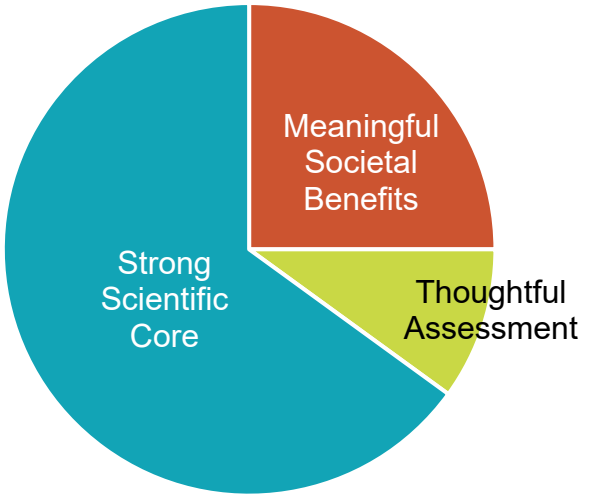
A Winning Approach:



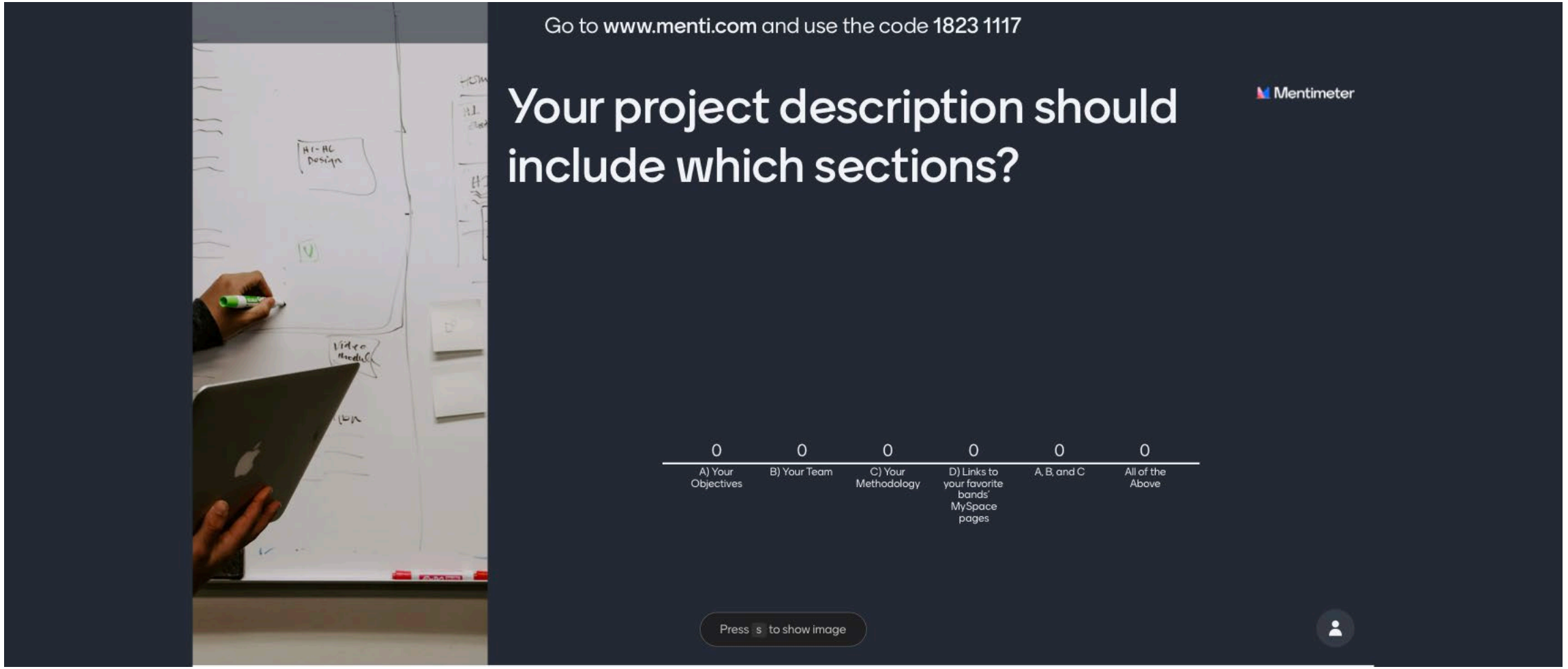
Stay engaged with program staff

&

Strive for the right balance



Survey: www.menti.com 1823 1117



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Broader Impacts

Learning Objective: Describe the societal benefits of your research, including well-justified and organized education, outreach, assessment, and other elements.

