



**National Science Foundation**  
**Division of Undergraduate Education (DUE)**

# Proposal Writing Strategies

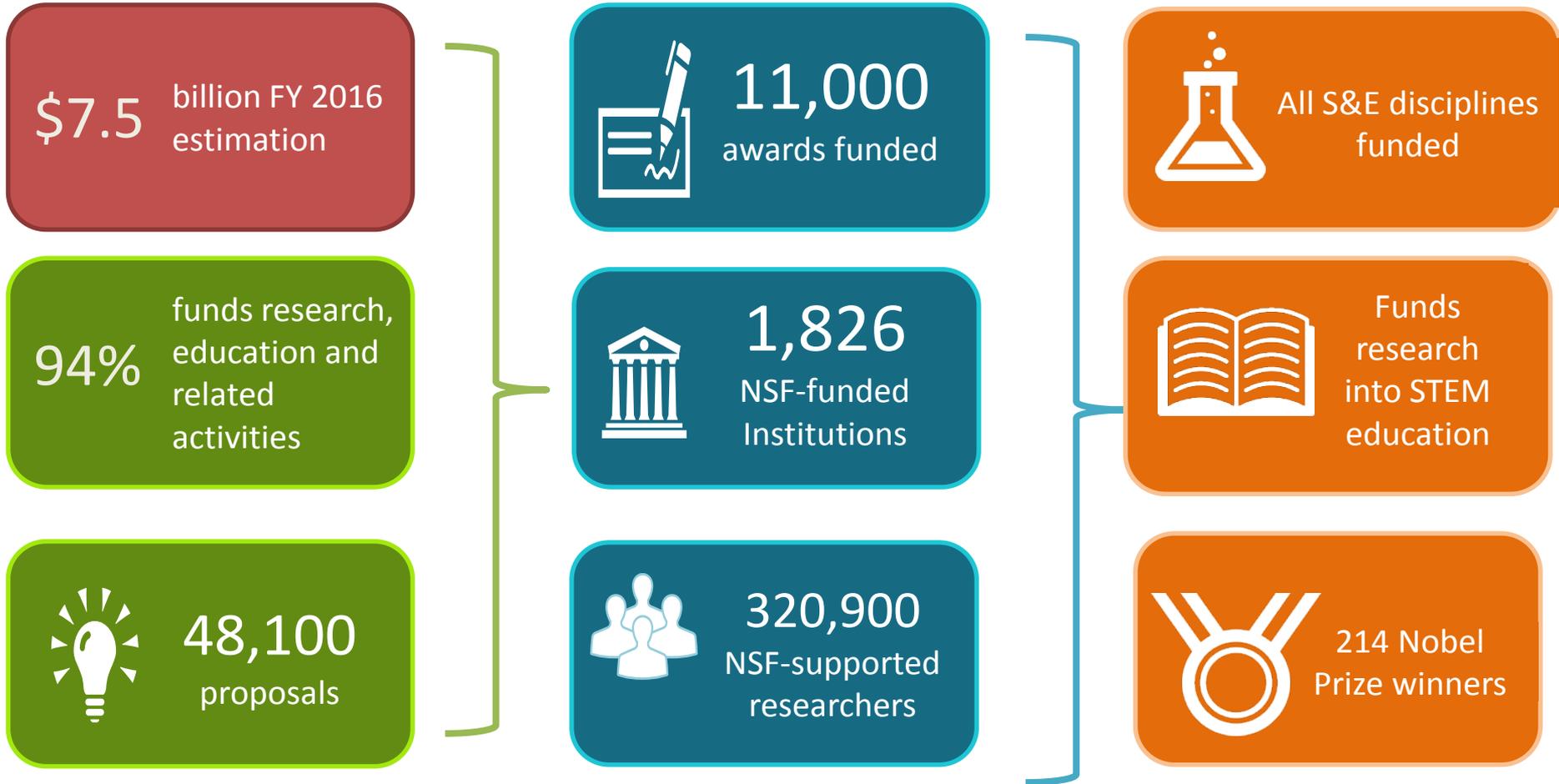
**Presented by:**

**Keith A. Sverdrup, Ph.D.**

**Program Director**

NSF Division of Undergraduate Education (DUE)

Directorate for Education and Human Resources (EHR)



## NSF by the numbers

*Other than the FY 2016 figure, numbers shown are based on FY 2014 activities.*



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EHR is committed to a healthy and vital national STEM enterprise.



