



## **NSF Webinar Presentation**

Engineering Education and Centers Division  
Broadening Participation in Engineering Program

BRIGE Solicitation FY-2013: NSF 13-534

***Broadening Participation Research Initiation Grants in  
Engineering***

### **Connection Information – Audio Portion:**

*To listen to today's Webinar please call:*

**1-877-952-7402**

*The passcode when requested is:*

**BRIGE**

The presentation will be available following the March 6 webinar at:

[http://www.nsf.gov/eng/eec/webinars/EEC\\_BRIGE\\_Webinar.jsp](http://www.nsf.gov/eng/eec/webinars/EEC_BRIGE_Webinar.jsp)



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Engineering***

**Presenter:            Richard N Smith**  
**Program Director**  
**ENG/EEC**

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## NSF Solicitation: NSF 13-534

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The line will be open for Q&A  
immediately following the presentation.

**Please set your telephone to MUTE during the presentation.**

If you have additional questions after the webinar concludes,  
please send them via email to:

[rnsmith@nsf.gov](mailto:rnsmith@nsf.gov)

The presentation will be available following the March 6 webinar at:

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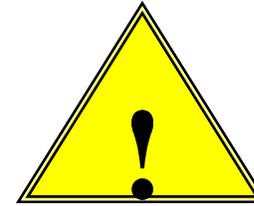
# Webinar Outline

0. Introductory Remarks
1. NSF Overview: *ENG and EEC*
2. Program Overview: - *Broadening Participation in Engineering*
3. Key Aspects of BRIGE Proposals and Awards
4. Proposal Preparation for BRIGE
5. NSF Review Criteria
6. Some guidelines for successful proposal preparation





## **CAUTION**



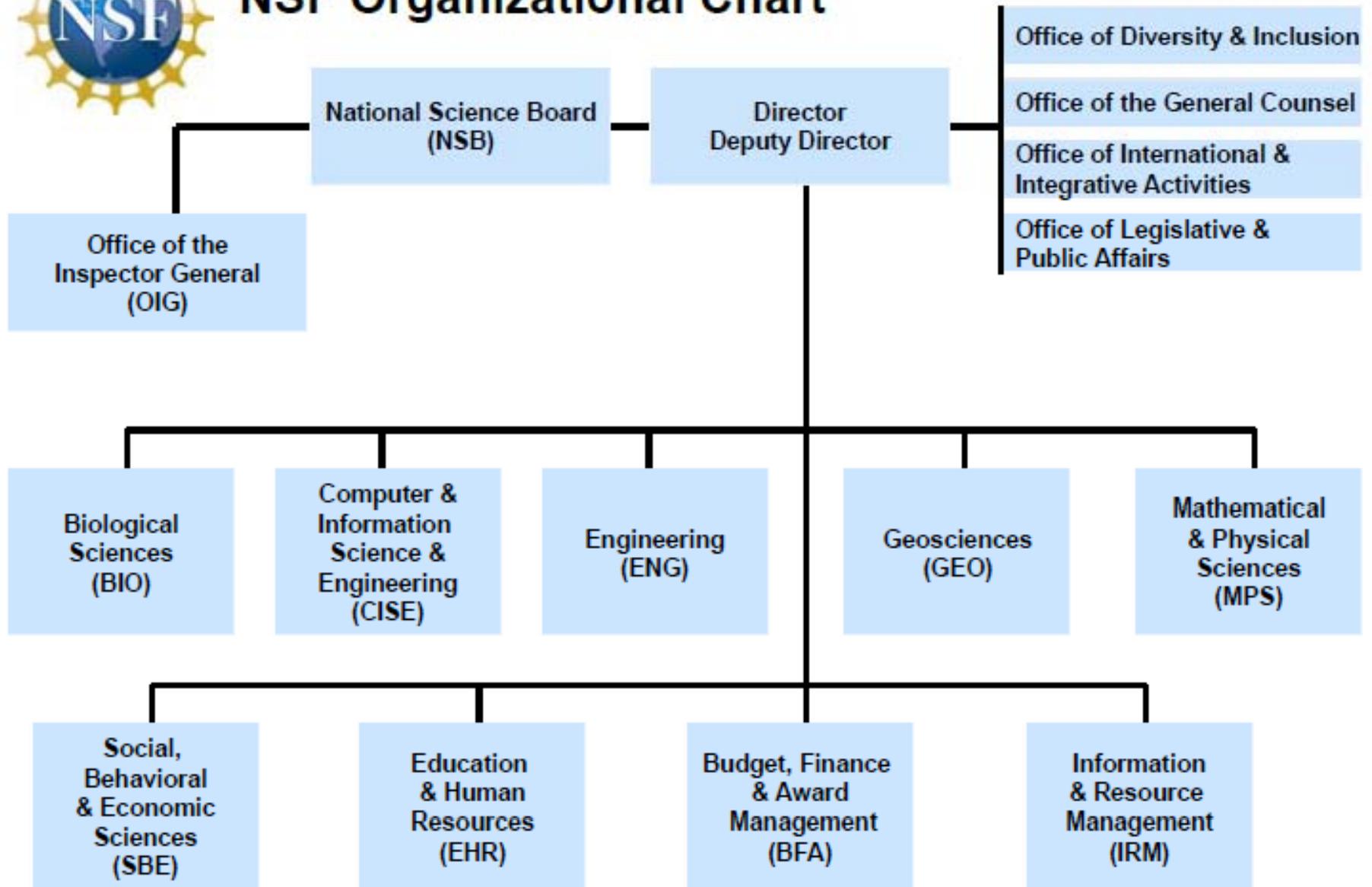
The Proposal and Award Policies and Procedures Guide (PAPPG, NSF 13-001) and the Program Solicitation (for BRIGE: NSF 13-534) are the only accepted references for preparing, adjudicating or appealing proposals for any NSF program.