Broader Impacts

Broader Impacts encompass a wide array of societal benefits

Go beyond education and broadening participation. Include commercial, innovation, economic, workforce, environmental, quality of life and other benefits.

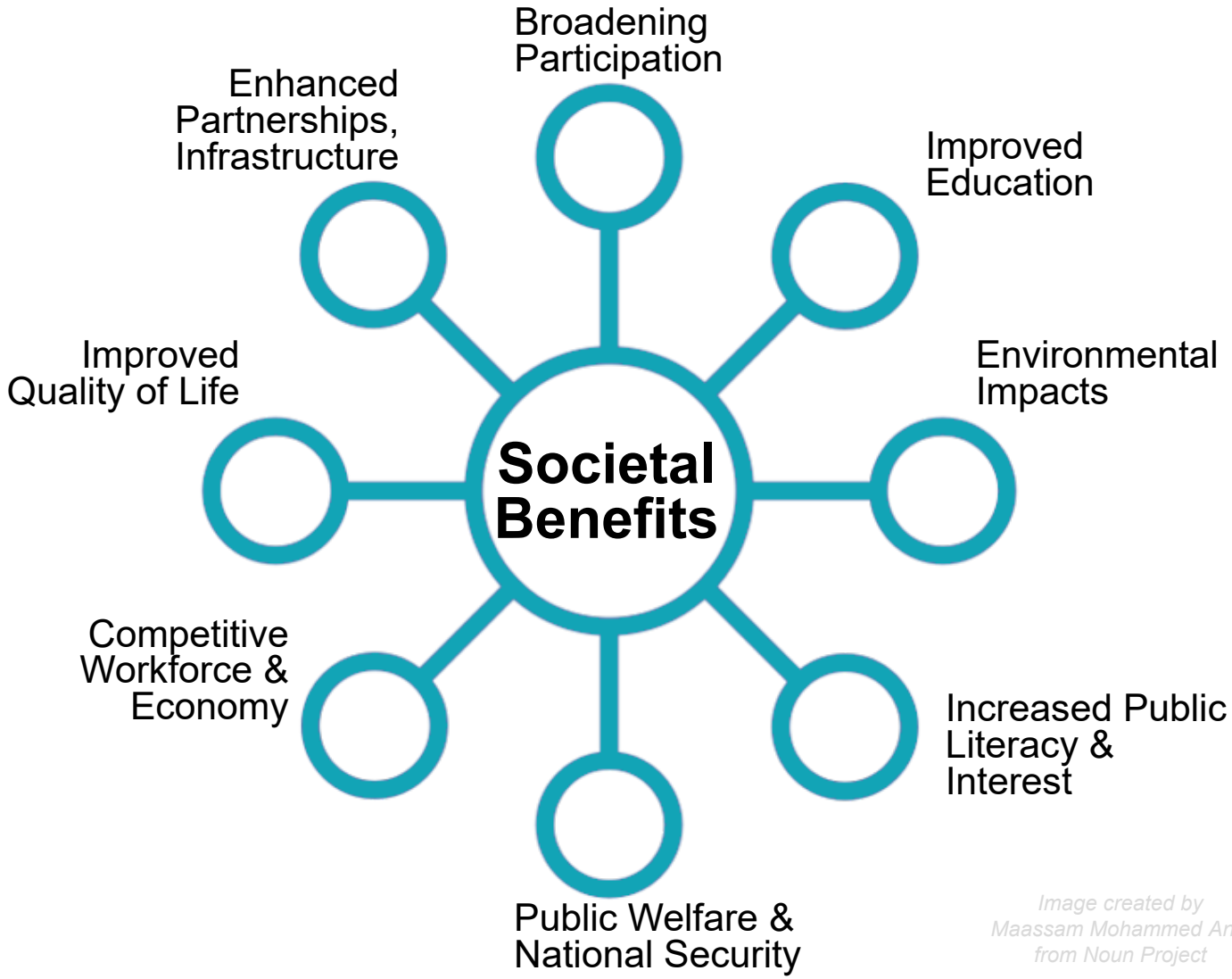


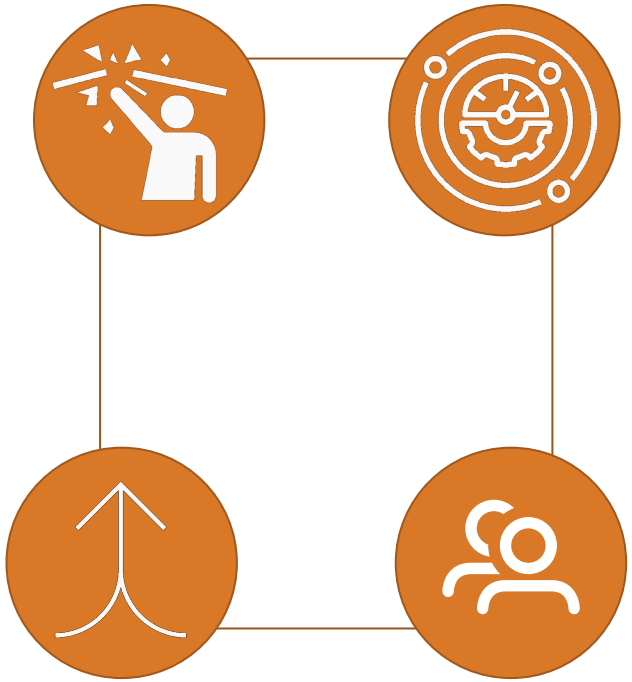
Image created by Maassam Mohammed Anis from Noun Project

Elements of Effective Broader Impacts discussions

Develop a plan to engage underserved/underrepresented groups in education and/or research

Ensure activities synergize with your research

- Activities make sense in the context of the research being performed
- Tell how you are engaging a community relevant to your research



Describe the outcomes/ impacts you plan to achieve

- Present clear goals; don't just list activities
- ***How will you measure success?*** (include assessment element)

Leverage partnerships

- Who are your partners? Be specific
- What resources at CSU can you engage to identify community partners?

Explain WHY, not just WHAT

DO's

- Align your Broader Impacts with your research
  - Show how they synergize
- Explain why your BI programs are needed and will be impactful
  - Engage underserved groups who have a clear need or would particularly benefit from your proposed research
  - Include innovation activities such as commercialization or workforce development

DON'Ts

- Use cookie-cutter, boilerplate educational programs
