HSI Program

Minerva Cordero and Talitha Washington

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NSF Mission

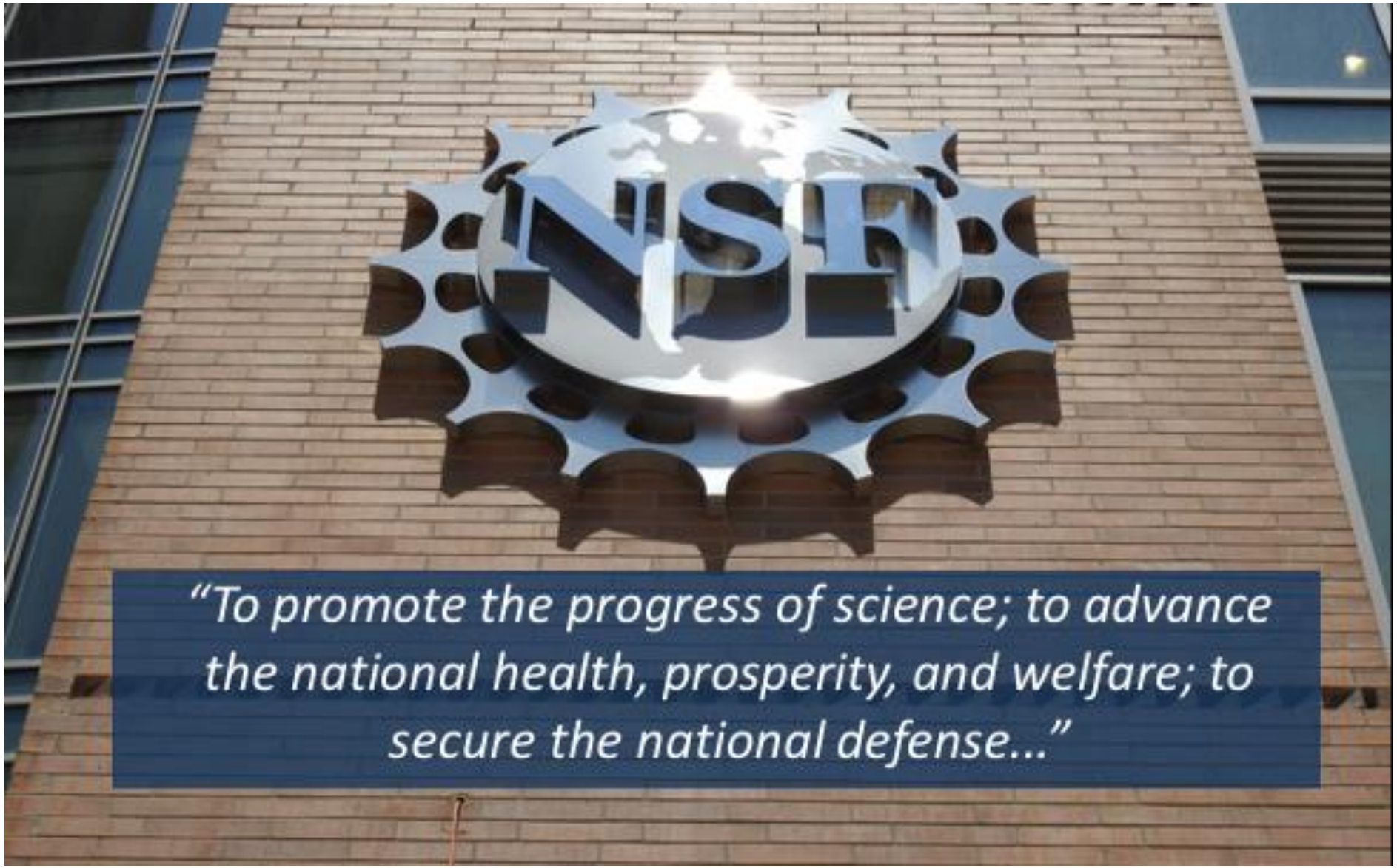

Photo Credit: Maria Barnes, NSF

Alert: This presentation is **not** all-inclusive

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What Makes NSF Unique

Funds broad fundamental research – longer lead time for identifying results

- Drives U.S. economy
- Enhances American security
- Advances knowledge to sustain U.S. global leadership

Distributes 93% of its budget through the merit review process

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11,000
Awards funded

2,000
NSF-funded institutions

359,000
People NSF supported

49,000
Proposals evaluated

$1.2B
STEM education and workforce development

$7.5B
FY 2017 budget enacted

$100M
To seed public-private partnerships

93%
Funds research, education and related activities

231
NSF-funded Nobel Prize winners (since 1951)

Numbers shown are based on fiscal year 2017 activities.