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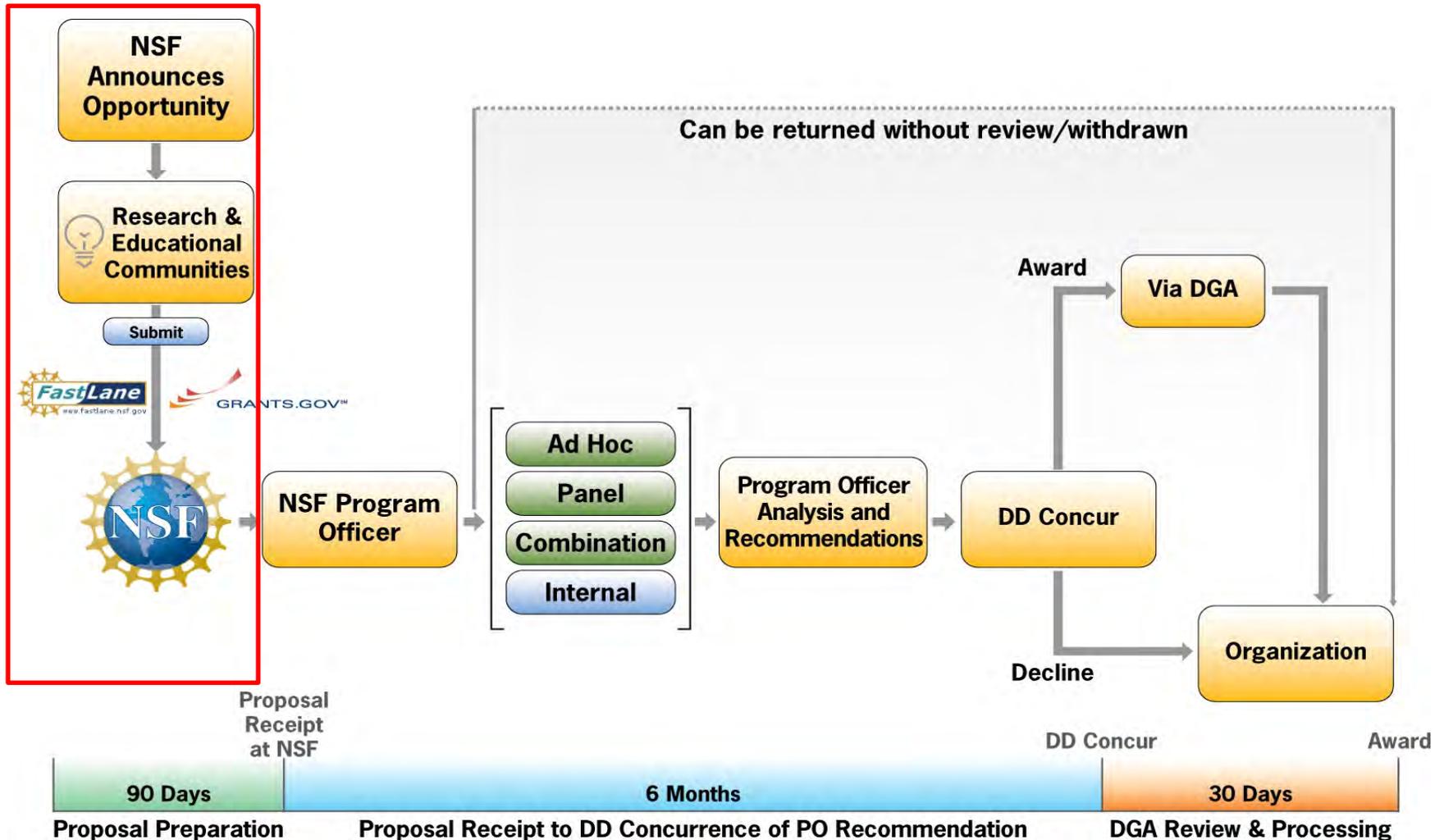
## **DUE's Mission:**

*To promote excellence in undergraduate science, technology, engineering, and mathematics (STEM) education for all students.*

**Potentially Transformative Education R&D**



# NSF Proposal & Award Process Timeline





## The Submitter's Three Jobs



Identify the right funding opportunity



Conceptualize a relevant project



Write a persuasive proposal in 15 pages



Funding



Find Funding

A-Z Index of Funding Opportunities

Recent Funding Opportunities

Upcoming Due Dates

Advanced Funding Search

Interdisciplinary Research

How to Prepare Your Proposal

About Funding

Proposals and Awards

Proposal and Award Policies and Procedures Guide

Introduction

Proposal Preparation and Submission

Grant Proposal Guide

Email Print Share

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## Integrative Graduate Education and Research Traineeship Program (IGERT) N

### CONTACTS

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IGERT Coordinating Committee members are listed on the IGERT web page, at <http://www.nsf.gov/grsprog/igert/cc.jsp>.

### PROGRAM GUIDELINES

Solicitation [11-533](#)

### Important Notice to Proposers

A revised version of the NSF Proposal & Award Policies & Procedures Guide (PAPPG), [NSF 13-1](#), was issued on October 4, 2012 and is effective for proposals submitted, or due, on or after January 14, 2013. Please be advised that, depending on the specified due date, the guidelines contained in [NSF 13-1](#) may apply to proposals submitted in response to this funding opportunity.



## National Science Foundation Division of Undergraduate Education (DUE)

### SYNOPSIS

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The Integrative Graduate Education and Research Traineeship (IGERT) program has been developed to meet the challenges of educating U.S. Ph.D. scientists and engineers with interdisciplinary backgrounds, deep knowledge in chosen disciplines, and technical, professional, and personal skills. The program is intended to establish new models for graduate education and training in a fertile environment for collaborative research that transcends traditional disciplinary boundaries. It is also intended to facilitate diversity in student participation and preparation, and to contribute to a world-class, broadly inclusive, and globally engaged science and engineering workforce.

Building upon the IGERT platform, the purpose of this IGERT solicitation is to support new models in graduate education in which students are engaged in an environment that supports innovation to learn through hands-on experience how their own research may contribute in new ways to benefit society and to learn the processes for the successful implementation of such contributions.