- There are significant changes in BRIGE in 2013.
- There are changes in the NSF Merit Review Criteria in 2013.
- Using past BRIGE proposals or awards as a guide **MAY** not lead to a successful result.





# NSF Organizational Chart



# NSF

- The NSF **Mission** is
  - To promote the progress of science; to advance the national health, prosperity, and welfare; to secure the national defense (NSF Act of 1950)
- The NSF **Strategic Goals** are related to:
  - Discovery – advance frontiers of knowledge
  - Learning – cultivate an inclusive S&E workforce
  - Research infrastructure – invest in advanced instrumentation, cyber infrastructure, tools, etc.
  - Stewardship – support excellence in S&E research and education

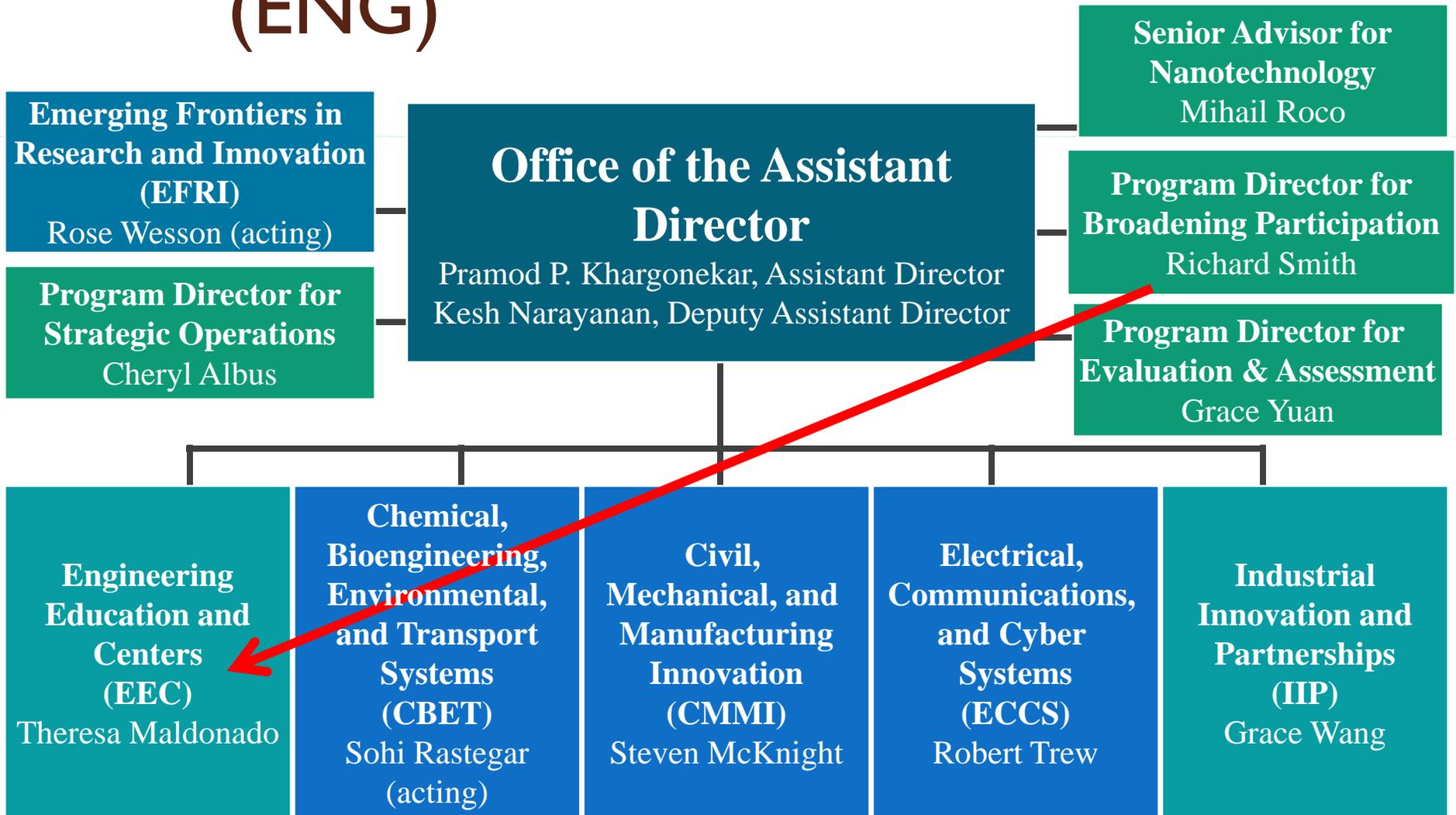
Adapted from a presentation by G. Hazelrigg

# ENG Mission and Vision

- Mission: To enable the engineering and scientific communities to **advance the frontiers of engineering research, innovation, and education**, in partnership with the engineering community, and in service to society and the nation.
- Vision: **ENG will be a global leader** in identifying and catalyzing fundamental engineering research, innovation, and education.



# NSF Directorate for Engineering (ENG)



# Civil, Mechanical, and Manufacturing Innovation (CMMI) Research Clusters

**Advanced  
Manufacturing**

BRIGE Liaison for CMMI:

**Mary Toney**

**Resilient and  
Sustainable  
Infrastructures**

**Mechanics and  
Engineering Materials**

**Systems  
Engineering and  
Design**



# Electrical, Communications, and Cyber Systems (ECCS) Clusters

**Electronics, Photonics,  
and Magnetic Devices**

BRIGE Liaison for ECCS:  
**Lawrence Goldberg**

**Communications,  
Circuits, and Sensing  
Systems**

**Energy, Power, and  
Adaptive Systems**



# Chemical, Bioengineering, Environmental, and Transport Systems (CBET) Clusters

**Chemical,  
Biochemical, and  
Biotechnology  
Systems**

BRIGE Liaison for CBET:  
**Ted Conway**

**Environmental  
Engineering and  
Sustainability**

**Biomedical Engineering  
and  
Engineering  
Healthcare**

**Transport and  
Thermal Fluids  
Phenomena**



# Engineering Education and Centers Division Research Programs

**Research in  
Engineering  
Education**

BRIGE Liaison for EEC:  
**Richard N Smith**

**Broadening  
Participation in  
Engineering**



## 2. BPE Program Overview

- Definition: A program is an organized collection of activities designed to reach certain objectives.
  - Organized activities are not a random set of actions but a series of planned actions that are designed to solve some problem.
  - If there is no problem, then there is no need for programmatic intervention.
- Also defined by: staffing, budget/funding, identity/uniqueness, service philosophy



