

NSF HBCU-UP 2018 PLANNING GUIDE

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Founded in 2003, Hanover has over 300 employees, including a high-caliber staff of researchers, survey experts, analysts, statisticians, and grant professionals. Hanover provides grant development and strategic advising support to education and healthcare organizations. Our grants professionals deliver customized proposal review, revision, and production support, while also helping to align their needs and strategic priorities to funding trends and federal, state, and foundation grant opportunities.

The Historically Black Colleges and Universities Undergraduate Program (HBCU-UP) is committed to enhancing the quality of undergraduate STEM education and research at HBCUs as a means to broaden participation in the nation's STEM workforce. To this end, HBCU-UP provides awards to develop, implement, and study evidence-based innovative models and approaches for improving the preparation and success of HBCU undergraduate students so that they may pursue STEM graduate programs and/or careers. Historically Black Colleges and Universities (HBCUs) that are accredited and offer undergraduate educational degree programs in science, technology, engineering and mathematics (STEM).

PROGRAM TRACKS INFORMATION

HBCU-UP offers funding pursuant to the following programmatic tracks:

1. HBCU Excellence in Research (EiR) supports projects that enable STEM and STEM education faculty to further develop research capacity at HBCUs and to conduct research. Generally, projects of up to three years to perform research in STEM disciplines supported by NSF. ***Prospective PIs are encouraged to contact the cognizant program officer from OIA for further information.*** HBCU Excellence in Research Projects provide support for STEM faculty at HBCUs in two ways:

- ***Collaborative research projects*** that are expected to build and support the development of research capacity at HBCUs. Budget items may include, but are not limited to: release time to enable faculty members to conduct research; visits by faculty members to laboratories at other institutions to learn new methods and techniques; support for research and faculty professional development; support for post-doctoral fellows and students; acquisition or upgrading of research equipment; and collaborative research efforts with partner universities, research laboratories, and national laboratories. Supported projects must have a research focus in one of the research areas supported by NSF, and a direct connection to the long-term plans of the host department(s) and the institutional mission. It should be clearly articulated how the project expands institutional research capacity. Proposers are encouraged to establish a research collaboration with one or more additional HBCU partner institutions to work with faculty and to build and expand research capacity.

- **Research projects** to support research by individual PIs. The project should help to further the PI's research, to improve research capacity at the institution, and to involve students in research experiences. Collaborations are encouraged. PIs with no prior research funding or who have held no external research funding in the last three years should consider applying to the Research Initiation Awards track.

2. Targeted Infusion Projects (TIP) provide support to achieve a short-term, well-defined goal for improving the quality of undergraduate STEM education at HBCUs. Projects are for two to three years for targeted short-term, well-defined goals to improve the quality of and make innovations in undergraduate STEM education at HBCUs. Targeted Infusion Projects are expected to build knowledge with respect to STEM education. Projects must describe and make a strong case for how a project advances the knowledge base in STEM education through research, evaluation or a combination of research and evaluation processes. The theoretical and empirical justification for the proposed project must be clearly articulated.

Targeted Infusion Projects could adapt evidence-based learning experiences and pedagogies in STEM fields. Projects could develop creative uses of cyberlearning. Projects could enhance academic infrastructure by updating curricula, modernizing laboratory research equipment, or improving the computational network array supporting research and education. Projects could enhance existing degree programs, establish new degree programs or concentrations, secure specialized accreditation or certification, or infuse STEM programs with disciplinary field advances and evolving workforce requirements. Projects that develop faculty expertise, promote implementation of educational innovations, or focus on the preparation of future K-12 teachers are encouraged. Projects should be guided by research on teaching and learning. HBCUs that currently have a five-year Implementation Project will need to explain how the Targeted Infusion Project differs from the Implementation Project activities and how the HBCU-UP funded projects will be leveraged, integrated, or synergized to produce greater outcomes that could not be achieved separately.

3. Broadening Participation Research (BPR) supports research that seeks to create and study new theory-driven models and innovations related to the participation and success of underrepresented groups in STEM undergraduate education. Projects may be up to three years to investigate topics to impact the recruitment, retention, and success of African Americans in STEM education and the workforce. Broadening Participation Research proposals in STEM Education may investigate behavioral, cognitive, affective, learning and social differences, as well as organizational, institutional or systemic processes that may impact participation and success in STEM education. Successful proposals will be grounded in appropriate theory and incorporate recent innovations and advances in research methodologies, conceptual frameworks, and/or data gathering and analytic techniques. Proposals should reflect relevant advances in quantitative, qualitative, and mixed-methods research and evaluation methodologies and provide a compelling argument about how the proposed methodologies are appropriately matched with the strategic research questions of the project. Additionally, proposals should demonstrate how the methods chosen will result in rigorous, cumulative, reproducible, and usable findings to merit peer-review and publication.

Broadening Participation Research proposals must include PIs with demonstrable expertise in education research and/or social science research methods and knowledge about STEM programs at HBCUs. Proposers are encouraged to establish collaborations to strengthen the research project and describe in

the proposal the nature of the collaboration and the anticipated benefits. As appropriate, proposals should describe mechanisms to transfer findings into educational practice for use by other researchers and policymakers.

4. Research Initiation Awards (RIA) provide support for STEM faculty with no prior or recent research funding to pursue research at the home institution, a NSF-funded research center, a research intensive institution, or a national laboratory. Projects may be up to three years to perform scientific research. Research Initiation Awards provide support for a STEM faculty member at the HBCU to pursue research at either the home institution, an NSF-funded Center, a research intensive institution, or at a national laboratory. The project description should contain all of the elements of a standard NSF research proposal. The project should further the faculty member's research capability and effectiveness, improve research and teaching at the home institution, and involve undergraduate students in research experiences. Research Initiation Awards are for faculty who are starting to build or are rebuilding a research program. ***Faculty members who hold or have held an external research award within the last three years are not eligible for the Research Initiation Award.***

5. Implementation Projects (IMP) provide support to design, implement, study, and assess comprehensive institutional efforts for increasing the number of students receiving undergraduate degrees in STEM and enhancing the quality of their preparation by strengthening STEM education and research. Within this track, **Achieving Competitive Excellence (ACE) Implementation Projects** are intended for HBCUs with exemplary achievements and established institutionalized foundations from previous Implementation Project grants. Projects may be up to five years to advance institution-wide, undergraduate STEM education and research in two areas:

- **Implementation Projects** provide support to design, implement, study, and assess comprehensive institutional efforts to increase the numbers of students pursuing STEM degrees and the quality of their preparation. Five-year, institution-wide, sustainable and potentially transformative projects will advance STEM education and research. Implementation projects should create and/or adapt and assess evidence-based models and materials for teaching and learning in STEM, embody knowledge about how students learn most effectively in STEM teaching and learning activities, and bring STEM disciplinary advances into the undergraduate experience. Proposers are encouraged to analyze the strengths and potential of the institution in STEM. Transferability and dissemination of successful models, effective methods, and innovative materials for educating undergraduate STEM students are critical aspects of implementation projects. The implementation design should apply research-based practices to produce significant improvements in undergraduate STEM education and research programs at the institution.