### EDUCATIONAL OPPORTUNITY

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This program provides educational opportunities for Undergraduate Students, Graduate Students. This program supports institutions that may provide support to individuals at those institutions. To inquire about opportunities in this program, contact one of the awarded institutions, available by clicking on the Awards link.

### RELATED URLS

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[Integrative Graduate Education and Research Traineeship Program-CIF21 Track \(IGERT-CIF21\)](#)

[IGERT Program Home Page](#)

[IGERT Resource Center](#)

[2011 IGERT Online Poster Competition Archive](#)

### THIS PROGRAM IS PART OF

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[Additional Funding Opportunities for the CNS Community](#)  
Opportunities that Highlight International Collaboration

[What Has Been Funded \(Recent Awards Made Through This Program, with Abstracts\)](#)



# Conceptualizing Your Project: Common Issues

- **Fit with program**  
Must match program goals
- **Clarity and specificity**  
Should have important decisions made, plans laid out
- **Research and development**  
Methods must match questions, build on literature, and contribute to knowledge
- **Expertise and collaboration**  
You need to incorporate expertise appropriate to the contributions you want to make, both in project and in proposal
- **Innovation and impact**  
You should be addressing an important problem, and not reinventing the wheel



## Writing a Persuasive Proposal

- By the end of page 1, the reviewer needs to know what you will do (roughly)
- The activities alone are not persuasive; you need an argument for why those activities lead to desired outcomes in both intellectual merit and broader impacts
- Ensure the expertise of your team is adequate to do the work and their expertise is reflected in your proposal
- Build trust in the reviewers that what you can't fit in the page limit is within your grasp
- You **MUST** follow the rules of the solicitation if you are submitting to one, and the GPG in any case