  - "We will develop a course about the research I'm doing"
- Target specific groups without a clear plan or capability to reach them
- Describe overly broad/vague underserved groups
- Overlook barriers that stand in the way of your programs

Educational Activities for Broader Impacts

What is your educational goal? What level of student is appropriate to engage?

- K-12 – Basic science concepts, excitement about STEM education
- Undergraduate – Professional STEM fields, graduate school readiness
- Graduate Students – Preparation for professional research careers
- General public – Policy education (e.g., environment, ethics, etc.)



Show your commitment and feasibility

- Show partner engagement
- Demonstrate feasibility through past experience (yours or partners')
- Take advantage of existing CSU offices

Image created by SBTS from Noun Project

Be creative!
Don't just replicate others' ideas

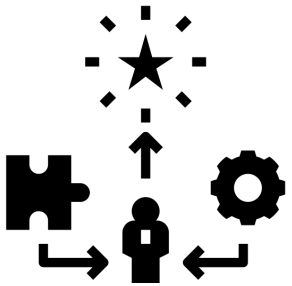
Examples of Educational Activities with Broader Impacts



Partner with a School District or Science Club

Example: Develop a K-12 microbiology module that teaches about germs or food safety).

Image created by Alzam from Noun Project



Offer Experiential Education

Provide experiential education that is relevant to your research. Recruit from an undergrad organization or course.

Example: Provide laboratory experiences for undergraduate students.