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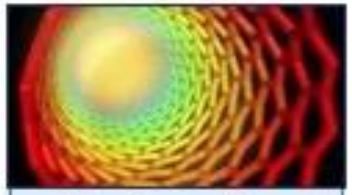
NSF Funds All Fields of S&E

Biological Sciences

Computer & Information Science & Engineering

Education & Human Resources



Engineering

Geosciences (including Polar Programs)

Integrative Activities

International Science and Engineering

Social, Behavioral & Economic Sciences

Mathematical & Physical Sciences

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Ten Big Ideas for Future NSF Investments

RESEARCH IDEAS

Harnessing Data for 21st Century Science and Engineering

Work at the Human-Technology Frontier: Shaping the Future

Navigating the New Arctic

Windows on the Universe: The Era of Multi-messenger Astrophysics

The Quantum Leap: Leading the Next Quantum Revolution

Understanding the Rules of Life: Predicting Phenotype

PROCESS IDEAS

Mid-scale Research Infrastructure

NSF 2026

Growing Convergent Research at NSF

NSF INCLUDES: Enhancing STEM through Diversity and Inclusion

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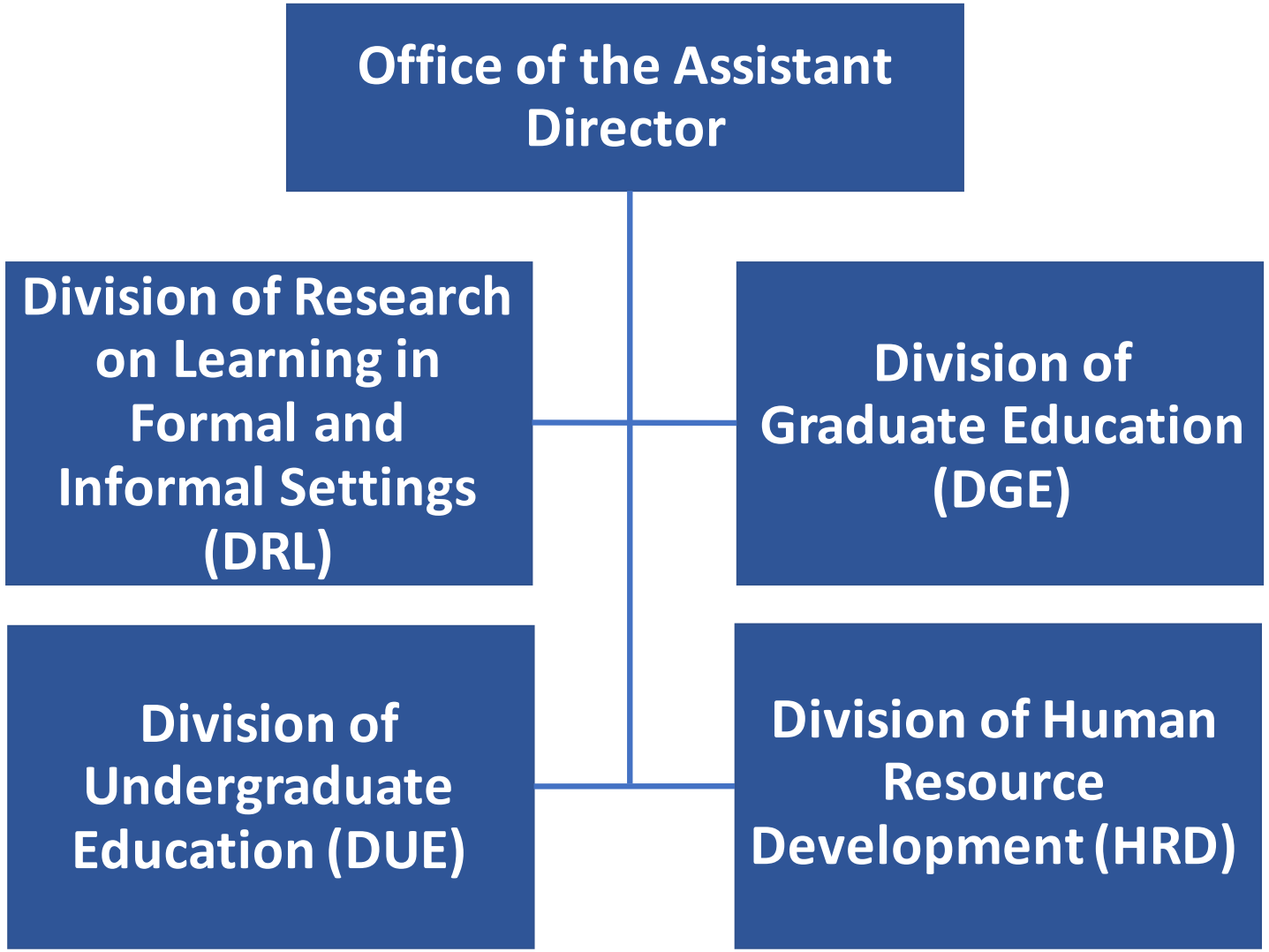