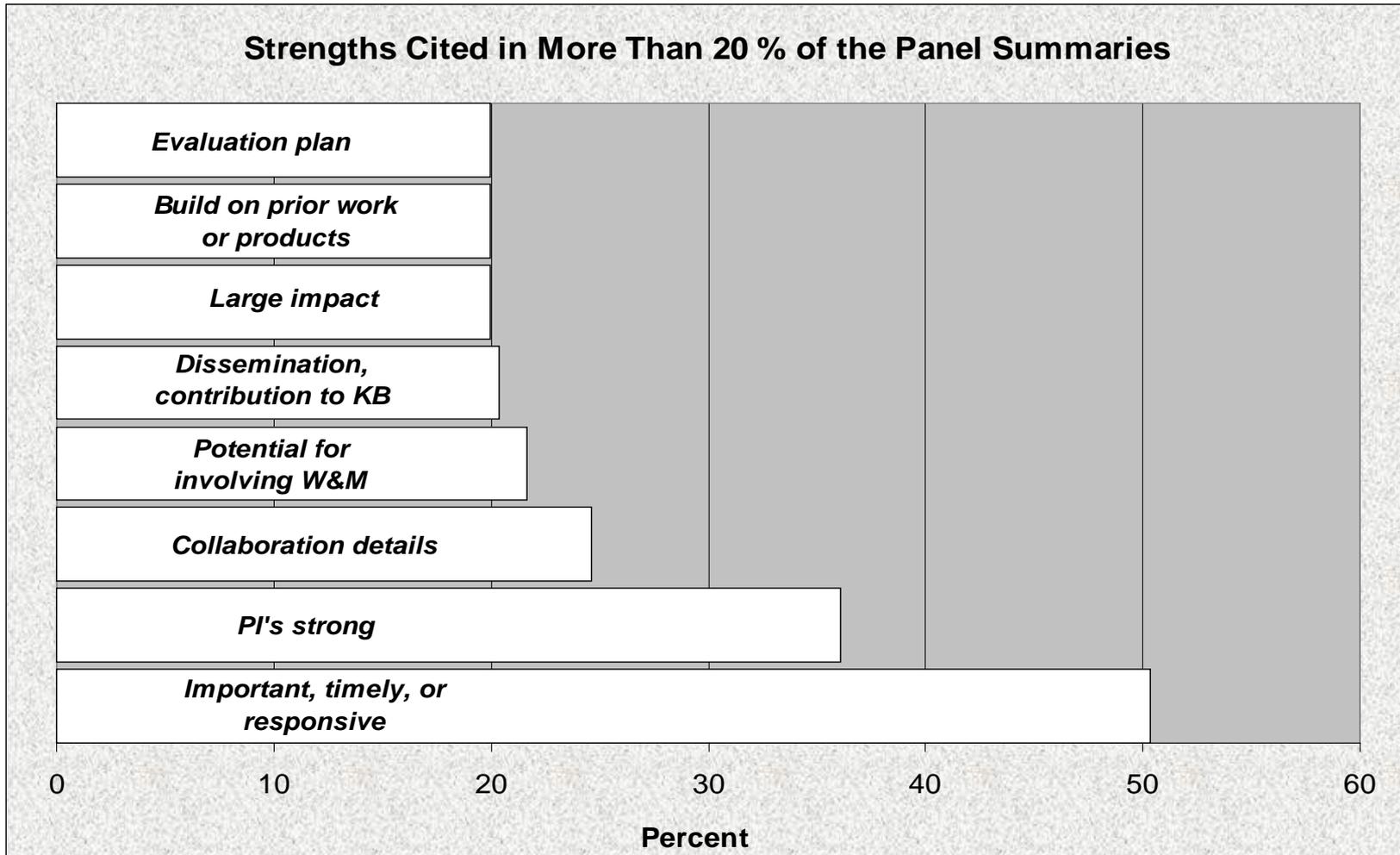


## Writing a Persuasive Proposal: Help the Reviewers

- Make what they are looking for easy to find, using the language of the review criteria and headings to highlight the elements of the project description
- Don't assume that all reviewers will know the jargon of your discourse community or commonly used acronyms
- Consider how your proposal will read both when reading start to finish and when a reviewer skims to look for certain elements



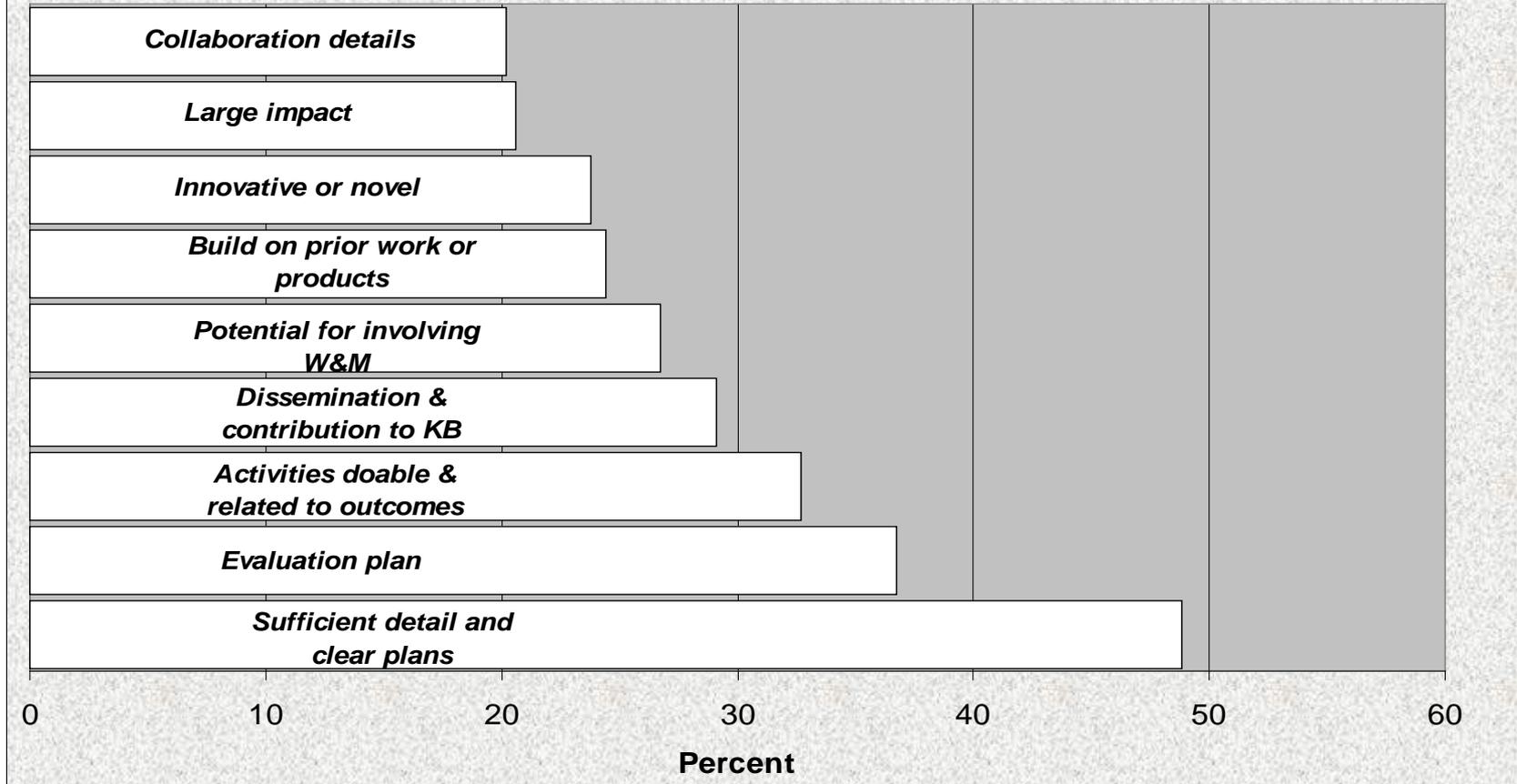
# Most Common Strengths





# Most Common Weaknesses

Weaknesses Cited in More Than 20 % of the Panel Summaries





## Top Ten Strengths and Weaknesses

Rank	Strengths	Weaknesses
1	Important, timely topics & responsive to needs	<i>Sufficient detail and clear plans</i>
2	<i>PI's strong</i>	Evaluation plan good
3	Collaboration details	<i>Activities doable &amp; related to outcomes</i>
4	Potential for involving women and minorities	Dissemination good & contributes to knowledge
5	Dissemination good & contributes to knowledge base	Potential for involving women and minorities
6	Large impact	Build on prior work or products
7	Build on prior work or products	Innovative or novel
8	Evaluation plan good	Large impact
9	Innovative or novel	Collaboration details
10	<i>Non-traditional pedagogy</i>	Important, timely topics & responsive to needs