Image created by Nithinan Tatah from Noun Project



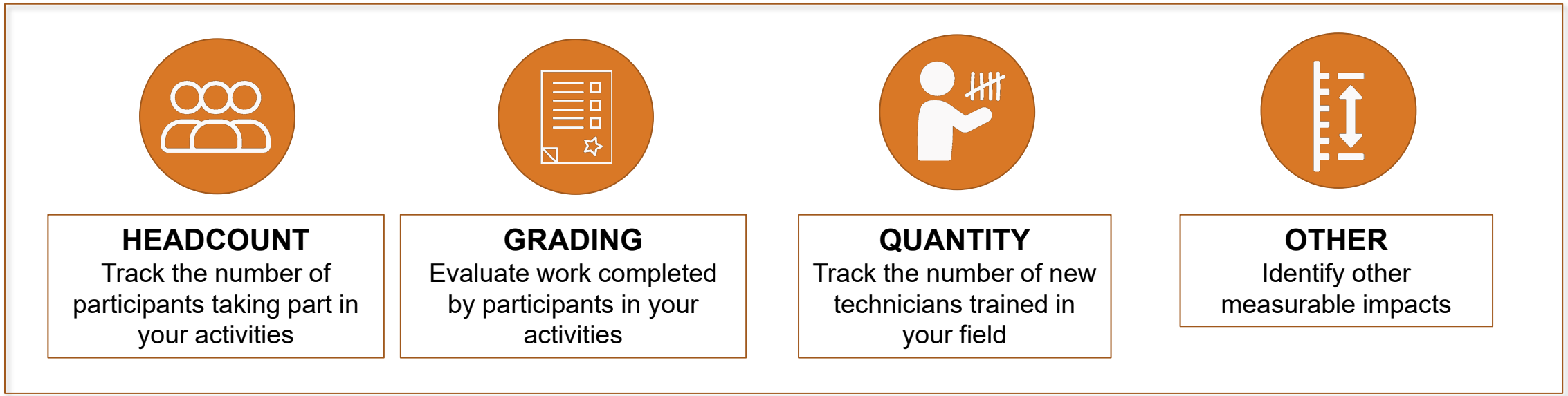
Work with a Local Union or Community College

Example: Develop training modules for technical school students to learn to build the electronic devices your lab uses.

Image created by WEBTECHOPS LLP from Noun Project

Broader Impacts – Assessment

- **Describe how you will measure the success of your education, innovation, and outreach activities**
  - *Partner with your institution's assessment center*



HEADCOUNT
Track the number of participants taking part in your activities

GRADING
Evaluate work completed by participants in your activities

QUANTITY
Track the number of new technicians trained in your field

OTHER
Identify other measurable impacts

Image created by Mada Creative from Noun Project
Image created by Made by Made from Noun Project
Image created by Adrien Coquet from Noun Project
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Small-Group Activity: Broader Impacts

Pair up!

Speaker (2-3 minutes)

1. **Detail your Broader Impacts of your research.**
   - How will you broaden participation in STEM fields?
   - How will your research connect to the community?
   - Are there innovation or workforce components to your project?
   - How do your BI efforts align with and synergize with your research?
   - How will you assess the success of your broader impacts?

Listener – Provide feedback

- Was the message clear?
- Did you understand the context and importance?
- Was it compelling?