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Division of Human Resource Development (HRD)

- **ADVANCE** (NSF 19-552)
  - Broaden the implementation of evidence-based systemic change strategies that promote equity for STEM2 faculty in academic workplaces and the academic profession
- **Alliances for Graduate Education and the Professoriate** (NSF 16-552)
  - Improve pathways to the professoriate for historically underrepresented minority doctoral students (including those with disabilities), postdoctoral fellows and faculty
- **Centers of Research Excellence in Science and Technology** (NSF 18-509)
  - Enhance the research capabilities of MSIs through the establishment of centers with collaborating partners that integrate education and research
- **HBCU-Undergraduate Program** (NSF 18-522)
  - Evidence-based, innovative models and approaches to nourish improvements in the preparation and STEM workforce career success of HBCU undergraduates
- **Louis Stokes Alliances for Minority Participation** (NSF 17-579)
  - Alliances that implement strategies that result in the graduation of well-prepared, highly-qualified underrepresented students who pursue graduate studies or careers in STEM
- **Tribal Colleges and Universities Program** (NSF 18-546)
  - Awards to Tribal Colleges and Universities, Alaska Native-serving institutions, and Native Hawaiian-serving institutions to promote STEM education and research

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Division of Undergraduate Education (DUE)

- **Advanced Technological Education** (NSF 18-571)
  - Focuses on the education of technicians for the high-technology fields that drive our nation's economy
- **Improving Undergraduate STEM Education: EHR** (NSF 17-590)
  - Improve the effectiveness of undergraduate STEM education, educate students to become leaders and innovators in STEM, and to provide a foundation in scientific literacy for all students
- **Noyce Teacher Scholarship Program** (NSF 17-541)
  - Encourages talented STEM majors and STEM professionals to become K-12 STEM teachers
- **Scholarships in STEM** (NSF 17-527)
  - Institutional scholarship programs for full-time, academically-talented STEM students with demonstrated financial need

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Improving Undergraduate STEM Education: Hispanic-Serving Institutions (HSI Program)

NSF 19-540

Deadline: September 18, 2019

- Website: https://nsf.gov/ehr/HSIProgramPlan.jsp

  FAQs, data from listening sessions, and announcements

- Addresses requirements set by Congress in the Consolidated Appropriations Act, 2017 and the American Innovation and Competitiveness Act, recognizing the need to **build capacity** at HSIs and **increase the retention and graduation rates** of students pursuing associate or baccalaureate degrees in STEM fields at HSIs

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HSI Program Supported Activities

- Projects are expected to be **evidence-based** as well as **generate new knowledge** about how to enhance undergraduate STEM education to increase retention and graduation rates of undergraduate students pursuing degrees in STEM fields at HSIs.

- The HSI Program will support activities that:
  - ✓ improve **STEM learning** and learning environments,
  - ✓ **broaden participation** in STEM,
  - ✓ **build institutional capacity** for STEM learning, and/or
  - ✓ develop the professional **STEM workforce** of tomorrow.

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HSI PROGRAM Tracks

Track 1: Building Capacity

Track 2: HSIs New to NSF

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Track 1: Building Capacity

Priority Area 1: Critical Transitions

Priority Area 2: Innovative Cross-Sector Partnerships

Priority Area 3: Teaching and Learning in STEM

- Proposals should focus on one or more of these priority areas, as appropriate to the project goals.
- The proposal should identify its priority area(s) in both the **overview of the Project Summary** and the **body of the proposal**.