If an institution has previously received an Implementation Project grant, the proposal for another Implementation Project must provide complete information on the outcomes and impact of the previous HBCU-UP project, including a description of what was learned from the previous activities, how these findings were disseminated to the broader community, and how successful activities are being sustained at the institution. The new proposal should be based on a thorough evaluation of the previous HBCU-UP project and an assessment of the current state of the institution so that a new project can build on progress and achievements and identify new innovations undertaken to move the institution into the next level of STEM program competitiveness. The proposal should include a component that outlines a strategy for the

creative integration of NSF-funded awards at the institution that are related to the proposed project's goals and scope. Proposals for a second round or subsequent Implementation Project must include a research project that is linked to the proposed interventions and strategies to formally study such strategies in the particular setting of the HBCU. Projects may offer a postdoctoral research fellowship to a social science or educational researcher to provide opportunities early in his or her career and to work with this research project.

- The **ACE Implementation Project** track is intended for HBCU recipients of previous Implementation Project grants. Institutions that have had previous Implementation Project grants should be able to exhibit an established foundation and to provide evidence of institutionalized achievements toward the HBCU-UP goals and objectives. The goal of the ACE program is to help institutions to bolster their capacity and move onto the national landscape in undergraduate STEM education and research. ACE projects are ambitious, potentially transformative proposals that have the promise of significant advances in STEM undergraduate education at the institution. Possible approaches might include: establishing new collaborations and alliances with public and private research institutions, centers, and national laboratories; providing access to tomorrow's science through computationally intensive tools and global networks; establishing international collaborations to enhance undergraduate student and faculty research; or increasing fiscal resources for frontier STEM education and research through innovative institutional integration, leveraging partnerships, and strong linkages with business and industry. Institutions submitting an ACE Implementation Project must include a component that outlines a strategy for the creative integration of NSF-funded awards at the institution that are related to the proposed project's goals and scope, and that describes how the institution thinks strategically about moving forward in STEM education and research. ACE Implementation Projects must include a research project that is linked to the proposed approaches and interventions to formally study such approaches in the particular setting of the HBCU. Projects may offer a postdoctoral research fellowship to a social science or educational researcher to provide opportunities early in his or her career and to work with this research project.

6. Broadening Participation Research Centers (BPRC) provide support to conduct broadening participation research at institutions that have held three rounds of Implementation or ACE Implementation Projects and with demonstrated capability to conduct broadening participation research. Five-year projects that build the intellectual infrastructure to facilitate the creation, integration, and transfer of new knowledge in broadening participation research. Broadening Participation Research Centers are expected to represent the collective intelligence of HBCU STEM higher education, and serve as national hubs for the rigorous study and broad dissemination of the critical pedagogies and culturally sensitive interventions that contribute to the success of HBCUs in educating African American STEM undergraduates. Centers are expected to conduct research on STEM education and broadening participation in STEM; perform outreach to HBCUs in order to build capacity for conducting this type of research; and work to disseminate promising broadening participation research in order to enhance STEM education and research outcomes for African American undergraduates across the country.

Institutions that have been awarded three previous Implementation or ACE Implementation Projects are eligible to be the lead institution to submit a proposal for a Broadening Participation Research Center (BPRC). BPRCs conduct research through partnerships as appropriate. BPRCs are expected to establish a culture in broadening participation research that will add to the research knowledge base and enhance

understanding of the barriers that hinder and factors that enhance our ability to broaden participation in STEM. The results of these efforts will inform approaches to increase the access and involvement of underrepresented groups in STEM and to strengthen our national STEM capabilities and competitive advantage. NSF expects BPRCs to demonstrate leadership in the involvement of groups traditionally underrepresented in STEM at all levels, including students, postdoctoral researchers and faculty. Centers will offer the HBCU community a venue for interaction and an effective mechanism to undertake long-term integrated research and education activities focusing on broadening participation research. Centers will also develop approaches to ensure the transfer of knowledge of research and education advances. BPRC partner institutions work together with the lead institution as an integrated whole to achieve the shared research, education, outreach, and knowledge-transfer goals of the Center.

Other Funding Available. HBCU-UP also funds conferences; EARly-concept Grants for Exploratory Research (EAGER); grants for Rapid Response Research (RAPID); and grant supplements for existing awards. Such proposals may be submitted, as described in the [NSF Proposal & Award Policies & Procedures Guide \(PAPPG\)](#):

- For conferences, see PAPPG, II.E.7
- For Early-concept Grants for Exploratory Research (EAGER), see PAPPG II.E.2.
- For grants for Rapid Response Research (RAPID), see PAPPG, II.E.1.

HBCU-UP funds planning grants of twelve to eighteen months to undertake an institutional STEM program self-analysis in preparation for submitting an Implementation Project, a Broadening Participation Research Center Project, or a proposal that focuses on establishing a new department. Planning grants are also accepted from institutions that want to undertake an analysis in preparation for submitting a center grant or institutional transformation grant to other NSF divisions for studying institutional preparedness and setting up the needed collaborations among stakeholders. Planning grants are submitted as unsolicited proposals. ***Pls are advised to discuss the planning grant proposal with a program director before submission.***

OTHER PROGRAM INFORMATION – 2018

Proposal Due Dates 2018

HBCU-UP Mechanism	Letter of Intent	Pre-Proposal	Full Proposal
EiR	Jan. 16, July 24	N/A	March 1, Oct. 2
TIP	Sept. 4	N/A	Nov. 27
BPR	Sept. 4	N/A	Nov. 27
RIA	July 24	N/A	Oct. 2
IMP/ACE	Sept. 4	N/A	Nov. 27
BPRC	N/A	March 19	Nov. 19

Funding Information 2018

Approximately \$28 million, pending availability of funds, for new awards in FY 2018 for Targeted Infusion Projects, Broadening Participation Research Projects, Implementation Projects, ACE Implementation Projects, Research Initiation Awards, Broadening Participation Research Center, and unsolicited proposals. The EiR program will have \$20 million available in FY 2018.