## Common Mistakes in STEM Education Proposals

- The PI fails to provide a roadmap for eventual impact
- Insufficient description of prior related work; the proposal fails to place the work in the context of existing literature and/or to make a case for why the work will add coherently to this literature
- No clear research question
- A research question that is too broad
- A course/lab/curriculum development proposal that does not advance understanding of engineering formation
- The methodology and/or research plan are deficient
- Lack of an appropriate theoretical framework that will be used in the research
- Failure to identify an appropriate audience for the research results and dissemination plans
- Not having the right team to achieve meaningful dissemination
- No clear value proposition is stated



## Actually ~50+ pages

- Cover sheet 'signed' by AOR
- Summary and **Narrative (1+15p)**
- References cited
- Biosketches (2p ea.)
- **Budget(s)** (1p per year + 1p total budget) and Budget Narrative(s) (3p max)
- Current and Pending Support
- Facilities and Resources
- Data Management Plan (2p)
- Postdoc Mentoring Plan (1p)
- Other Supplemental Documents **ONLY** as allowed



# Workshop Outline

- Merit Review Criteria
  - Intellectual Merit
  - Broader Impacts
    - Mock Review
    - Report Out and Debrief
    - Questions and Answers
- Project Management
- Project Assessment and Evaluation
- Budget Considerations
- Q&A



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# Merit Review Criteria



## NSF has TWO Merit Review Criteria

- **Intellectual Merit**
  - What will we learn?
  - How will it advance knowledge?
- **Broader Impacts**
  - What will the impact be on society?
  - How will it make the world a better place?

*Educationally-focused projects often have a hard time disentangling these, but you need to separate them out in your proposal.*



# Elements of the Merit Review Criteria

- 1) What is the potential for the proposed activity to ***make a difference***?
  - a) By ***advancing knowledge*** and understanding within its own field or across different fields (Intellectual Merit); and
  - b) By ***benefitting society*** or advancing 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?
- 4) Does the plan incorporate a ***mechanism to assess success***?
- 5) How ***qualified*** is the individual, team, or institution to conduct the proposed activities?
- 6) Are there ***adequate resources*** available to the PI (either at the home institution or through collaborations) to carry out the proposed activities?



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# Mock Review

**Award #1432018**

“RISE: Research-based Interdisciplinary  
STEM Education”



# Typical Format of a Review

- Intellectual merit
  - General summary of project (2-3 sentences)
  - Strengths
  - Weaknesses/concerns
- Broader impacts
  - Strengths
  - Weaknesses/concerns
- Summary statement
  - Overall strengths
  - Overall concerns
  - Rationale that justifies your rating



# Rating the Proposal

- Excellent
- Very Good
- Good
- Fair
- Poor

## ***Be discerning and supportive!***

- No proposal is “perfect”, it can still be “Excellent”
- Rating all the proposals “Good” does not help the Program Officer or the PI.
- A “Poor” rating is generally reserved for cases where there was no good faith effort in writing the proposal
- Put yourself in the PI’s shoes.



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## Mock Review Process

- Read the proposal.
- Note strengths and weaknesses.
- Note **Intellectual Merit** and **Broader Impacts**, and organize strengths and weaknesses in each area.
- Consider summary statement.
- Assign your own overall rating.



# What is your rating?

## Panel comments/concerns?

- Excellent (E)
- Very Good (V)
- Good (G)
- Fair (F)
- Poor (P)



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# Intellectual Merit-Strengths

What intellectual merit strengths did you identify?



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# Intellectual Merit-Weaknesses

What intellectual merit weaknesses did you identify?



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# Broader Impacts-Strengths

What broader impacts strengths did you identify?



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# Broader Impacts-Weaknesses

What broader impacts weaknesses did you identify?



# How did reviewers rate this proposal?

**IUSE 1432018**

**Ratings: E, E, E, V, V (Average = 4.60/5)**



# Intellectual Merit-Strengths

- Builds upon on prior work that integrates biology and chemistry curricula to broaden participation in STEM.
- Starts a culture shift from lecture-based, traditional classrooms to research experiences and engaging curriculum.
- The detailed combination of activities could lead to transformative outcomes.
- The goals, activities, and assessments are clearly described and integrated.
- Project plan is well laid out with definitive objectives and time line.



## **Broader Impacts-Strengths**

- Could be a model for other 2 year/4 year partnerships.
- Project will provide opportunities for non-traditional students from community colleges.
- Strong dissemination through a web page, webinar, and strategic presentations.



# Weaknesses

## Intellectual Merit

- Can so many proposed pieces actually be executed by the PI's?

## Broader Impacts

- The evaluation plan could provide more detail.
- Will the PIs be able to deal with any setbacks that might occur?



## What did the Program Officer want to know?

- Provide more details on the content and structure of teaching materials.
- Would it be wise to add a fourth PI to share the work?
- Can you provide milestones for formative assessment?
- How could the project be sustained once funding ends?
- There are almost always budget negotiations!