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Track 1: Building Capacity

Priority Area 1: Critical Transitions

- Lower- to upper-division coursework
- Two-year to four-year institutions
- Secondary education to undergraduate education of students enrolled in a STEM undergraduate degree-granting program

- Proposals should include **institutional data** that demonstrates a **need** for the proposed project.
- The proposed project should **identify** and **investigate factors** that affect student success and subsequent graduation.
- Institutional partnerships should have in place or plan to develop **articulation agreements** for the transfer of students from one institution to another that leads to STEM degree attainment.
- Successful **project leadership teams** will typically include STEM administrators and those who specialize in higher education issues and processes.

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Track 1: Building Capacity

Priority Area 2: Innovative Cross-Sector Partnerships

- Develop cross-sector partnerships that lead to increased student engagement in STEM research and learning experiences while also generating knowledge about how cross-sector partnerships contribute to STEM teaching and learning, and workforce development.
- Partners may include industry, government, academic institutions, non-profit organizations, and local communities.
- Projects should prepare students for future STEM careers by increasing access to experiential professional development opportunities.
- Projects may provide opportunities for faculty engagement in interdisciplinary and cross-sector STEM research.
- These projects are also expected to inform best practices for STEM workforce development in higher education.

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Track 1: Building Capacity

Priority Area 3: Teaching and Learning in STEM

- Projects should generate new knowledge about teaching and learning strategies and curricular models that improve undergraduate STEM education for a culturally diverse student population.
- Projects may also create and adapt learning materials and teaching strategies to enhance STEM learning that lead to measurable gains and implementable models.
- Projects enhance understanding of how students learn STEM topics and how faculty adopt culturally relevant instructional approaches in STEM.
- Projects may include investigators (internal or external to the institution) with demonstrated expertise in education research and/or social science research methods, as well as knowledge about STEM programs.

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Eligibility for Track 1: Building Capacity

- An institution can **submit only one proposal**.
  - An institution that is part of a larger system is considered separate for proposal submission purposes if it is geographically separate from the other campus(es) and has its own chief academic officer.
- **Who May Serve as PI:**
  - The Lead Principal Investigator (PI) **must** be employed by the eligible institution submitting the proposal.
  - Co-PIs are **not** restricted to employees of eligible institutions.

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Track 2: HSIs New to NSF

- Build capacity in undergraduate STEM education at HSIs that either have never received NSF funding or have not received funding from NSF in the five years prior to the proposal deadline.
- Stimulate implementation, adaptation, and innovation in one or more of the three priority areas identified in Track 1.
- Projects will develop **evidence-based** innovative models that address retention and graduation rates of students pursuing associate or baccalaureate degrees in STEM.
- Anticipated **new knowledge** to be generated from the project should be described.
- It is expected that some of the funded Track 2 projects will serve as pilots for ideas that may be expanded in future proposals in Track 1 or other NSF programs.

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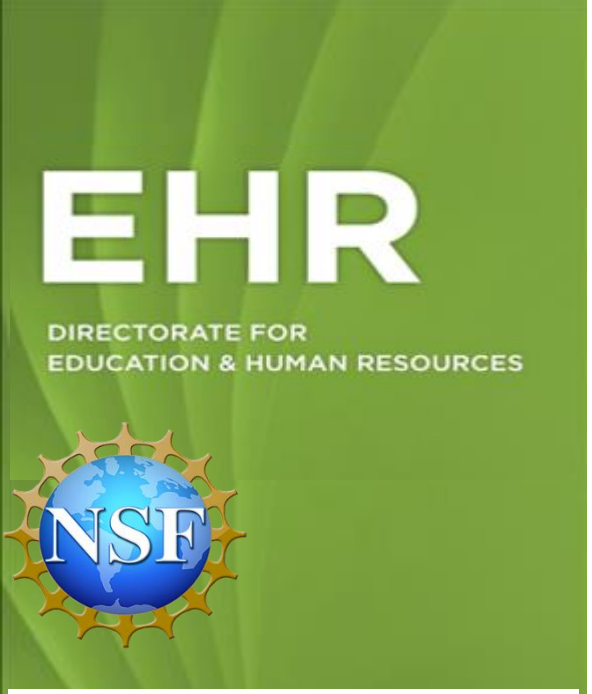
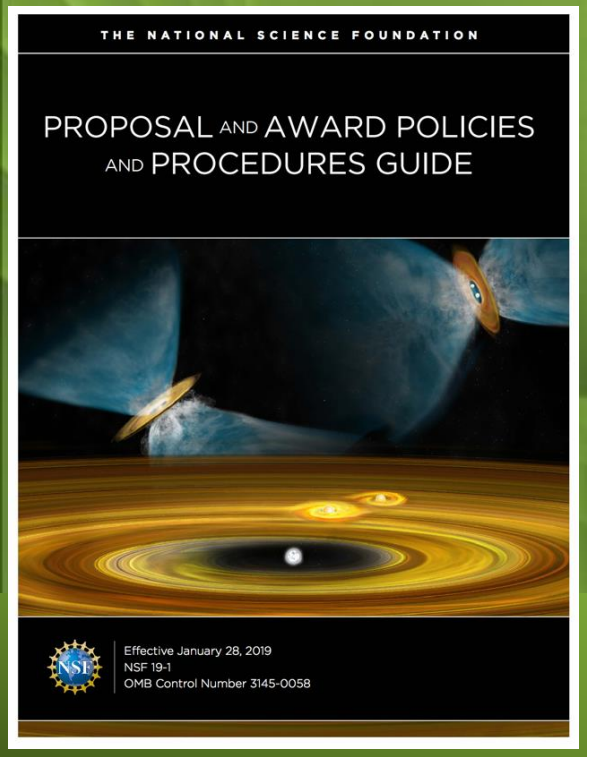
Eligibility for Track 2: HSIs New to NSF