HBCU-UP Mechanism	Awards Anticipated	PI Requirements*
EiR	10 research capacity building; 20 individual investigator	Faculty member in a STEM or STEM education discipline at the HBCU from which the proposal is submitted.
TIP	20	Must be the individual who will direct the implementation of the project activities.
BPR	6	Must be responsible for managing the project and must be one of the key researchers. At least one of the Principal Investigators must have experience in education or social science research.
RIA	22	Must be a faculty member in a STEM or STEM education discipline at the HBCU. Co-Principal Investigators and senior personnel are not permitted.
IMP/ACE	7 IMP; 2 ACE	Must be the key personnel that will be responsible for guiding the implementation of the project or Center.
BPRC	1	

* PIs/Co-PIs are limited to a submission of only two (2) proposals.

Budget Information. Inclusion of voluntary committed cost sharing is prohibited. All proposals should budget for the PI to attend a one to two day grantee meeting in the Washington, DC area every year of the project. PIs who include a postdoctoral fellow for second, third or fourth round Implementation Projects or for ACE Implementation Projects may add the salary and fringe benefits, as well as an annual travel allowance of \$2,000, for the postdoctoral fellow to the maximum allowed award size.

Financial support may be provided to student participants under HBCU-UP projects. However, financial support may only be provided to students who are U.S. citizens, nationals, or permanent residents. Student support should be included on the "Stipends" line under the "Participant Support Costs" section of the budget. Stipends to undergraduate students should not replace other need based grants and scholarships already awarded to the students.

Equipment Information. HBCU-UP awards include the following equipment restrictions:

- Broadening Participation Research Projects - Broadening Participation Research Projects are not intended to support implementation activities; therefore, major equipment is not normally included. However, minimal equipment costs are allowed if required to perform the research activities.
- Research Initiation Awards - Equipment cost cannot exceed 20% of the total budget.
- Implementation Projects and ACE Implementation Projects - Equipment costs cannot exceed 30% of the total NSF budget requested.

Institutional Proposal Limits.

- There is no limit on the number of **Excellence in Research** proposals that may be submitted by an eligible institution.
- An eligible institution can submit only one **Implementation Project** or **ACE Implementation**

Project proposal per year. An institution may have only one active Implementation Project or ACE Implementation Project award. However, a new proposal can be submitted by an institution with an active project if that project is due to expire before new awards will be made. Also, an institution can be awarded, at most, three Implementation Projects and one ACE Implementation Project over time.

- An eligible institution can submit only one **Broadening Participation Research Center** proposal and can have only one active center. The lead institution of the center proposal must have been awarded three rounds of an Implementation or ACE Implementation Project and must demonstrate the capacity to conduct broadening participation research.
- An eligible institution can submit no more than two **Broadening Participation Research** proposals per year.
- An eligible institution can submit no more than two **Targeted Infusion Project** proposals per year and can only have one active Targeted Infusion Project for any given department or unit.
- An eligible institution can submit no more than two **Research Initiation Award** proposals per year.

LETTER OF INTENT COMPONENTS AND PROCESS

Letters of intent are required for HBCU-UP submissions, except Broadening Participation Research Centers. All letters of intent must be submitted via FastLane. A separate letter of intent is requested for each application for Excellence in Research, Targeted Infusion Project, Broadening Participation Research Project, Research Initiation Award or Implementation/ACE Implementation Project proposal that will be submitted from an eligible institution. Letters of Intent are not required for BPRC proposals. Submission by an Authorized Organizational Representative (AOR) is required. A Minimum of 1 and Maximum of 4 Other Senior Project Personnel are permitted. An institution may submit multiple Letters of Intent. The Letter of Intent should include the following information:

- The type of proposal that will be submitted (Research Initiation Award)
- The project title
- The PI name and Co-PI names, department, institution, phone, fax and email, and the PI listed as point of contact. The PI should be listed as the point of contact. Research Initiation Award letters of intent should list only the PI under Senior Project Personnel
- The submitting institution name
- A project synopsis (no more than 500 words) that describes the proposed research and/or implementation activities

PRELIMINARY PROPOSAL COMPONENTS AND PROCESS

A preliminary proposal is required only for **Broadening Participation Research Center** proposals via [NSF FastLane](#). Submission of a preliminary proposal is required to be eligible for invitation for a full BPRC proposal. Preliminary BPRC proposals must contain the items listed below and adhere strictly to the specified page limitations. No additional information may be provided as an appendix or by links to web pages. Figures and tables must be included within the applicable page limit. Preliminary proposals that are not compliant with the guidelines may be returned without review, thus making the proposing team automatically ineligible for submitting a full BPRC proposal. The preliminary proposal should consist of the

following elements:

- Project Summary (1 page maximum): Provide an overview of the proposed Center, addressing separately the intellectual merit and broader impacts.
- Project Description (8 pages maximum): The Project Description should articulate a vision for the proposed Center that clearly outlines the challenges being addressed. The proposed research should be sufficiently complex and long-term to justify a Center and flexible enough to permit change as the research proceeds. In addition to an outline of research themes, some illustrative examples of specific research directions with sufficient detail to be evaluated by reviewers should be included. The Project Description must describe how the integration of research, education, outreach, and knowledge transfer in a Center-level activity will advance the proposed research in a way that other funding mechanisms cannot. A description of the team members and why each is essential to the project plan should be included (must not be more than 2 of the 8 pages). Results from Prior NSF Support should not be included.
- References Cited (2-page limit): See NSF PAPPG instructions for format.
- Biographical Sketches (2-page limit per person): Biographical Sketches are required for the PI and co-PIs only.
- Supplementary Documents (to be entered in the Supplementary Documents section of FastLane):
 - a) List all project personnel who have a role in the management, research, education, outreach, and knowledge transfer components of the Center. Provide the last name, first name, and institution/organization.
 - b) Include a one-page table indicating an estimate of funds that will be allocated to each participating institution broken down by category, i.e., research, education, outreach, and knowledge transfer.
- Collaborators & Other Affiliations (COA) information specified in the PAPPG should be submitted using the instructions and spreadsheet template found on the Collaborators and Other Affiliations Information [website](#). Please note that proposers using the COA template for more than 10 senior project personnel will encounter proposal print preview issues.