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# Project Management



# Project Management

- Initiating or completing an activity
- Finishing a “product”
- NOT to be confused with **data management plan** (supplemental document)

## Describe the project management plan

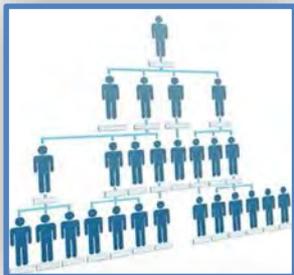
- **Team responsibilities**
- **Tasks**
  - Implementation (Objectives & Activities)
  - Evaluation
  - Dissemination
- **Timeline**



## Team Responsibilities



*Clearly define roles and who will be in charge of key actions.*



*Roles/responsibilities should be tailored for your project.*

- Check solicitation for team composition specifics.



***Hint:*** *Let the bio-sketches speak to personnel qualifications. Don't waste space in the narrative.*



# Tasks

## *Implementation Plan*



*Activities* that will be undertaken in order to achieve the project's goals and expected outcomes



Include *evaluation* and *dissemination* (and any other deliverables)



# Implementation Plan

Ultimately the implementation plans should convince the reader that the PIs:



*Understand the activities needed to achieve the expected outcomes*

- Technical details for each activity
- Interrelationships between the activities
- Scheduling of the activities
- Resources and effort required



*Have a doable plan*



*Will complete the activities and achieve the expected outcomes*



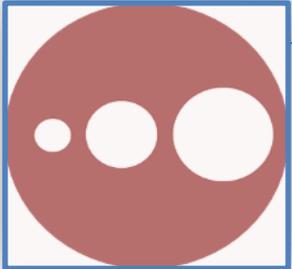
*Have considered the intellectual merit and the broader impacts*



# Timeline



A **project schedule** is used to manage and track the project's progress



The schedule should be based on the project lifecycle and the objectives, activities and milestones (i.e. deliverables)



The project schedule may be displayed in a variety of formats. A **Gantt Chart** is a common **graphical representation** of tasks/milestones and their dependencies across time



# Timeline

## ➤ Sample Gantt Chart

- Chart tools: MS Excel, Word (tables)

	Year 1	Year 2	Year 3	Year 4	Year 5
Objective 1					
Activity 1.1	■				
Activity 1.2		■			
Objective 2					
Activity 2.1		■	■		
Activity 2.2			■		
Activity 2.3			■		
Objective 3					
Activity 3.1			■		
Activity 3.2				■	
Objective 4					
Activity 4.1			■		
Activity 4.2				■	
Activity 4.3				■	
Activity 4.4					■

## ➤ Associating resources with the schedule may also be useful



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## Mock Review Process

- Read the project management plan
- Note **Team**, **Tasks** and **Timeline** and organize strengths and weaknesses in each area
- Consider content and clarity



# What did the panel say?

**IUSE 1432018 Ratings:** E, E, E, V, V (Average = 4.60/5)

## **PANEL SUMMARY:**

The Project Plan is well laid out with definitive objectives and time line.



## Strengths - TEAM

- The PIs outline a detailed and well written plan of activities, strategies for implementation of the interventions, and **roles and qualifications of PIs** etc.
- It is clear that the PIs are well-situated to perform the proposed work.
  - seem to be well-qualified to carry out the proposed tasks
  - have adequate resources
  - have an excellent track record for success in developing cutting edge curriculum focused on engaging and retaining STEM students.
  - have lots of experience in grant execution.
  - have strong research background and results from previous NSF project



## Strengths - TASKS

- The PIs outline a detailed and well written plan of activities, **strategies for implementation of the interventions**, and roles and qualifications of PIs etc.
- The PIs have **described several "deliverables"** that will be disseminated throughout the course of this project...



## Strengths - TIMELINE

- The PIs outline a **detailed and well written plan of activities**, strategies for implementation of the interventions, and roles and qualifications of PIs etc.
- The PIs have described several "deliverables" that will be **disseminated throughout the course of this project...**
- The writers produced a proposal with excellent organization and table of objectives and plans, figures, and outlines of the project implementation; it was very well-laid out and easy to follow.



# Weaknesses

- There is a lot of work planned here, will three PIs...be able to carry out all this?
- There are so many pieces and promised objectives, that it may be possible the PIs are promising too much within the confines of this timeline and budget, and unpredictable setbacks that might occur.



# What did the Program Officer want to know?

- Provide more details on the content and structure of teaching materials.
- **Would it be wise to add a fourth PI to share the work?**
- **Can you provide milestones for formative assessment?**
- How could the project be sustained once funding ends?
- There are almost always budget negotiations!