- Proposals will only be accepted from eligible institutions that have never received NSF funding or have **not received funding from NSF** in the **five years prior** to the proposal deadline.
- The Lead Principal investigator (PI) must be employed by the eligible institution submitting the proposal.
- There are no restrictions or limits on the number of proposals per organization.





Conferences

- Proposals for conferences addressing critical challenges in undergraduate STEM education at HSIs may be submitted at any time **following consultation with a program officer**.
- Conference proposals that address increasing the diversity of institutions and faculty participating in the HSI Program are encouraged.
- Proposals may involve collaborations of education researchers and scientists in the STEM disciplines to ensure that undergraduate STEM education addresses the cultural differences of diverse student populations.
- Information about preparing a Conference Proposal is contained in PAPPG Chapter II.E.7.

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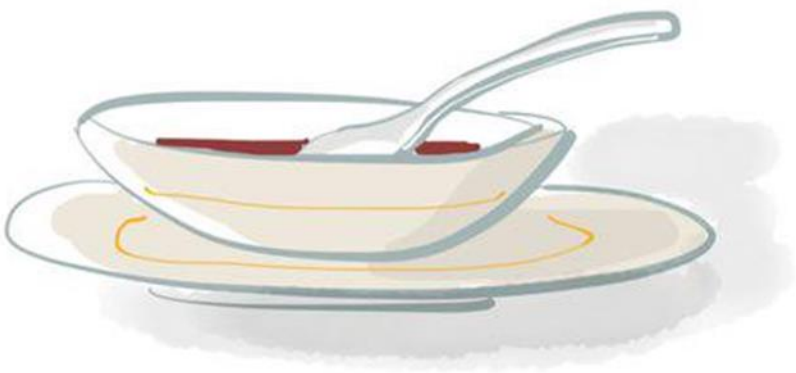
Research versus Evaluation

Soup As Metaphor



- **Research**
  - What happens to the soup's flavor when I use different ingredients?
  - How does the rate of cooling change when I use different bowls?
- **Evaluation**
  - Did I use appropriate procedures to make the soup?
  - Did I adequately consider the possible ingredients I might use?

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Research Design

- The **research design** addresses a research question and/or hypothesis that is important to the project and the field, and is appropriate to the **size** and **scope** of the project.

Project Evaluation: Measures to Assess Success

- The **evaluation pla**n examines all aspects of the project activities to inform the project's progress towards its goals, and is appropriate to the **size** and **scope** of the project.

- **Successful proposals** will have well aligned research questions/hypotheses, methods, analyses, project activities, and project evaluation.

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Award Information

Approximately $15 million is anticipated, pending availability of funds.

Track 1: Building Capacity

- Number of awards: Up to 10 in FY19
- Project length: Up to **five years**
- Award size: Up to **$2,500,000**

Track 2: HSIs New to NSF

- Number of awards: Up to **5** in FY19
- Project length: Up to **three years**
- Award size: Up to **$300,000**

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Need more information?

