

The NSF Merit Review, Review Criteria, and Evaluation/Assessment

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Who We Are

- PRISSEM Academic Services, LLC, a Black-owned company, was founded by Dr. Falcon Rankins in 2005 with the goal of helping HBCU STEM faculty thrive.
- Dr. F. Rankins brings a host of experience working closely with STEM faculty at HBCUs to develop research plans, obtain funding, and successfully carry out funded projects.
- Dr. Claudia Rankins brings 12 years of experience as program officer for the NSF HBCU-UP, CAREER, and HBCU Excellence in Research programs, having managed a portfolio of \$400m in awards, mostly to HBCUs. She also has over 20 years of experience in STEM faculty and administrative positions at an HBCU.
- Dr. Koren Bedeau brings 18 years of experience as a university administrator in academic affairs. She has a wealth of experience in leadership development for women faculty in STEM, STEM faculty at HBCUs, and grant execution for broadening participation.

Agenda

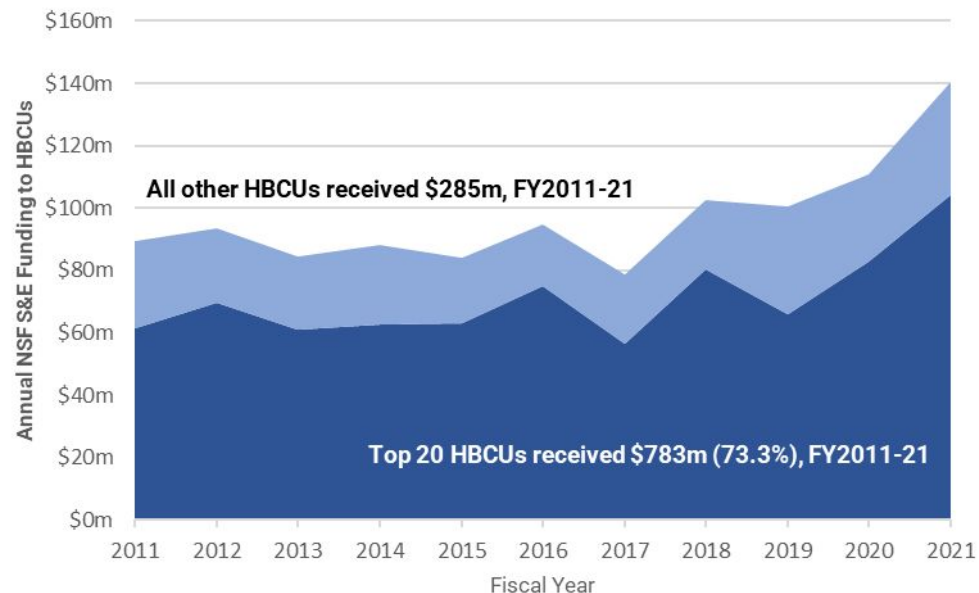
- NSF Review Process
- Exploring intellectual merit and broader impacts
- Review considerations
- Research and program evaluation/assessment of your NSF project

NSF funding landscape of HBCUs

Current funded projects at **MSU**, by NSF directorate:

NSF Directorate	# Awards
EDU	16 (11)
ENG	10 (9)
CISE	5 (5)
MPS	10 (9)
OISE and OIA	3 (1)
SBE	2 (3)
BIO	0
GEO	6 (7)

NSF awarded HBCUs \$1.07b in Science & Engineering funding, FY2011-21



What is peer review?

For wise judgment of the merits of specific research proposals the [National Science] Foundation depends upon those most competent and respected in their various fields.

- 2nd Annual Report of the NSF, 1952

- Peer review is longstanding “gold standard” of Western science
- Plays an integral - and *social* - role in directing fields
- A multi-level peer review process has always been a foundation of NSF
- Peer review may be ideal, but it's not perfect

Your role in the review process as a PI

- Understand the rules of the game
- Always remain mindful of the funder's interests
- Submit competitive proposals