FULL PROPOSAL COMPONENTS AND PROCESS

The application can be submitted online either via the [Grants.gov](#) or [NSF FastLane](#) system. Note that there are significant functional benefits to using NSF's FastLane and that *Hanover strongly recommends that all PIs and applicants submit using the FastLane system.*¹ General NSF formatting requirements are 1" margins, single spaced (no more than 6 lines per inch) using Arial, Courier New, or Palatino Linotype at a font size of 10 points or larger; Times New Roman at a font size of 11 points or larger; or Computer Modern family of fonts at a font size of 11 points or larger. NSF's [Proposal and Award Policies and Procedures Guide \(NSF 18-1\) \(PAPPG\)](#) provides specific guidance for proposal content and formatting requirements. In addition to the PAPPG, the [2018 HBCU-UP funding announcement](#) contains additional instructions that take precedence for applications to this program.

COVER SHEET - Begin the project title with appropriate HBCU-UP program track title (i.e. "Excellence in Research").

¹ Although submission via Grants.gov is allowed, we strongly recommend that HBCU-UP applicants only use FastLane to avoid some of the reviewer biases displayed against Grants.gov users in the past.

PROJECT SUMMARY – 1 page limit. The Project Summary consists of an overview, a statement on the intellectual merit of the proposed activity, and a statement on the broader impacts of the proposed activity. The overview includes a description of the activity that would result if the proposal were funded and a statement of objectives and methods to be employed. The statement on intellectual merit should describe the potential of the proposed activity to advance knowledge. The statement on broader impacts should describe the potential of the proposed activity to benefit society and contribute to the achievement of specific, desired societal outcomes. The Project Summary should be written in the third person, informative to other persons working in the same or related fields, and, insofar as possible, understandable to a scientifically or technically literate lay reader. It should not be an abstract of the proposal. ***Proposals that do not contain the Project Summary, including an overview and separate statements on intellectual merit and broader impacts will not be accepted by FastLane or will be returned without review.***

PROJECT DESCRIPTION - 15 page limit. The Project Description must contain, as a separate section within the narrative, sections labeled "Intellectual Merit" and "Broader Impacts". These sections should further describe the intellectual merit and the broader impacts of the proposed work. Per the guidance in the PAPPG, results from prior NSF support must be provided for PIs and co-PIs who have received NSF support, including an award with an end date in the past five years. Results related to Intellectual Merit and Broader Impacts are described under two separate, distinct headlines.

REFERENCES CITED - Provide the references cited in the proposal.

BIOGRAPHICAL SKETCHES - Outline the experiences of the PI and co-PIs (two-page limit each person) using the PAPPG guidelines.

BUDGET FORM AND JUSTIFICATION DOCUMENTS

CURRENT AND PENDING SUPPORT- Use the formats provided in FastLane. Enter this proposal as pending support.

FACILITIES, EQUIPMENT & OTHER RESOURCES - Provide a description of available facilities and priorities for their use, if applicable. Please note that this section is a required part of the proposal. If not applicable, the proposer should enter "Not applicable" in the Facilities, Equipment, and Other Resources section of the proposal. Collaborators & Other Affiliations (COA) information specified in the PAPPG should be submitted using the instructions and spreadsheet template found on the Collaborators and Other Affiliations Information [website](#).

SUPPLEMENTARY DOCUMENTS

- **DATA MANAGEMENT PLAN** - Must be included as a supplementary document and should describe how the proposal will conform to NSF policy on the dissemination and sharing of research results. The plan should be commensurate with the scope and size of the proposal. Information can be found at <https://www.nsf.gov/bfa/dias/policy/dmp.jsp>.
- **POSTDOCTORAL RESEARCHER MENTORING PLAN** - Must be included as a supplementary document if funding to support a postdoctoral researcher is requested.

- **STUDENT MENTORING PLAN** - HBCU-UP requires that proposals requesting funding to support students must include, as a supplementary document, a description of the mentoring activities that will be provided for such individuals. Mentoring plans for undergraduate students should be separate and different from mentoring plans for any graduate students that are involved in the project. Mentoring plans should not only speak to research mentoring for the students, but how the PIs will mentor and work with the students to achieve the next level in their scholastic or professional careers.

5. ADDITIONAL GUIDELINES PER HBCU-UP PROGRAM TRACK

1A. Excellence in Research capacity building projects. The project description should include the following information:

- A section on how the project is aligned with the mission of the institutions and long-term goals of the department(s) in building the research capacity and increasing the number of students in STEM at the undergraduate and/or graduate level.
- State the goals and include objectives that are measurable and achievable within the proposed timeframe. Indicate how the proposed project will contribute to increasing the research capacity of the institution.
- Provide an outline of the proposed research plan, including the research questions or hypotheses, the broad design of activities to be undertaken, and, where appropriate, a description of experimental methods and procedures. Investigators should address what they want to do, why they want to do it, how they plan to do it, how they will know if they succeed, and what benefits could accrue if the project is successful.
- Address institutional support for and sustainability of the project.
- Outline a strategy for the integration of the research with educational activities. A plan for scholarly dissemination and a plan for assessment of the activities must be included in the project description.
- A description and explanation of any proposed partnerships with other universities and/ or national laboratories. This requirement applies especially to the collaboration with other HBCU partners, which could be an HBCU community college or a smaller HBCU.
- Letters of collaboration that describe the partnership in some detail are allowed for Excellence in Research proposals. A letter from the department chair, dean or chief academic officer. This letter should explain the institutional commitment to enabling the PIs to carry out this project.

1B. Excellence in Research individual investigator projects. The Project Description should provide a detailed statement of the proposed research to be undertaken. It should contain the following:

- A brief description of the PI's overall research goals.
- An outline of the general plan of work, including the research questions or hypotheses, the broad design of activities to be undertaken, and, where appropriate, a description of experimental methods and procedures. Proposers should address what they want to do, why they want to do it, how they plan to do it, how they will know if they succeed, and what benefits could accrue if the project is successful. The project activities must be well justified.
- A brief discussion of how students will be involved in this research.
- A plan for scholarly dissemination of this research.
- A plan for how the progress of the research will be assessed.

- A letter from the department chair, dean or chief academic officer, explaining the institutional commitment to supporting the PI's ability to carry out this project.