Contact Steve Turley:
rturley@nsf.gov

BOEING

Dear Colleague Letter: **STEM Workforce Development Utilizing Flexible Personal Learning Environments, NSF 19-025**

- For proposals that support flexible personalized learning to prepare the **STEM workforce** of the future.
- Includes the design, development, implementation, and analysis of **online courses** in model-based engineering, model-based systems engineering, mechatronics, robotics, data science and sensor analytics, program management, and artificial intelligence.
- For new proposals, principal investigators must refer to this DCL in the overview statement of the **Project Summary** and in the **Project Description**.
- The Project Description should also include a brief description about **how** the project supports **flexible personalized learning**, thus complementing the work funded by the **Boeing** gift.

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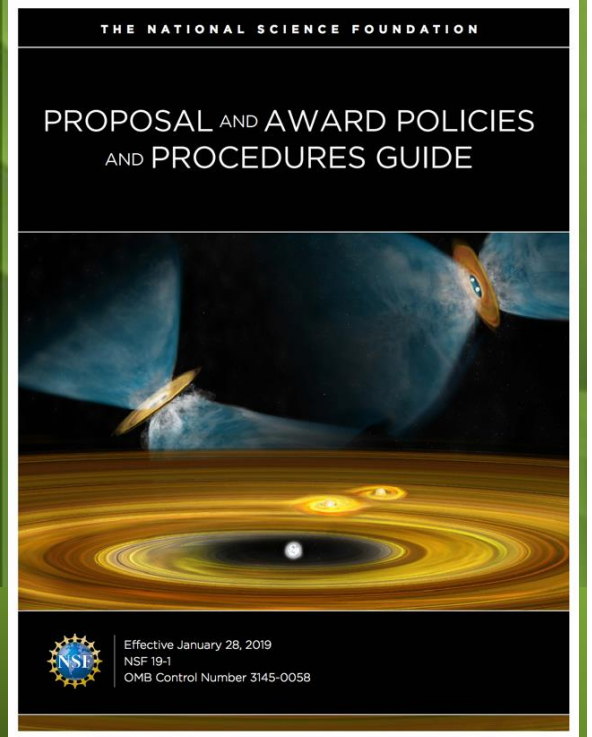

NSF Merit Review Criteria For All Proposals

1. What is the potential for the proposed activity to make a difference?
   - **Intellectual Merit**: By **advancing knowledge and understanding** within its own field or across different fields; and
   - **Broader Impacts**: By **benefitting society** or advancing desired societal outcomes?
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 **qualified** is the individual, team, or institution to conduct the proposed activities?
5. Are there **adequate resources** available to the PI (either at the home institution or through collaborations) to carry out the proposed activities?

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Funding Decisions

- The individual reviews and panel summary provide:
  - Review of the proposal
  - Feedback (strengths and weaknesses) to the proposers **anonymously**
- NSF Program Officers make funding recommendations guided by program goals and portfolio considerations.
- NSF Division Directors either concur or reject the Program Officer's funding recommendations.
- NSF's grants and agreements officers make the official award - as longs as:
  - The institution has an adequate grant management capacity.
  - The PI/CO-PIs do not have overdue annual or final reports.
  - There are no other outstanding issues with the institution or PI.

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Proposal Development Strategies

Key Questions for PIs

- Have you identified the needs the project will address?
- What has already been done?
- Have you obtained preliminary data?
- What do you intend to do?
- Why is the work important or unique?

What Do You Need Besides $?

- Prepare to do the project
  - Realistically assess needs
  - Do you have the right team?
  - Determine available resources
  - Present to colleagues/ mentors/ students

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Proposal Development Strategies

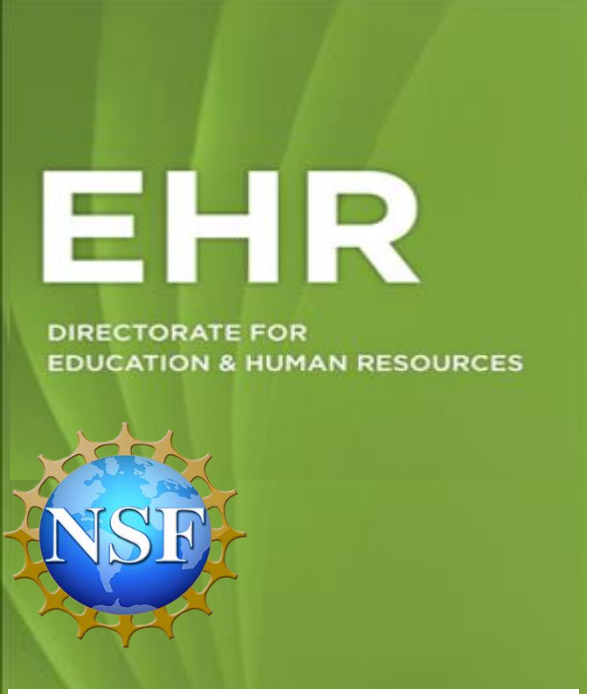
Who Should You Talk To?