"Conversation" by ProSymbols, from Noun Project

Switch & Repeat

Types of Broader Impacts

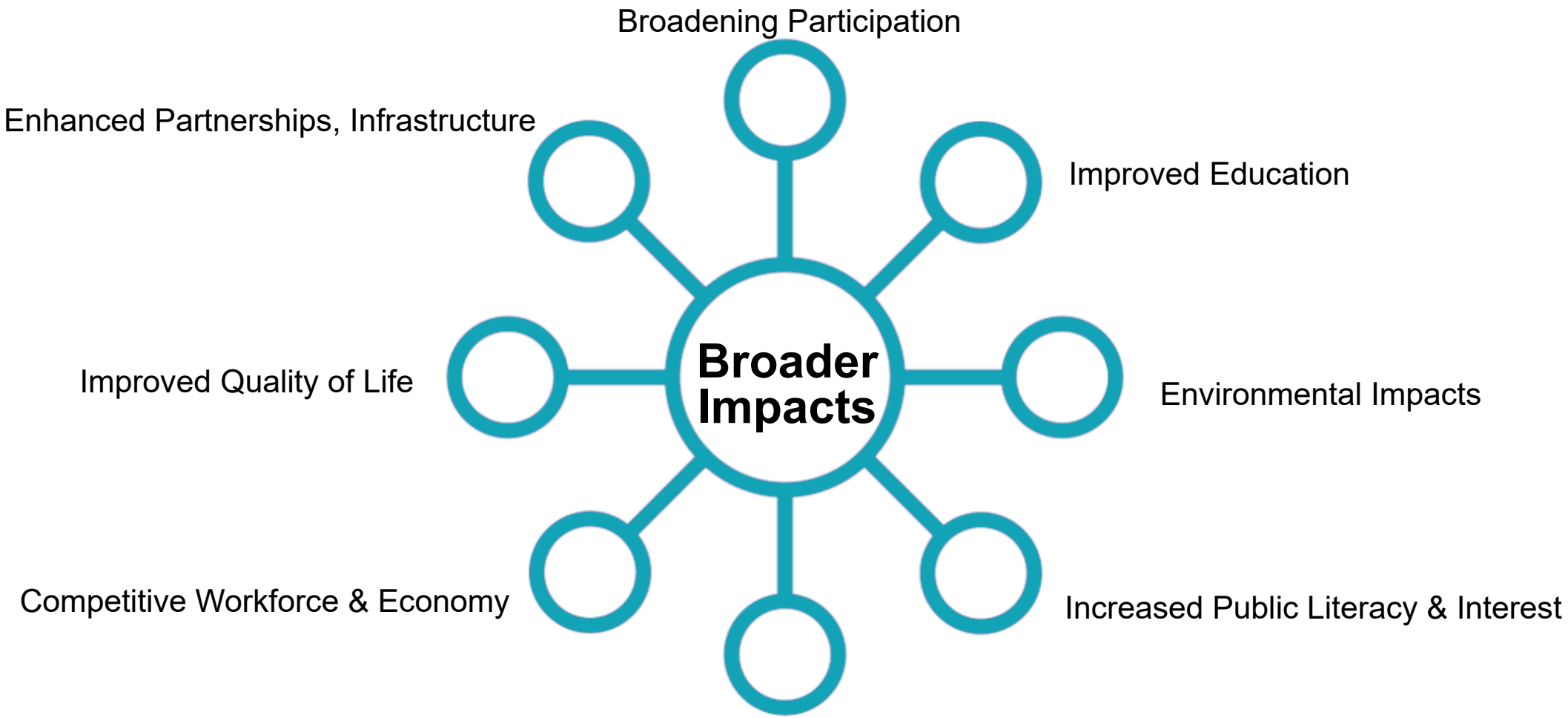


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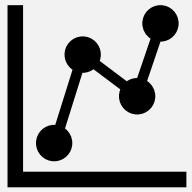
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Other Proposal Components

Learning Objectives: Identify best practices for other NSF components

Other Sections



Data Management Plan (DMP)
2 pages max

- Required for all proposals
- Describe how proposal conforms with NSF dissemination policy
- DMP can vary across different directorates and programs
- If no detailed plan is needed, state that in the DMP and provide a clear justification

Image created by Nhorfrom Noun Project



Biosketches
3 pages max

- Include a biosketch for each person listed as senior personnel
- List academic, professional, or institutional appointments in reverse chronological order
- List up to 5 products most closely related to proposed project + 5 other significant products (may be related or unrelated)
- Use SciENcv or NSF fillable PDF

Image created by Adrien Coquet from Noun Project



Postdoctoral Mentoring Plan (PMP)
1 page max

- Required *only* for proposals that include funding to support a postdoc researcher(s)
- Describe mentoring activities to be provided for all postdocs
- Lead institution on collaborative proposals must submit a mentoring plan for *all* postdoc researchers on the *entire* project, not just those at the lead institution

Image created by Saepul Nahwan from Noun Project

Letter(s) of Collaboration

- Provide a letter from each collaborator
- Content of each letter must consist of **only** the following sentence:
  - *"If the proposal submitted by Dr. [name of the PI] entitled [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 or the Facilities, Equipment and Other Resources section of the proposal."*
- Letters must **not**:
  - Include any content other than the sentence above
  - Recommend or endorse the PI or the project
- Letters **must** be:
  - On the collaborator's organizational or departmental letterhead
  - Signed



Detailing Collaborative Activities

- Describe collaborative activities in the ***Project Description*** or ***Facilities, Equipment or Other Resources*** section
- Activities may include:
  - Intellectual contributions
  - Permission to use a site/facility or instrument
  - Provision of samples or other materials
  - Logistical support
  - Evaluation services
  - Mentoring U.S. students at a foreign site