Your role in the review process as a reviewer

Become a reviewer

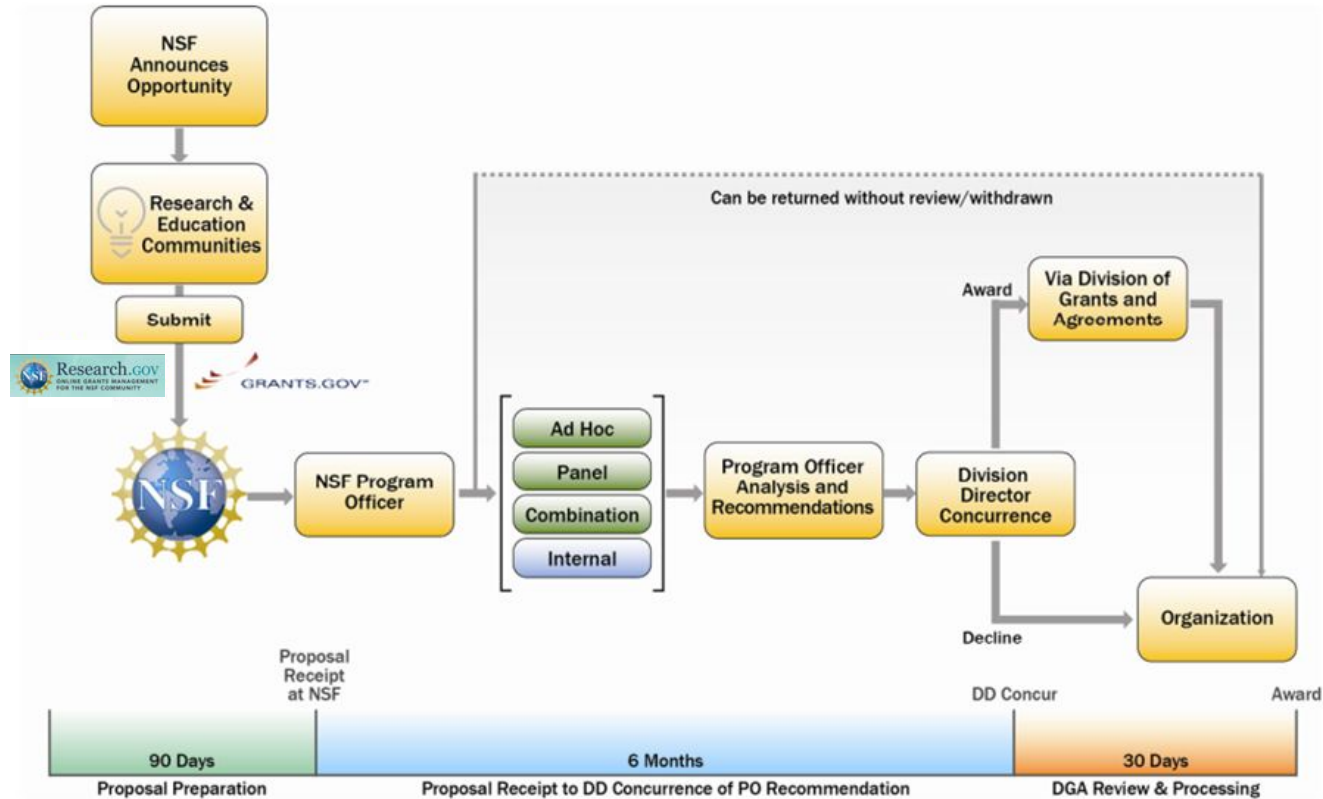
- Send your CV if you are interested in serving on a panel or being considered for ad hoc reviews
- Best time to send your CV

Your role in the review process as a reviewer

Serving on a panel

- You have been selected for a panel, now what?
- Why is it important for you to be on a panel?
- Preparing for the panel

NSF Merit Review Process



NSF says:

NSF strives to invest in a robust and diverse portfolio of projects that enables breakthroughs across all areas of science and engineering. The foundation uses the following three principles in determining which proposals to fund as a part of its portfolio:

- *All NSF projects should be of the highest quality and have the potential to advance, if not transform, the frontiers of knowledge*
- *NSF projects, in the aggregate, should contribute more broadly to achieving societal goals.*
- *Meaningful assessment and evaluation of NSF funded projects should be based on appropriate metrics*

What is Intellectual Merit?

The Intellectual Merit criterion encompasses the potential to advance knowledge - NSF PAPPG

- How does your work move the field forward? And *which* field?
- IM is largely derived from:
 - the research questions you propose
 - the placement of your work within the larger field
- Intellectual Merit is NEVER...
 - guaranteed by previous success or defined by previous declination
 - inherent

Important to remember re: Intellectual Merit

Peer review may be the best option available, but it's far from perfect

You have to *argue/persuade/convince* that your proposed project has intellectual merit

- NSF's evaluation criteria are...murky
 - no clear assessment rubric
 - no clear consensus in the community
- No idea/proposal has an stronger inherent claim to being “good science” than any other
- Reviewers are overworked, underappreciated, [biased,]....and **influenceable**