2. Targeted Infusion Projects. The project description should include the following information:

- Background and Context
- Describe the overall goals and objectives of the project. The objectives must be clearly stated, measurable, and achievable within the proposed time line.
- Describe the benefits of achieving the goal to STEM education and research at the institution.
- Include baseline data to provide the context for the impact of the Targeted Infusion Project.
- Provide information on the extent to which evidence-based instructional practices in the department(s) involved in the proposed project are used. Be specific as to what these practices are, in what departments and specific courses they are employed, and how many students are typically enrolled in these courses.

Proposed Activities

- Describe the specific activities that will be undertaken in order to achieve the goals and objectives
- Describe and make a strong case for how the project advances knowledge in STEM education through research, evaluation, or a combination of research and evaluation processes. The theoretical and empirical justification for the proposed project must be clearly articulated.
- Since institutions have different policies and procedures, such as for new degree program approval, explain how the project timeline reflects all institutional requirements. If appropriate, include evidence (such as letters of support) that indicate that institutionally required procedures are being followed and preliminary approvals have been secured.

Equipment and supplies

- Explain how recurring costs, such as lab supplies for a newly created laboratory course or recurring software license/maintenance fees, will be supported after the project ends.
- Quotes or estimates for major equipment purchases should be included in the supplementary documents section.
- Explain how long-term maintenance of new equipment will be supported after the project ends.

Dissemination

- Describe plans to communicate the knowledge gained (including the results and outcomes of the project) to other professionals in STEM education and research, both during and after the project.
- Describe the information to be disseminated, the means of dissemination, and the procedures for determining the success of the dissemination effort.

Project Management

- Provide a management plan for the project that will ensure that the activities and the required reporting will be implemented on time and within budget.
- Provide a timeline for the activities to be implemented - include measurable objectives and outcomes, and the staff that are responsible for carrying out the activities.

Project Evaluation

- The evaluation plan should refer to the objectives, goals and baseline data presented within the

description of the proposed Targeted Infusion Project activities.

- The formative evaluation should include benchmarks and indicators of progress to assess the Targeted Infusion Project.
- The summative evaluation should assess whether the Targeted Infusion Project achieved the overall goals, as well as identify any unexpected results.
- The evaluator should be someone external to the project.

3. Broadening Participation Research Projects. The project description should include the following information:

- Background and Context
- Describe the research question(s) to be investigated and explain the significance and importance of answering the proposed research question(s).
- Discuss the base of research/theory that motivates the question(s).
- Explain how the project will contribute to the knowledge base of broadening participation research and how it has the potential to be replicated at other HBCUs, and other institutions seeking to increase the success of underrepresented students in STEM.

Proposed Research Activities

- Describe the research plan (design, data collection, data analysis, etc.) that will be undertaken to answer the research question(s).
- A study of a promising intervention and effectiveness studies are permitted.
- In general, implementation activities are not recommended under Broadening Participation Research Projects. In some cases, implementation activities may be appropriate, but these activities must clearly be required in order to answer the proposed research question(s) and must be significantly different from implementation activities undertaken in other projects. If implementation activities are included, clearly explain why the activities are needed to answer the research question(s).
- Address the validity and reliability of new or previously validated survey instruments.
- Provide a timeline for the research plan - include measurable objectives and outcomes and identify who will be responsible for completing each task.

Dissemination

- Describe detailed plans to communicate the results and outcomes of the project to other professionals in STEM education and research and the higher education community, both during and after the project.
- Describe the information to be disseminated, the means of dissemination, and the procedures for determining the success of the dissemination effort.

Project Management

- Provide a management plan for the project that will ensure that the activities and the required reporting will be implemented on time and within budget.
- At least one of the PIs on the project must have formal training or significant professional experience in education or social science research.

Project Evaluation

- It is expected that each Broadening Participation Research proposal will include an evaluation plan that includes benchmarks and quantitative and qualitative indicators of progress for the research project.
- The plan should address the assessment of project outcomes and contributions to the research knowledge base and/or educational practice.
- The evaluator should be someone external to the project.

4. Research Initiation Awards. It is the responsibility of the PI to find a research collaborator at the home institution; a NSF-funded research center, such as a Center for Research Excellence in Science and Technology, Engineering Research Center, Materials Research Science and Engineering Center, Physics Frontier Center, Science and Technology Center, or Science of Learning Center; at a national laboratory; or with a research group at a research university. The PI could conduct research during the summer months at the research collaborator's site (if it is not the home institution) and make arrangements for continuing the research during the academic year at his or her home institution. Support can be provided for release time during the academic year, summer salary for the PI, travel and housing at the research site for the PI and undergraduate students, and stipends for undergraduate student research experiences. Research Initiation Awards are for faculty who are starting to build a research program. Faculty members who hold or have held an external research award within the last three years are not eligible for the Research Initiation Award. The Project Description should provide a detailed statement of the proposed research to be undertaken, including:

- A brief description of the PI's overall research and education goals.
- A clear outline of the general plan of work, including the research questions or hypotheses, the broad design of activities to be undertaken, and, where appropriate, a clear description of experimental methods and procedures. Proposers should address what they want to do, why they want to do it, how they plan to do it, how they will know if they succeed, and what benefits could accrue if the project is successful. The project activities may be based on previously established and/or innovative methods and approaches, but in either case must be well justified.
- The relationship of the proposed activities to the PI's projected longer term research goals.
- A discussion of how those activities will benefit the research capacity at the institution.
- A discussion of how undergraduate students will be involved in this research.
- A plan for dissemination of this research.
- A plan for how the progress of the research will be assessed.

Special Information and Supplementary Documentation

- A letter of commitment from the PI's Department Chair or Dean stating that the PI will have institutional support in terms of allowance for release time, travel for research purposes, and access to existing research facilities.
- A mentoring plan for the PI from the Department Chair, Dean, or a senior faculty member. Note: if the letter of commitment and the mentoring plan are written by the same person, one document can be submitted.
- A letter of collaboration and mentoring plan from the PI's research collaborator.
- A mentoring plan from the PI for the undergraduate students that are involved in the project and the graduate students that may be involved in the project.