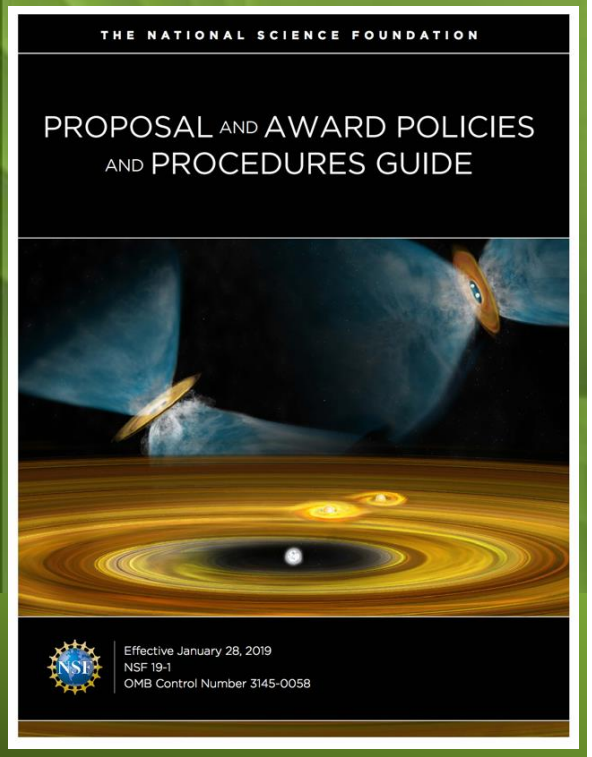
NSF Program Officer

- Your proposed project
- Clarifications on specific program requirements/limitations
- Current program patterns

Your Organization's Sponsored Projects Office

- University guidelines for applications
- Institutional Review Board "IRB" Approvals
    - e.g. institutional Animal Care and Use Committee (IACUC) approvals





2. Sections of the Proposal

p. 42, PAPPG 19-1

The sections described below represent the body of a research proposal submitted to NSF. Failure to submit the required sections will result in the proposal not being accepted[12], or being returned without review. See Chapter IV.B for additional information.