IM looks different for different types of projects

Fundamental or Basic research

- Seeks to develop new, generalizable knowledge and explain why things happen
 - 1) posit a theory
 - 2) design a way to test the theory
 - 3) execute and conclude whether the theory held or was disproved
 - 4) report to the community
- These aims naturally align with NSF's concept of intellectual merit

IM looks different for different types of projects

Applied Research

- Aim is generally more focused on a specific - rather than general - case
 - Developing or optimizing methods or processes
 - Characterizing new materials or methods
- Knowledge is advanced, but PI must seek to maximize that advancement
 - What general theories can be advanced through the applied research?
 - What fundamental aspects of the techniques are better understood?

IM looks different for different types of projects

Education-related or implementation-oriented projects (eg S-STEM, IUUSE, HBCU-UP Implementation, LSAMP)

- Important to identify whose knowledge is being advanced
 - Hint: it's probably the STEM education community, rather than students!
- Important that appropriate expertise is engaged
 - STEM education researcher? Evaluator?
- Important to note that foundational vs applied paradigm exists here, too
- Important that approach to generating intellectual merit is well-articulated
 - Pose appropriate research questions and design
 - Build the proposal around a strong evaluation plan

Broader Impacts

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

- On paper, it's equally important; but in practice...
- BI is less understood and less appreciated by the community
- Broadening Participation is one - but only one - aspect of BI
- <https://beta.nsf.gov/science-matters/nsf-101-five-tips-your-broader-impacts-statement>

NSF DCL 21-059: A Framework for Broader Impacts

For most types of fundamental research, descriptions of broader impacts *should focus on a reasonable and honest assessment of possible and likely outcomes rather than on the probability of specific outcomes.*

In the Dear Colleague Letter, NSF encourages principal investigators to consider each of the BI Framework's three questions:

- Who can the scientific opportunities and communicative products empower?
- Whose quality of life can the empowerment improve?
- What actions make these broader impacts more likely?

What the community says about broader impacts

*“The **weakness** of the Broader Impacts criterion is [that] **it is mysterious to people**; it is **not understood** by principal investigators, prospective principal investigators, or panelists. It is **hard for reviewers** to give the broader impacts a clearly objective set of evaluative criteria – how do you compare a proposal that includes grad students with one which partners with a museum? **It varies** from place to place and division to division.”*

“It is like a big fuzzy ball”

Quotes from interview STEM leaders in 2011 NSB report on NSF merit review criteria

Other Merit Review Considerations

NSF asks reviewers to consider both IM and BI when evaluating proposals in terms of the following considerations:

- To what extent do the proposed activities suggest and explore creative, original, or potentially transformative concepts?
- 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?
- How well qualified is the individual, team, or organization to conduct the proposed activities?
- Are there adequate resources available to the PI (either at the home organization or through collaborations) to carry out the proposed activities?

Assessment vs Evaluation

- The terms are frequently used interchangeably
- Key component of both is the intent to *render judgement* or *make decisions* based on collected data or research performed
- Often divided into formative and summative efforts
- Within the context of NSF projects, evaluation/assessment ultimately asks: “did NSF get a good return on its investment in a particular PI/project [and should we fund this PI’s next proposal]?”

Assessment and Evaluation of NSF Projects

- All proposals should have clearly stated goals, activities, and expected outcomes to measure progress against during project implementation
- Outcomes and products should be reported in annual reports
- For **research-oriented** projects (incl'd'g STEM education research)
 - Focus may be more on formative evaluation/assessment
 - Likely will not need an evaluator; but an advisory group/board/committee may be appropriate
 - Summative evaluation judgements implicitly rendered by the community

Evaluation in implementation-oriented projects

- For **implementation-oriented projects**, there is more of an explicit need for evaluation, both formative and summative
- Generally, the solicitation calls for an evaluation plan to be included in the proposal
- Often conducted by trained evaluators
- Multiple forms and techniques available
- Budget accordingly

Evaluation, Research, and Intellectual Merit

- In implementation-oriented projects, evaluation and research may be closely related
 - EQ: What impact did attending a CURE section of BIO 111 have on the persistence rate of Morgan State biology majors entering their junior year?
 - RQ: What impact does CURE integration have on the persistence rate of biology majors entering their junior year at a research intensive HBCU?
 - Intellectual merit: This project advances the STEM education community's understanding of the impact of CUREs on the persistence of biology majors at research intensive HBCUs.
- Small projects - evaluation may be driving the intellectual merit
- Larger projects - may need to distinguish between evaluation and social science research