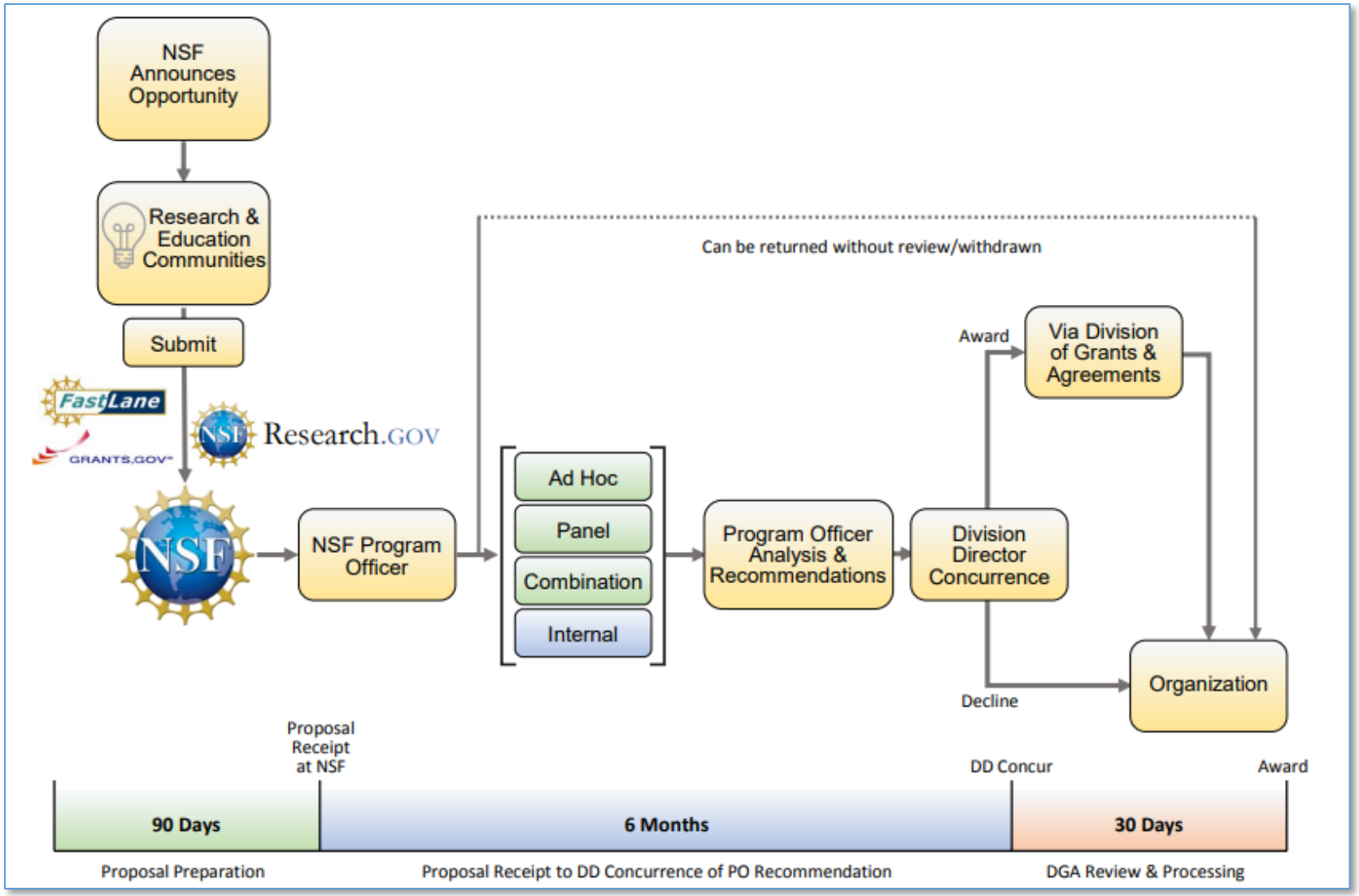
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NSF Review Process

Learning Objective: Understand how the NSF review process informs grantsmanship choices.