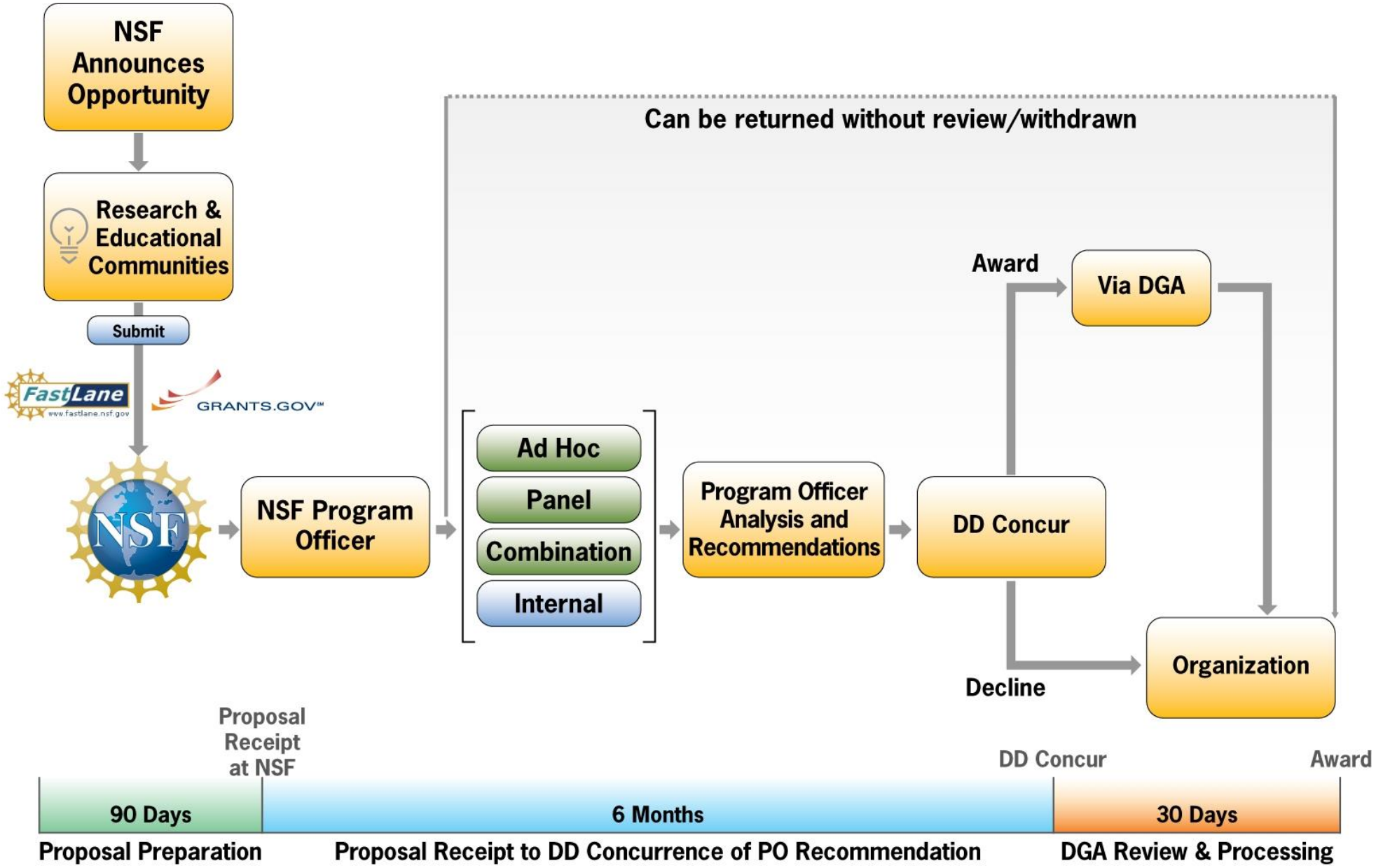
A full research proposal must contain the following sections[13]. Note that the *NSF Grants.gov Application Guide* may use different naming conventions, and sections may appear in a different order than in FastLane, however, the content is the same:

a. Cover Sheet
b. Project Summary
c. Table of Contents
d. Project Description
e. References Cited
f. Biographical Sketch(es)
g. Budget and Budget Justification
h. Current and Pending Support
i. Facilities, Equipment and Other Resources
j. Special Information and Supplementary Documentation
   - Data Management Plan
   - Postdoctoral Mentoring Plan (if applicable)
k. Single Copy Documents
   - Collaborators & Other Affiliations Information

The proposal preparation instructions for RAPID, EAGER, RAISE, GOALI, Ideas Lab, FASED, conference, equipment, travel, center, research infrastructure, and fellowship proposal types may deviate from the above content requirements.

All proposals to NSF will be reviewed using the two NSB-approved merit review criteria described in greater length in Chapter III.

Proposal Review and Processing



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HSI Program Officers

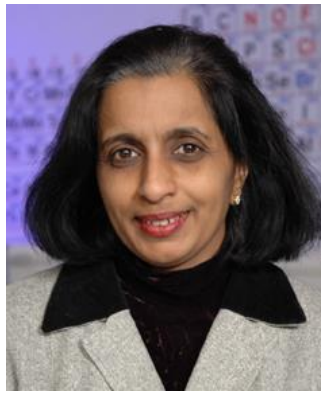
Minerva Cordero, HRD, co-Lead

Talitha Washington, DUE, co-Lead

Ellen Carpenter, DUE

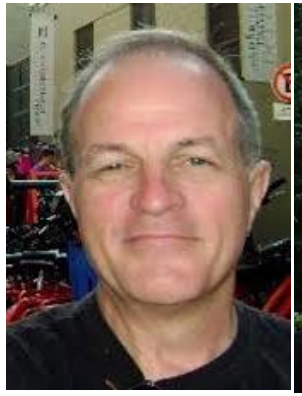
Tom Higgins, DUE

Karen Keene, DUE



Pushpa Ramakrishna, DUE

Dawn Rickey, DUE



Bob Russell, DRL

Victor Santiago, HRD

M. Alejandra Sorto, DRL

R. Steve Turley, DUE

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HACU Intern: Diana Hernandez

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Questions?

Minerva Cordero 703-292-7377
mcordero@nsf.gov

Talitha Washington 703-292-4640
twashing@nsf.gov

Be a reviewer

For general inquiries, contact: NSF-EHR-HSI@nsf.gov

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hsistemhub.org