# Program Descriptions vs. Solicitations

- Program Descriptions
  - Broad, general descriptions of programs and activities in directorates, offices, and divisions
  - Encourage the submission of proposals in areas of interest to NSF
  - Use generic eligibility and proposal preparation instructions
- Solicitations
  - More focused than program descriptions
  - Specific proposal preparation requirements
  - Specific review criteria
  - Special eligibility requirements



# Broadening Participation in Engineering Program

**BPE Program Description Published in January, 2013**

**PD 13-7680**

- **Mentoring and Networking** for early career engineering faculty with an emphasis on underrepresented groups
- **Broadening Participation Research** – Create new models and innovations related to graduate education, postdoctoral training, and academic careers
- **BRIGE** – Broadening Participation Research Initiation Grants in Engineering
  - **New Solicitation in January: Significant revisions from 2012**
  - **NSF 13-534**
  - Enable early career faculty to integrate effective diversity strategies in their engineering research, education and innovation activities



# Programmatic Goals for BPE

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- Fundamental premise: It is critical that the faculty of the future are able to **draw from diverse perspectives** in their engineering research and educational activities
- BPE supports engineering faculty, particularly early career faculty, in **integrating broadening participation and diversity** with their scholarly activities, including education, research and innovation
- Underrepresented groups in engineering
  - Women
  - Ethnic/racial minorities, including African-American, Hispanic, Native American, Alaska Native, Native Pacific Islander
  - Persons with disabilities



# BPE Interests for Research and Education

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- Understanding how a diverse engineering student body, professional workforce, and faculty impact engineering innovation and productivity.
- The underlying issues affecting the differential participation rates in engineering, particularly those that can be addressed by engineering faculty members.
- The experiences and interactions that enhance or inhibit underrepresented groups' persistence to degree and career interest in the professoriate.



### 3. ... which brings us to BRIGE

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- Promote the participation of early career engineering faculty in all fields of engineering research.
- Support the integration of effective diversity and broadening participation strategies in their research, education, and innovation activities.
- Develop champions for diversity and broadening participation of URG in engineering as a career objective.



## 2013 BRIGE Solicitation Revisions

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- Eligibility restrictions have been modified
- Plans for broadening participation and for activities related to diversity and inclusion must be an integral part of the Project Description



## BRIGE Proposals Will ...

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- Be innovative and potentially transformative in terms of engineering research
- Be strengthened through careful integration of effective activities to promote broadening participation
- Include a discussion of future research goals, which include incorporation of broadening participation as a sustainable component of the PI's scholarly enterprise
- Proposals will show how BP activities will strengthen the research and how the research activities will promote diversity
- PIs should develop the capability to serve as role models for BP and as mentors for students/colleagues from URG



# BRIGE Proposal Considerations

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- Reviewers will be asked to consider
  - The integration of broadening participation into the research activities
  - The potential of the research initiation activities to produce sufficient preliminary results to serve as the basis for future competitive research proposal to the Engineering Directorate
- Special encouragement for participation from early career faculty who
  - Are members of underrepresented groups
  - Are from Minority Serving Institutions
    - Historically Black Colleges and Universities
    - Hispanic Serving Institutions
    - Tribal Colleges and Universities
    - Predominantly Black Institutions

# 2013 BRIGE Eligibility

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## At the time of proposal submission ...

- Be a US Citizen or Permanent Resident
- Have a primary appointment in an engineering department
- Be in a full-time, tenure-track position for less than three years (cumulative)

## At the time an award is made ...

- May not be or have been a PI or Co-PI on any NSF research grant

# Prior NSF Grant Exceptions

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- Instrumentation, education, workshop, and other non-research awards
- Doctoral dissertation improvement award,
- A post-doctoral research award such as a SEES Fellowship,
- A Graduate Research Fellowship or similar fellowship awards from the NSF.
- REU or RET site awards.
- SBIR or STTR awards that were made while the PI was in industry