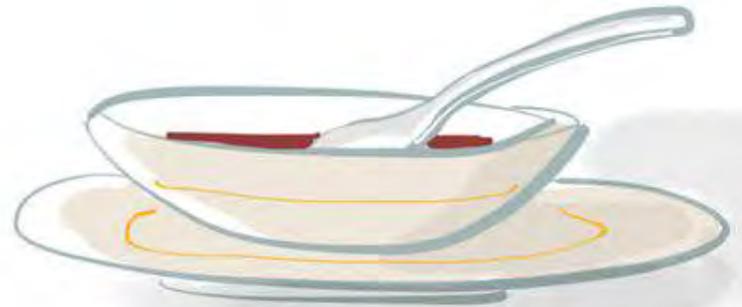
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# **Project Assessment and Evaluation Plans**

# FORMATIVE SUMMATIVE



WHEN THE **CHEF**  
TASTES THE SOUP



WHEN THE **GUESTS**  
TASTE THE SOUP

@bryanMMathers

FROM STEVE WHEELER'S BLOG "THE AFL TRUTH ABOUT ASSESSMENT"

<http://steve-wheeler.blogspot.com/2014/10/the-afl-truth-about-assessment.html>





# Elements of an Assessment and Evaluation Plan



Evaluator

Outcomes



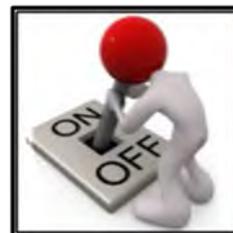
Instruments



Data Analysis



Controls





# Finding an Evaluator



On Your  
Campus



Colleagues



Professional  
Organizations



Independent  
Consultants



NSF Projects





# Example Tool: Logic Model

What new and existing resources will be used to support the project?

What are the main things the project will do/ provide?

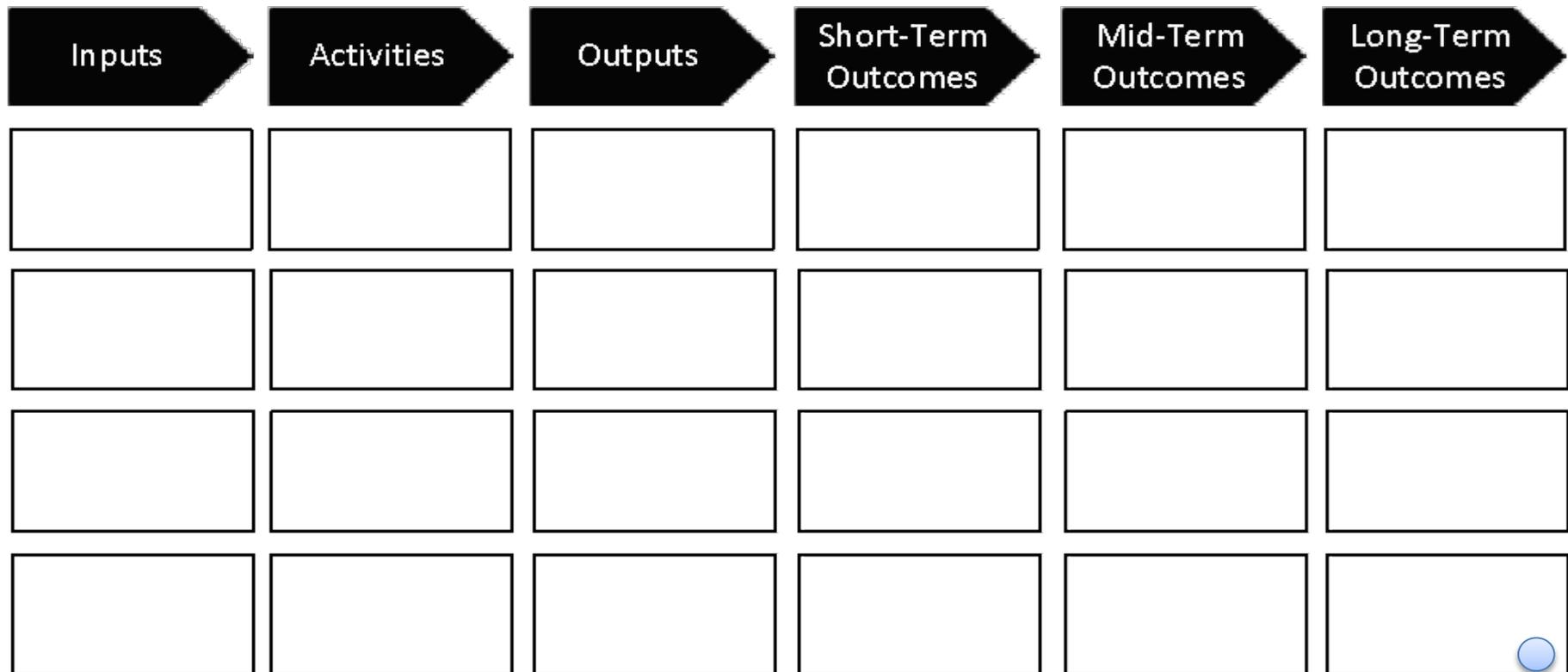
How many and what sort of tangible results will be achieved? (typically, things that can be counted or directly observed)

What will occur as a direct result of the activities and outputs? (typically, changes in knowledge, skills, attitudes)

What results should follow from the initial outcomes? (typically, changes in behavior, policies, practice)

What results should follow from the initial outcomes? (typically, changes in broader conditions)

Source: [www.evaluate.org](http://www.evaluate.org)





# Data Management Plan

Types of Data

Format and Content Standards

Access and Sharing Policies \*\*Including Privacy Protection\*\*

Reuse, Redistribution, and Derivative Policies

Plans for Archiving

**DATA MANAGEMENT PLAN ≠ EVALUATION PLAN**





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# Mock Review Process

- Read the project evaluation plan.
- Note strengths and weaknesses relative to:
  - Formative and summative components
  - Evaluator
  - Anticipated outcomes
  - Instruments
  - Data analysis
  - Controls
- Consider content and clarity.