5A. Implementation Projects and 5B. ACE Implementation Projects. For both 5A) and 5B), the project

description should include the following elements:

- Background and Context:
- State the problem(s) to be addressed.
- Articulate current knowledge of the problem(s) and some of the causes as understood from documented sources.
- Provide information on the institution's current STEM education and research capability (baseline data). Examples of information and data include a description of STEM degree programs, student enrollment, retention, graduation rates, number of students going to graduate schools, gatekeeper course performance, STEM faculty demographics, and STEM infrastructure resources at the institution and collaborating organizations.
- Provide information on the extent and use of evidence-based instructional practices in STEM degree programs at the institution. Be specific as to what these practices are, in what departments and specific courses they are employed, and how many students are typically enrolled in these courses.
- Describe prior efforts and results of those efforts. Provide information on STEM-related programs that have been implemented or are currently active. This should include previous HBCU-UP awards and awards from other NSF programs, other federal programs, state programs, and institution programs. Explain the outcomes from these efforts. Institutions that have received an HBCU-UP Planning Grant must describe the planning grant activities and the findings of those activities.
- Identify the areas that have not been understood, determined, verified, tested, or resolved by previous efforts.
- Highlight some of the areas that need improvement and that will be addressed with the proposed project activities.

Goals and Objectives

- Clearly state the goals and objectives of the project.
- Describe the information and knowledge that will be obtained from the project.
- Describe the expected results and student outcomes.
- Explain the expected significance of the project and the compatibility with the mission and environment of the institution.

Detailed Project Plan

- Describe the research-based or evidence-based practices selected for implementation and why and how they could improve undergraduate STEM education at the institution and under the present setting and conditions.
- As necessary, describe the demographic, social, cultural, and economic environment in which the project is situated and how this environment may affect implementation, operations, and results. Describe adjustments that must be made to adapt the documented practices and strategies of this project to the environment.
- Implementation Design: Present the conceptual model of the project and describe each of the components (i.e. each of the educational activities and interventions being implemented) and their links to the project goals and objectives.
- Implementation/Intervention Study: Define the procedures and methods for analyzing and assessing each of the educational activities and interventions of the project in producing the

desired effects.

- Define the expected measurable outcomes and explain the relationships with the components of the implementation linked to project goals and objectives. Include indicators and benchmarks with timelines that will determine which implementation strategies are proving to be effective in the environment.

Dissemination

- Describe plans to communicate the knowledge gained, results and outcomes of the project to other professionals in STEM education and research, both during and after the project.
- Describe the information to be disseminated, the means of dissemination, and the procedures for determining the success of the dissemination effort.

Project Management Plan

- Implementation of evidence-based practices and programs almost always requires organizational change. Define the organizational structure for the project and explain its institutional alignment for achieving the project goals and objectives.
- Define the roles and responsibilities of key personnel who will carry out project activities.
- Define the processes and systems that will be applied to operate the project, including budget management, data management and reporting.
- Define the plans for sustainability or institutionalization of any project components.
- The Principal Investigator should be an academic leader with the authority to lead a project that crosses several STEM schools, departments, or units.
- The co-Principal Investigators should be STEM academic leaders, scientists, and faculty members who carry-out the project work plan. Implementation Projects should have an Internal Steering or Advisory Committee to help manage the project implementation, resolve project issues, and ensure that the project is on track for meeting project goals. Implementation Projects also should have an external advisory committee that meets at least once a year.
- Define the commitment of institutional leadership to the implementation process. Provide evidence of the commitment to the proposed Implementation Project activities from the institution's administration, STEM leadership and faculty, and other partners and collaborators, as applicable.
- Substantive letters of commitment to the proposed project activities can be included as supplementary documents. General letters of support from individuals not involved in the implementation of project activities should not be included.

Evaluation Plan

- Provide a formative evaluation plan with strategies to monitor operations and activities of the project as they evolve and to inform and guide these efforts.
- Describe the criteria to be used in evaluating the quality and impact of the project and the process for collecting and analyzing information at the institution.
- Provide a summative evaluation plan with strategies to assess the effectiveness and impact of the project in achieving its goals and for identifying positive and negative findings when the project is completed.
- Include the capability statement and credentials of the external evaluator as supplementary documents.

Research Project

Second round and subsequent Implementation and ACE Implementation Project proposals are required to include a five-page supplementary document that describes, in detail, the research project. The research is linked to the proposed approaches and interventions to formally study why and if such approaches work in the particular setting of the HBCU. Research that investigates novel aspects of the proposal is especially encouraged. It should be clear in the proposal, which team members, and/or consultants will undertake the research and their relevant qualifications should be included. The supplemental document must include information relevant to the proposed study, such as:

- The research question(s) to be investigated; the conceptual framework for the project; and a discussion of the theory or theories grounding the research and testable hypotheses. The research plan must include the research design, including underlying methodological assumptions, targeted population and sampling, measures and instruments, and data gathering and analysis plan.
- Data collection procedures should be specified, particularly with information on the reliability, validity, and appropriateness of proposed measures and instruments or specific plans for establishing them if not initially known.
- Quantitative research should include statistical methods to be used. Qualitative studies should include procedures to collect, code, reduce, and analyze data and specific conceptual frameworks that will guide analysis.

Postdoctoral Research Fellowship

For the research project, Implementation or ACE Implementation Projects may offer a postdoctoral research fellowship to a social science or educational researcher to provide opportunities early in his or her career. The postdoctoral research fellowship is intended to provide beginning investigators with research experiences that will broaden perspectives, facilitate interdisciplinary interactions and establish them in positions of leadership within the scientific community, specifically in the area of broadening participation research.

6. Broadening Participation Research Centers. Institutions that have been awarded three previous Implementation or ACE Implementation Projects are eligible to be the lead institution to submit a proposal for a Broadening Participation Research Center (BPRC). The Project Description must contain the sections described below and cannot exceed 25 pages including tables and illustrations.

- Broader Impacts: The broader impacts resulting from the proposed project must be addressed and described as an integral part of the narrative.
- Introduction and Rationale for the Center (suggested 4 page limit): Describe the background for the Center and its expected significance. Explain the unique opportunities that a Center will provide and describe what will be achieved in the center mode that could not be achieved otherwise. Describe how the Center will build a community of scholars in the science of broadening participation. Show how the Center will contribute to incorporating and promoting the connection of HBCUs to mainstream STEM higher education reform. Discuss the goals and objectives of the Center. Include appropriate baseline data to provide the context for the impact of the Center. Describe the potential legacy of the Center.
- Description of the Research Objectives of the Center (up to 10 pages): State the overall vision and long-range research goals of the Center. Describe the proposed research areas/themes and how

they integrate with each other to realize the Center's research vision. Indicate the lead role of each partner organization or participant in each research topic/goal area. The research focus should be sufficiently long-term to justify a center form of organization and flexible enough to permit change as the research proceeds. Provide a research plan with sufficient detail to allow assessment of the scientific merit and to justify the necessity for the center mode of operation. Indicate the potential impact or expected significance the Center's research will have.