## 4. Important Components of BRIGE Proposals

### Cover Sheet

- Title must begin with “BRIGE:”
- Primary division for submission: EEC
- Solicitation Number I3-534
- Secondary unit of consideration: The ENG program within CMMI, CBET, ECCS, or EEC most closely aligned with your proposed research
  - Example: CBET/TTTP



# Important Components of BRIGE Proposals

## Project Summary

- Components will be 3 required text boxes in FastLane, not to exceed 4700 characters
  - (1) Succinct summary of the research objectives and how these will be integrated with BP objectives
  - (2) Summary of the Intellectual Merit
  - (3) Summary of the Broader Impacts
- Broader Impacts statement should summarize how BP of underrepresented groups in engineering will occur

Project summaries with special characters may be uploaded as a .pdf document



# Important Components of BRIGE Proposals

## Project Description (15 pages)

- PI's research and education goals, including integration of BP
- Proposed research activities, including preliminary results and relevant background
- Proposed BP activities ... Evaluation
- Integration of BP activities with research and innovation objectives ... Sustainable
- Relationship to long term research goals

**NO WEBSITE LINKS**



# Important Components of BRIGE Proposals

## Budget

- \$175,000 for 24 months (STRICT LIMITS)
- Normal NSF no-cost extension provisions apply
- No senior personnel except for the PI
- Collaborations are encouraged, but no support may be provided
- Include travel funds for a grantees meeting in Arlington VA



# Important Components of BRIGE Proposals

## Special Information and Supplementary Documentation

- Letter from department chair/head or dean
  - PI meets eligibility requirements
  - PI has access to facilities and support
  - Proposed integration of BP and research is consistent with PI's successful career plan
- Letters of commitment—ok; Letters of recommendation—Not ok
- Post Doc Mentoring Plan, if applicable
- Data Management Plan





## Award Information

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- Type of Award – 24 month, standard grants
- Award Amount:
  - Not to exceed \$175,000
- Estimated Number of Awards – 25 to 30 (pending availability of funds)
  - No obligation to make a specific number of awards
- Anticipated Funding Amount ~ \$5,000,000 (pending availability of funds)
  - No obligation to spend a specific amount of money



## Warnings

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- 24 month project duration maximum
- **NOT 25 months**
- \$175,000 maximum request
- **NOT \$176,000**
- Due Date: April 29, 2013, 5:00 p.m.  
(Proposer's time)
- **NOT 5:01 p.m.**
- Anticipate technical problems—SUBMIT EARLY

# 5. NSF Merit Review Criteria

## # 1 What is the **Intellectual Merit** of the Proposed Activity?

The Intellectual Merit criterion encompasses the potential to advance knowledge

## #2 What are the **Broader Impacts** of the Proposed Activity?

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



Source: NSF 13-001 PAPPG



# NSF Merit Review Criteria

***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)
  - 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 organization to conduct the proposed activities?
5. Are there adequate resources available to the PI (either at the home organization or through collaborations) to carry out the proposed activities?



Source: NSF 13-001 PAPPG



# Transformative Projects

Transformative activity involves ideas, discoveries, or tools that **radically change our understanding** of an important existing scientific or engineering concept or educational practice or leads to the **creation of a new paradigm or field** of science, engineering, or education. Such research challenges current understanding or provides pathways to new frontiers.

Transformative activity results often do not fit within established models or theories and may initially be unexpected or difficult to interpret; their transformative nature and utility **might not be recognized until years later.**

## Transformative activity

- Challenges conventional wisdom,
- Leads to unexpected insights that enable new techniques or methodologies, or
- Redefines the boundaries of science, engineering, or education.





## Special Recent Requirements for NSF Proposals

### **Post-Doctoral Mentoring Plan**

**If** the award includes support for Post-Doctoral researchers

**Then** the proposal must include, as a one-page supplementary document, a description of the mentoring activities that will be provided for such individuals.