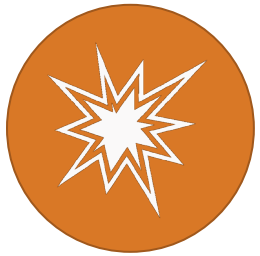
NSF Proposal and Award Process and Timeline



Proposal Review Process

- Proposals are reviewed by a panel of 3-10 peer reviewers
  - Ad hoc reviewers, panelists, or both
  - The reviewers may not be experts in the field(s) represented in the proposal, so write with these reviewers in mind

- Good idea to suggest reviewers, and who should not review
- Feedback provided after award decision



- Don't pick fights!
- Avoid "landmines"
  - Don't give them easy excuses to dismiss you (e.g., omitted key citations)

Image created by ka reemov from Noun Project

Reviewers look for descriptions that they can use for their assessment

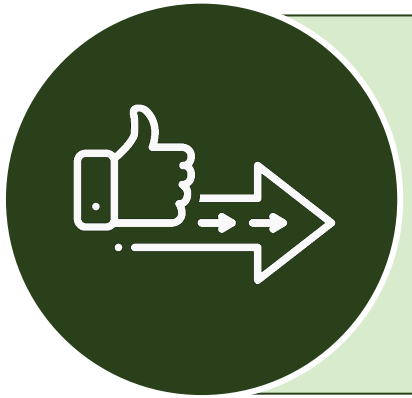
Avoid “RWR” (Return Without Review)

RWR is when NSF declines to accept the proposal as a valid submission, does not send it out for review, and returns it to the submitter without feedback



The most common reasons for a RWR are:

- Submitted after the deadline
- Did not follow guidelines of the solicitation or PAPPG
- Project is inappropriate for NSF funding
- Very similar to another funding project
- Resubmission of an unrevised proposal that was already rejected



How to Avoid an RWR

- Read the entire solicitation and know the PAPPG
- Talk to your NSF PO
- Search NSF Awards in your field
- When resubmitting, diligently incorporate feedback

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Proposal Writing Strategies, Tips, and Tactics

General Rules for Good Proposal Writing

- Clear writing underscores your credibility!



Image created by Eucalyp from Noun Project

Write for your reader, not for yourself

- Present background information needed to understand your message.
- Mentally keep track of what your reader needs to understand. Take the time to give them a foundation

Place information where your reader expects it

- Follow the opportunity instructions explicitly!

Convoluted writing doesn't make you look smarter

- Explain acronyms and avoid jargon.
- Avoid unnecessary controversy. Don't pick fights.

A Grant Proposal is Different than a Manuscript

	Proposal	Manuscript
Goal	To convey a strategy	To teach others to replicate your work
Time Orientation	Describes what may be true in the future	Describes what happened in the past
Level of Detail	Communicates big picture ideas. Describes a workplan, but does not provide exhaustive methodology details	Describes details. Offers an in-depth description of a study's planning, methodology, and results
Audience	Peers and those with a general scientific background	Peers
Degree of Certainty	Low: May speculate, hypothesize, and explore details you're unsure about	High: Material is public and must be very accurate
Organization	Create succinct sections that make the document easy to understand. The average reviewer spends only 1 to 1.5 hours per proposal	May include longer sections that take more time to read and understand