- *Description of the Education Objectives of the Center (suggested 2 page limit):* Present an education plan that describes how the Center will integrate research and education. The education activities should be evidence-based practices developed in the context of current education research. Describe plans for the mentoring and professional development of junior faculty, post-doctoral fellows, and students involved in the Center's education activities. Describe plans for recruiting students and describe the proposed activities in sufficient detail.
- *Description of the Outreach and Knowledge Transfer Objectives of the Center (suggested 1.5 page limit for each):* Present a plan that describes how the Center will conduct outreach to the scientific and academic communities and the general public; will provide technical assistance to Historically Black Colleges and Universities and other institutions; and will communicate the results and outcomes of the Center to the scientific community in STEM education and research. Describe how the Center will be a hub for dissemination of research on broadening participation and will connect the research community in this field. Describe other ways of knowledge transfer unique to the Center's mission and goals.
- *Description of the Management Plan for the various components of the Center (suggested 3 page limit):* Develop and present a management plan for the Center. Identify key members of the Center Management Team and explain their specific roles and areas of responsibility. The Center Director must have the capacity to develop and lead a team to fulfill the vision of the Center. Key members of the Center Management Team must have management experience and qualifications to administer their component of the Center. It is expected that the lead institution partners with other HBCUs; additional partnering organizations are chosen to complement the lead institution. The responsibilities of the lead institutions and partner organizations must be clearly described. Describe the processes that will be used to prioritize Center activities; to select and integrate research projects with one another and with other Center activities; to allocate funds and equipment across Center activities and among partners; and to select a replacement for the Center Director if needed. Describe the plans for sustainability or institutionalization of the Center. An external advisory committee is required for all Centers.
- *Description of the Evaluation Plan (suggested 3 page limit):* Provide a formative evaluation plan with strategies to monitor operations and activities of the Center as they evolve and to inform and guide these efforts. Describe the criteria to be used in evaluating the quality and impact of the Center's activities and the process for collecting and analyzing information. Provide a summative evaluation plan with strategies to assess the effectiveness and impact of the Center in achieving its goals. Include the capability statement and credentials of the evaluator(s) as supplementary documents.

Budget and Budget Justification

Provide a budget for each of the five years. The budget and budget justification should reflect start-up activities at the commencement of the Center activities. Submit a separate budget and budget justification for each participating institution.

Additional Special Information and Required Supplementary Documents

- The list of Partner Institutions and Project Personnel that were required in the preliminary proposal must be updated to reflect any changes occurring since the time of preliminary proposal submission (limit 2 pages).
- A timeline for all activities (limit 2 pages).

FULL PROPOSAL REVIEW PROCESS

Applications are reviewed by an NSF program officer and usually three to 10 external *ad hoc* or panel reviewers through an NSF merit review process that incorporates consideration of both the technical aspects of a proposed project and its potential to contribute more broadly to advancing the NSF's mission. In addition to any program-specific criteria, reviewers will be asked to evaluate all proposals against two criteria:

- Intellectual Merit – the potential to advance knowledge; and
- Broader Impacts – the potential to benefit society and contribute to the achievement of specific, desired societal outcomes.

In addition to the two NSF criteria for Intellectual Merit and Broader Impacts, special review criteria for **Targeted Infusion Projects, Implementation and ACE Implementation projects** are:

- Does the proposal describe a convincing rationale and appropriate methods for the project activities that are research-based/evidence-based?
- Are the project design and methods linked to measurable outcomes and are they appropriate to the scope, scale, and setting for the project?
- Is the project likely to produce high quality results that contribute to the undergraduate STEM education knowledge base?
- Is the project likely to have an impact on STEM education, student learning, and faculty practice?
- Is the project management plan adequate and does it include clear roles and responsibilities of the personnel who will contribute to the project?
- Is there commitment of the leadership to the implementation process?
- Does the evaluation plan define indicators and benchmarks to inform the project team and others about the operations and effectiveness of the implementation?
- Does the project have a plan for effective and scholarly dissemination of results?

Additional review criteria for **Broadening Participation Research Centers** are:

- Does the proposal convey a vision for how the Center will establish a culture in broadening participation research that will produce work that adds to the research knowledge base?
- How are the research, education, outreach, and knowledge transfer efforts strategically embedded and integrated in the proposed Center?
- To what extent are the research, educational, outreach, and knowledge transfer activities innovative and how do they
- contribute to the unifying mission of the proposed Center?

- To what extent does the proposed Center management have the vision, experience, and capacity to manage a complex and innovative enterprise that integrates research, education, outreach, and knowledge transfer?
- Does the evaluation plan define indicators and benchmarks to inform the project team and others about the operations and effectiveness of the implementation?

RECOMMENDED TASKS FOR HBCU-UP PROJECT AND PROPOSAL DEVELOPMENT

STEP 1 – CONTACT INSTITUTIONAL AND EXTERNAL STAKEHOLDERS/COLLABORATORS

PIs should contact and consult with the appropriate institutional stakeholders that will assist the project to plan effective use and leveraging of existing institutional resources to develop the HBCU-UP project and the proposal. Examples of institutional and external stakeholders who might assist investigators will development of successful projects and proposals include:

- Dean of Students
- Director of Counseling/Advising and Student Support Services (and team)
- Student services representation across campuses
- Enrollment Management, including the admissions, registration, and financial aid offices
- Career and Academic Planning Centers
- The Chief Academic Officer, Dean, Department Chair, Center Directors, etc.
- Institutional Research staff
- Representatives of external stakeholders, e.g. local LEAs, NGOs, PTAs, industrial partners, governmental agencies, etc.

Investigators should obtain the appropriate letters of collaboration from stakeholders – as required by the specific program track – that will play significant roles in supporting the project.

STEP 2 – ARTICULATE THE HBCU-UP PROJECT VISION

The next set of questions serves to guide project and proposal development; they should help articulate the vision for the HBCU-UP project.

Planning Question 1: *What does the institutional data and relevant literature show in terms of the need for the project?*

What does institutional data and the relevant academic literature suggest regarding the need for the proposed project and the proposed research and educational activities? HBCU-UP is particularly interested in building knowledge in areas related to the following questions:

- What are the underlying issues affecting the participation and success of African American students in STEM undergraduate education?
- What replicable models of successful STEM programs at HBCUs can be developed, described, and adopted by other HBCUs and other institutions that serve underrepresented minority students?
- What are effective methods of increasing the capacity of HBCUs to produce more STEM graduates who are highly qualified for the STEM workforce or graduate school?
- What models of collaborations and partnerships have the greatest short- and long-term positive impact for the HBCU institution, faculty, and/or students?