## Special 201 I+ Requirement for NSF Proposals

### Plans for **Data Management and Sharing** of the Products of Research

- **Required** supplementary two-page (maximum) document labeled “Data Management Plan”
- Submitted in a special section of the proposal.
- Reviewed as part of the Intellectual Merit and Broader Impacts
- Engineering has provided guidance for Pis
- [http://nsf.gov/eng/general/ENG\\_DMP\\_Policy.pdf](http://nsf.gov/eng/general/ENG_DMP_Policy.pdf)



## Other Special Requirements Needing Attention

### **Proposals Involving Vertebrate Animals**

- Approval by Institutional Animal Care and Use Committee (IACUC) before an award can be made
- Check the box on the Cover Page

### **Proposals Involving Human Subjects**

- Approval by Institutional Review Board (IRB) or affirmation of official that the project is exempt before an award can be made
- Check the box on the Cover Page



## 6. Proposal Basics

- Write to the reviewers (not to the program officers and not to yourself)
  - Your proposal will be judged by the reviewers
- 
- Reviewers want to know four things:
    - What is it about (the research and educational objectives)?
    - How will you do it (the technical approach)?
    - Can you do it (you and your facilities)?
    - Is it worth doing (intellectual merit and broader impact)?
  - This is, basically, all the proposal needs to convey – but it needs to convey this

# The Grant Proposal Guide (GPG)

- NSF-Wide Guidance for Proposals
- Default Resource for Proposal Requirements and Accountability
- NSF 13-001





# Writing the Project Summary

- The most important statement is your statement of the research and educational objectives
  - It should be sentence 1 of paragraph 1
  - Do not begin with a weather report: “The sky is falling. Tools are breaking. Designs are failing...”
  - Do not begin with a state-of-the-union address: “Business is moving off shore. Manufacturing is going to the ...”
- Remember, this is not a tech paper, it is not a murder mystery (where we find out what the objective is on page 15 of the Project Description)
- Don’t forget the Intellectual Merit and Broader Impact statements
- Do it last???



# Project Summary

## What The Reviewers Want to See

- What are your research and educational objectives?
- What is your approach?
  - Outline — just two or three sentences
- Why is your contribution important to your research community (the intellectual merit)?
- If successful, what will be the benefit to society (the broader impact)? Why is your project important to society?



# Summary Template

The objective of this research project is to test the hypothesis that too many monkeys in a tree will cause the tree to break. The approach will be to take a sample of ten trees and load them with monkeys until they break...

**Intellectual Merit** – It is important that we know how many monkeys can climb a tree before it breaks because this affects our perceptions of monkey procreation and... The Snerd Theory holds that tree size limits monkey procreation. This study challenges that theory with the notion that... If the objective hypothesis is correct therefore, it will transform our approach to...

**Broader Impact** – Monkeys are used in medical research. By knowing how many monkeys can fit in a tree, we will be able to provide more monkeys for such research thereby advancing medical science more quickly and improving the quality of life. Also, by watching the monkeys get hurt when the tree breaks, graduate students will be less likely to climb trees, thereby increasing their probability of graduating.

# The Rest of Your Proposal

- The next 15 pages of your proposal give backup and detail to your summary
- Start with a restatement of your research and BP objectives, clarify them, and provide a plan to accomplish them
- Provide a convincing argument that you can carry out your proposed plan
- Restate and provide detail on your intellectual merit and broader impact