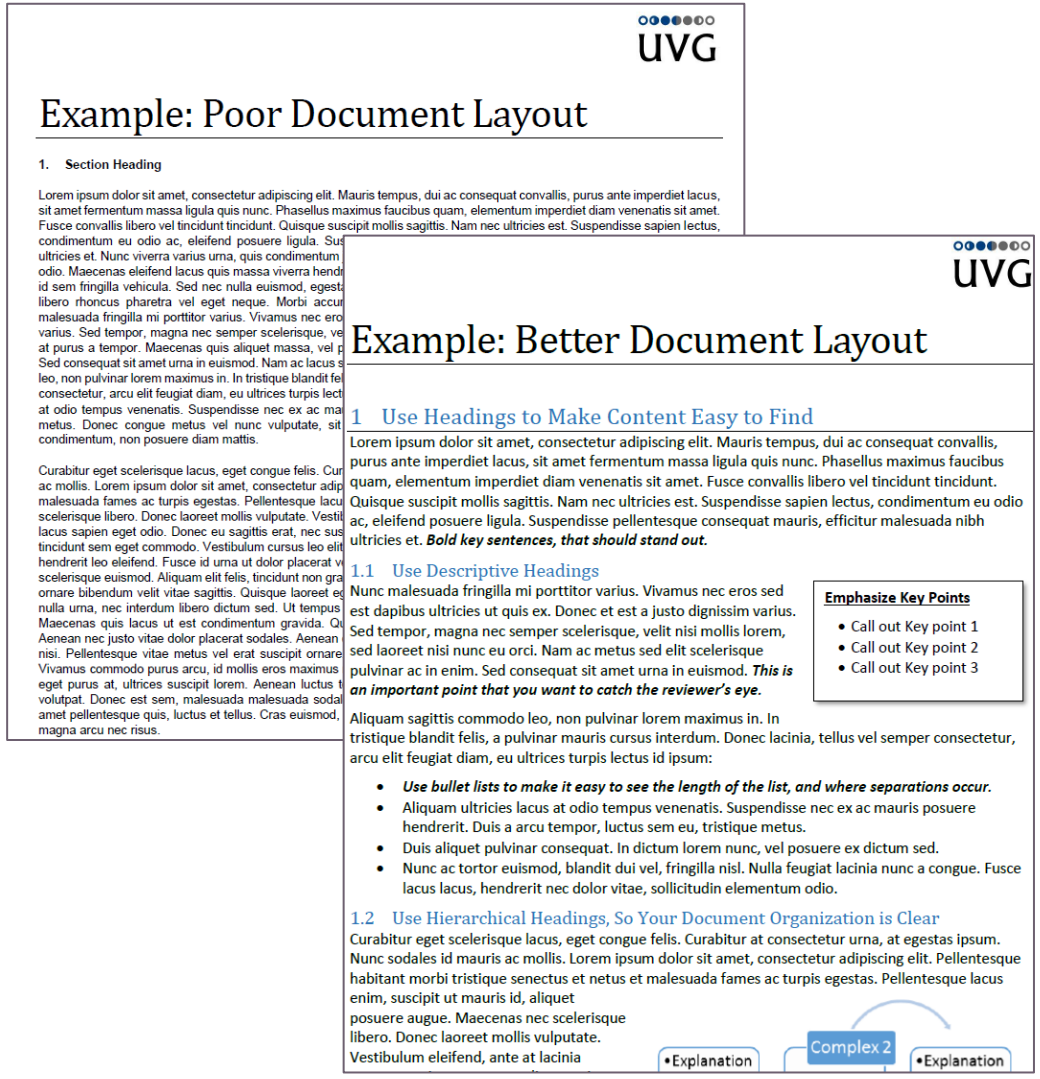
General Rules for Good Proposal Writing

- Make your document ***skimmable***
  - Reviewers may have dozens of proposals to review.
  - If a reader skims only headings and bolded information, will your content still be clear and logical?
  - Do not try to squeeze as much text as possible into the proposal

- Make your document ***indexable***
  - Reviewers may only once, if ever, read your proposal fully, front-to-back
  - More often, they will skip around, or refer back to specific sections
  - Use visual devices, headings, and other visually distinct elements to make key information easy to find
  - Make the pages look different!

Document Layout

- Use lots of headings and subheadings.
- Use graphical devices to illustrate complex subjects.
- Use paragraphs thoughtfully
  - Short, simple paragraphs signal idea transitions
  - One Paragraph = One idea supported by 1-3 sentences
- Use bullets to break up long lists.
  - Don’t bury lists in your narrative.
- Don’t right-justify (full-justify) text.
  - It might look “cleaner” from a distance, but it makes your prose harder to read.



UVG

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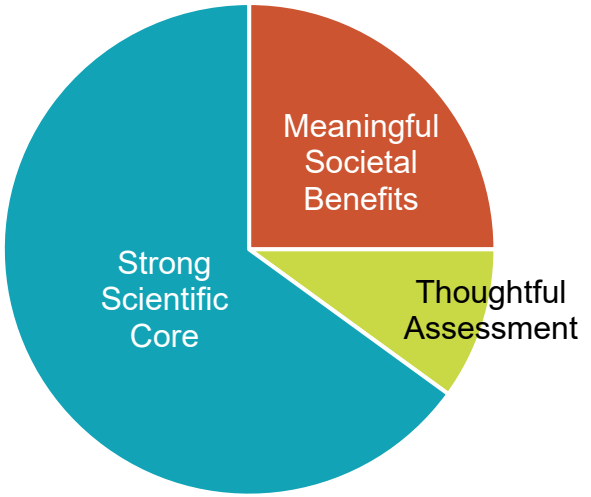
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These Slides Will Be Available Online

- We will upload this full presentation, as well as additional information on our website



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Thank you for attending!

Questions? Feel free to contact me!

DR. BURR ZIMMERMAN



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