## Strengths: What did the reviewers say?

- Goals clearly articulated and well aligned with activities; clear description of assessment of each goal
- Evaluator is well-qualified (though internal to the institution)

Note: A full evaluation plan was included in the supplementary documents (not recommended), which is a section that was redacted from the proposal that you received. Reviewers' comments were based on that portion of the submission.



## Weaknesses: What did the reviewers say?

- **Insufficient detail** to determine if evaluation will adequately address each objective
- Assessment plan should have been **in the project description**, not the supplementary documents (project description contains “abbreviated evaluation plan”)
- Thorough evaluation plan, but lacks details about some of the **assessment tools/instruments** to be used
- No **letter of collaboration** from the evaluator





# Participant Support

## PARTICIPANT SUPPORT COSTS – DEFINITIONS

### ➤ Uniform Guidance

Direct costs for items such as stipends or subsistence allowances, travel allowances, and registration fees paid to or on behalf of participants or trainees (but not employees) in connection with conferences or training projects.

### ➤ NSF – See PAPPG for entire definition

Direct costs for items such as 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. Any additional categories of participant support costs other than those described in 2 CFR § 200.75 (such as incentives, gifts, souvenirs, t-shirts and memorabilia), must be justified in the budget justification, and such costs will be closely scrutinized by NSF. (See also GPG Chapter II.D.9) For some educational projects conducted at local school districts, however, the participants being trained are employees. In such cases, the costs must be classified as participant support if payment is made through a stipend or training allowance method. The school district must have an accounting mechanism in place (i.e., sub-account code) to differentiate between regular salary and stipend payments.





# Participant Support

F. PARTICIPANT SUPPORT COSTS		
1. STIPENDS	\$ _____	0
2. TRAVEL	_____	16,400
3. SUBSISTENCE	_____	25,806
4. OTHER	_____	3,260
TOTAL NUMBER OF PARTICIPANTS		( 33 )

## PARTICIPANT SUPPORT COSTS – BUDGET LINE F



It's important to note, some costs can be accounted for on multiple budget lines.

- **Lines F.1 & F.3 – Stipends/Subsistence:** To help defray the costs of participating in a conference or training activity, funds may be proposed for payment of stipends, per diem or subsistence allowances, based on the type and duration of the activity. Such allowances must be reasonable, in conformance with the policy of the proposing organization and limited to the days of attendance at the conference plus the actual travel time required to reach the conference location.
- **Line F.2 – Travel:** Funds may be requested for the travel costs of participants.
- **Field Trips:** When the purpose of the field trip is directly related to and necessary to meet the objectives of the training activity, costs of transportation for participants can be allowable.



# Incentive Payments

Incentives such as gift cards, souvenirs, t-shirts and/or other memorabilia are not typically considered allowable costs, however, **when necessary to accomplish program objectives**, and **if reasonable in amount**, these costs *could* be allowable. **When it's unclear, ask yourself:**



- What leads you to believe that participation is unlikely without the use of an incentive?
- What is the estimated impact without the use of an incentive?
- How will incentives be distributed and tracked?
- What is the justification for the amount to be considered?



# Unallowable Costs

## THESE COSTS ARE UNALLOWABLE!!

**Entertainment:** Costs of entertainment, amusement, diversion and social activities, and any costs directly associated with such activities (such as tickets to shows or sporting events, meals, lodging, rentals, transportation and gratuities) are unallowable.



**Intramural Meetings:** NO funds may be requested for meals or coffee breaks for intramural meetings of an organization or any of its components, including, but not limited to, laboratories, departments and centers.



# Unallowable Costs

## THESE COSTS ARE UNALLOWABLE!!



**Alcoholic Beverages:** NSF funds may NOT be proposed or spent on alcoholic beverages

**Recognition Awards:** Payments given for the purpose of conferring distinction or to symbolize respect, esteem, or admiration may NOT be paid from grant funds.

**Prizes:** Prizes are unallowable costs on grants.





## **Common Subaward Issues**

- No budget attached
- Incorrect or no indirect rate applied
- No policies and procedures



## **Indirect Costs**

- Explain any exclusions from your base
- Use 10 % modified total direct cost if grantee does not have a federally negotiated rate



## Helpful Hints

- Adhere to your federally negotiated rate. Using any rate less than or more than any rate is unallowable and deemed involuntary cost sharing which is prohibited by NSF.
- Use 10% de minimus rate including subawards if you do not have a current federally negotiated indirect cost.
- State if your institution has a current federally negotiated rate and the cognizant federal agency in budget justification.
- Participant support costs are excluded from your indirect cost rate base allocation.
- Provide a detailed budget justification along with your budget prepared by line item.



## Helpful Hints (cont.)

- Include tuition remission amounts for all years in budget justification.
- Do not mingle travel funds between PIs and participant support trainees.
- Participants support costs should be students/teachers. Employees of an institution are not participants except for school districts.
- Place all related participant support costs in designated participant cost categories unless otherwise stated in solicitation.
- IRB approval or exemption must be completed prior to receiving a NSF award.





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***Thank you!***



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