Tips for working with an evaluator

- Keep expectations realistic
- What to look for in an evaluator; Should:
 - Also have realistic expectations
 - Value the work
 - **Understand the institutional context**
 - Have time for you (because there are a few evaluators taking a lot of jobs in the space)
 - *Personal Opinion: evaluator should put students first*
- Where to find an evaluator
 - Word of mouth - talk to other PIs at similar institutions
 - Linked-in/CREA center/AERA website
 - Us

Timeline for a few selected programs

CAREER ([NSF 22-586](#))

Proposal deadline: July 24, 2024

Research Initiation Award (HBCU-UP; [NSF 23-563](#))

LOI deadline: July 23, 2024 | Proposal deadline: October 1, 2024

HBCU-Excellence in Research ([NSF 23-598](#))

LOI deadline: July 11, 2024 | Proposal deadline: October 15, 2024

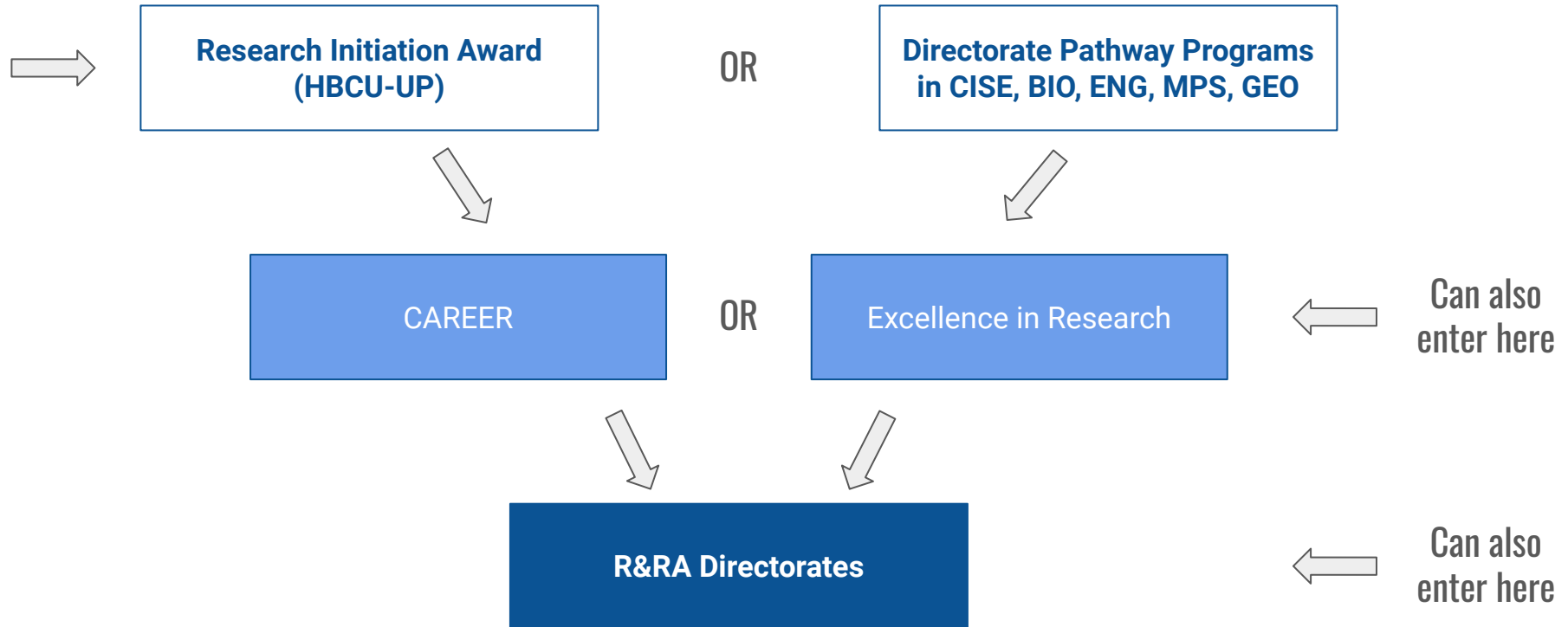
Targeted Infusion Project (HBCU-UP; [NSF 23-563](#))

LOI deadline: Sep 10, 2024 | Proposal deadline: November 14, 2024

Broadening Participation Research Project (HBCU-UP; [NSF 23-563](#))

LOI deadline: Sep 10, 2024 | Proposal deadline: November 14, 2024

Possible NSF Pathways for Single Investigators



Questions?

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