This is a good time to put forth your best effort



# Tips on Proposal Writing

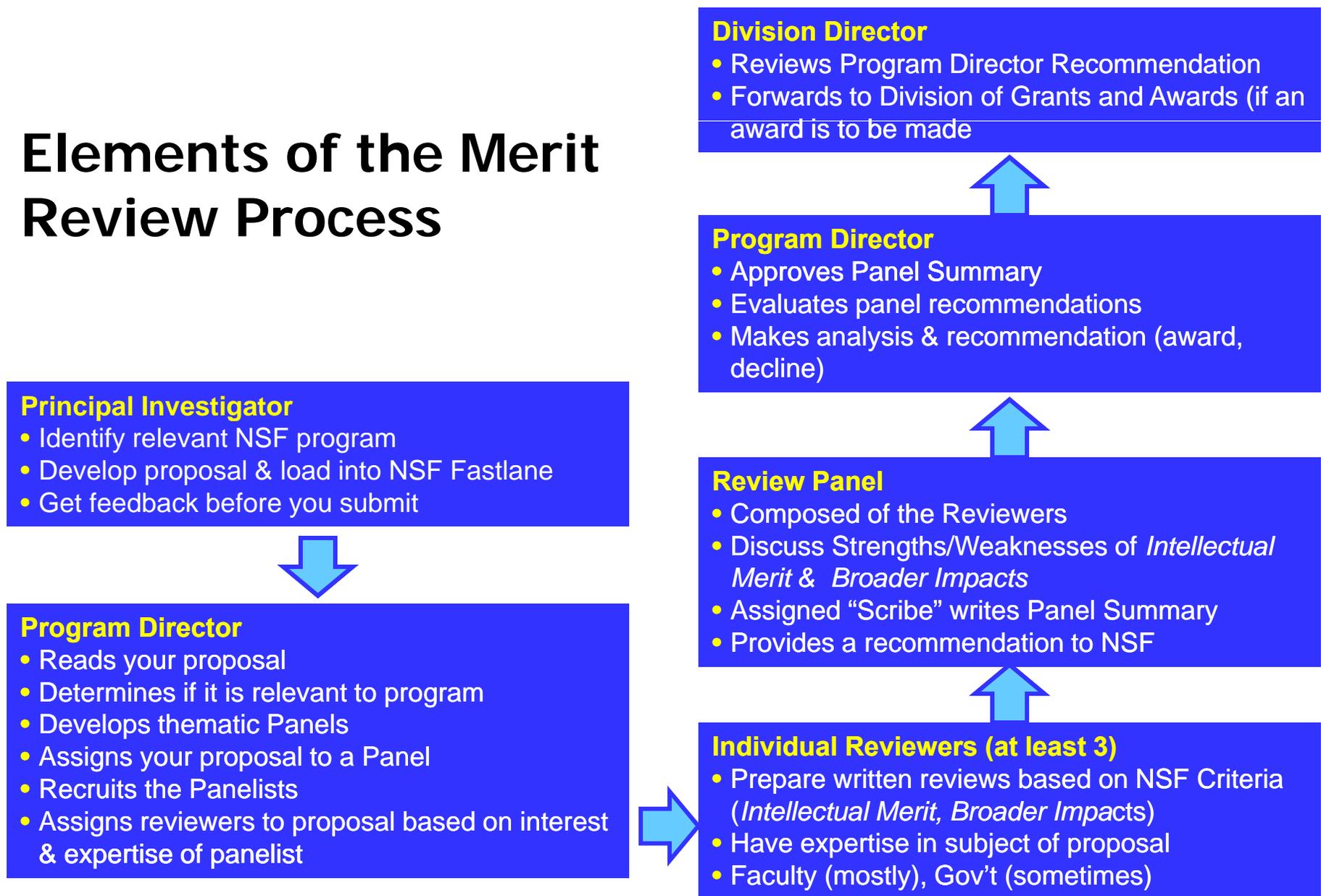
- Use only 12 point type
- Do not use figures or tables as filler— everything should contribute
- Everything should be legible—do not use 2 point type on figures or tables
- Be sure to include a clearly stated research objective
- Use only the required format
- Be sure to include intellectual merit and broader impact statements in the body of the proposal

# Program Descriptions vs. Solicitations

- Program Descriptions
  - Broad, general descriptions of programs and activities in directorates, offices, and divisions
  - Encourage the submission of proposals in areas of interest to NSF
  - Use generic eligibility and proposal preparation instructions
- Solicitations
  - More focused than program descriptions
  - Specific proposal preparation requirements
  - Specific review criteria
  - Special eligibility requirements



# Elements of the Merit Review Process



Adapted from a slide by Henning Winter



# Things PIs do to Ruin Their Chances for an Award

- Don't follow GPG guidelines (RWR)
- Don't state clear research and educational objectives
- Don't include a plan to accomplish the objectives
- Include inane tables and figures (boxes and arrows, 2pt fonts, gray fuzz,...)
- Use small fonts, obnoxious formatting
- Poor grammar and lots of typos
- Fail to know the literature and what has already been done
- Don't align the overall budget with the project objectives
- Don't proofread the submission

Adapted from a presentation by G. Hazelrigg

# BRIGE Program Contacts

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# Discussion/Follow-Up Q&A