Planning Question 2: *What are the project's objectives?*

What are the investigator's vision, goals, and targeted outcomes for the proposed research initiation project? What methods will be used? What are the expected outcomes? How is this proposed project novel and potentially transformative for the investigator, the institution, and the discipline? What literature supports the need for the proposed research informing the project?

Planning Question 3: *What is the project's management plan?*

How will you manage the project across the period of HBCU-UP support? How will you structure and implement research activities and manage research assistants at various levels (e.g. undergrads, grad students, and post-docs)? How will you work with your internal and external collaborators? How will you collect and manage data generated by the project? What is the plan for disclosing and disseminating research outcomes? How will you ensure proper and efficient administration of the project—including the organizational placement of the project; the time commitment of key project staff; and the specific plans for financial management, student records management, data collection, and personnel management? How will the success of the project be evaluated?

Planning Question 4: *What institutional resources, including education programs, equipment and facilities, and centers or offices support your project?*

What facilities, equipment, supplies, personnel, and other your institutional cash and in-kind resources will be committed to supplement the grant and enhance the project?

Planning Question 5: *How is the budget of the proposed HBCU-UP project reasonable, cost-effective, and adequate to support the project?*

Budget requests should be reasonable and appropriate to conduct the proposed work, and adhere to program and track-specific requirements, allowable costs, and restrictions. PIs should work closely with institutional financial and sponsored projects offices to develop the project budget using institutional and NSF budget templates.

Planning Question 6: *How does the project evaluation plan enable the investigator(s) to evaluate the success and/or effectiveness of the project?*

Are the evaluation methods appropriate to the project? Do the evaluation methods include both quantitative and qualitative evaluation measures? Do the evaluation methods examine, in specific and

measurable ways, using appropriate baseline data, the success of the project in improving the investigator's research capabilities and actual discoveries?

USEFUL LINKS FOR CONTACT AND PLANNING PURPOSES

Cognizant HBCU-UP Program Officers. Proposers are *strongly encouraged to reach out to program officers to discuss ideas and requirements for HBCU-UP projects*. Please note that the following information is current at the time of publishing. See program website for any updates to the points of contact:

- Toni Edquist, Program Specialist, EHR/HRD, telephone: (703) 292-4649, email: tedquist@nsf.gov
- Earnestine Easter, Program Director, EHR/DGE, telephone: (703) 292-8112, email: epsalmon@nsf.gov
- Andrea Johnson, Program Director, EHR/HRD, telephone: (703) 292-5164, email: andjohns@nsf.gov
- Clytrice L. Watson, Program Director, EHR/HRD, telephone: (703) 292-4775, email: clwatson@nsf.gov
- Claudia Rankins, Program Director, EHR/HRD, telephone: (703) 292-8109, email: crankins@nsf.gov
- Randy Phelps, Staff Associate, OIA, telephone: (703)292-5049, email: rphelps@nsf.gov

Other Helpful Resources

1. National Science Foundation, National Center for Science and Engineering Statistics. 2017. Women, Minorities, and Persons with Disabilities in Science and Engineering: 2017, Special Report NSF 17-310. Arlington, VA. Available from <https://www.nsf.gov/statistics/wmpd/>.
2. U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics. 2014. Digest of Education Statistics. NCES 2016-006. Washington, DC. Available from: <https://nces.ed.gov/pubs2016/2016006.pdf>.
3. McKinsey Global Institute. 2011. Big data: The next frontier for innovation, competition, and productivity. Available from: http://www.mckinsey.com/insights/business_technology/big_data_the_next_frontier_for_innovation.
4. National Academies of Sciences, Engineering, and Medicine. 2016. *Barriers and Opportunities for 2-Year and 4-Year STEM Degrees: Systemic Change to Support Students' Diverse Pathways*. Washington, DC: The National Academies Press. Available from: <https://doi.org/10.17226/21739>.
5. Members of the Committee on Underrepresented Groups and the Expansion of the Science and Engineering Workforce Pipeline. 2010. NAS Report. Expanding Underrepresented Minority Participation: America's Science and Technology Talent at the Crossroads. ISBN: 0-309-15969-5. Available from: <http://www.nap.edu/catalog/12984.html>.

6. National Academies of Sciences, Engineering, and Medicine. 2017. *Undergraduate Research Experiences for STEM Students: Successes, Challenges, and Opportunities*. Washington, DC: The National Academies Press. Available from: <https://doi.org/10.17226/24622>.

7. National Research Council. 2012. *Discipline-based Education Research: Understanding and Improving Learning in Undergraduate Science and Engineering*. Washington, DC: National Academies Press. Available from: <http://www.nap.edu/catalog.php>.

8. Committee on Equal Opportunities in Science and Engineering. 2013. 2011 2012 Biennial Report to Congress: Broadening Participation in America's STEM Workforce. Available from: https://www.nsf.gov/od/iia/activities/ceose/reports/Full_2011-2012_CEOSE_Report_to_Congress_Final_03-04-2014.pdf.

9. HBCU-UP welcomes proposals that will pair well with the efforts of NSF INCLUDES (https://www.nsf.gov/news/special_reports/nsfincludes/index.jsp) to develop STEM talent from all sectors and groups in our society. Collaborations are encouraged between HBCU-UP proposals and existing NSF INCLUDES projects, provided the collaboration strengthens both projects.

Past HBCU-UP Reviewers and Program Officers Links

- The NSF HBCU-UP webinar slides include information on the chair's letter, and excellent annotated example: <http://rds.ucmerced.edu/sites/rds.ucmerced.edu/files/event/templatedeptletter.pdf>.
- Although written in 2007, NSF still offers this e-book as a resource: <http://aries.imse.ksu.edu/nsf/NSF2014/subfolder/HBCU UP.pdf>
- NSF HBCU-UP webinar slides: https://www.nsf.gov/mps/dms/HBCU UP_and_pecase_information/HBCU UP_webinar_slides_2015.pdf
- Example proposals with reviewer comments (from 2013): <https://thmatters.wordpress.com/funding-opportunities-and-tips/HBCU UP-examples-proposalscomments/>