



ECR Hub
EDU Core Research



Preparing YOUR ECR One-Page Project Summary

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Meet the Presenters



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Session Goals

Purpose: Work with prospective ECR grantees to identify if their project aligns with the EDU programs, discuss strategies for crafting a compelling proposal, and encourage them to create a one-page summary of their proposal to discuss with a program officer.

Driving Questions:

1. How do you tailor **your project idea** to align with the EDU programs, specifically the EDU Core Research (ECR) program?
2. Understand how your project **fits within the specific domains of ECR program**
3. How do you **frame a project summary** that articulates the project overview, intellectual merit, and broader impacts?



Workshop Organization

Part 1: Developing YOUR Idea for an ECR Research Project

Part 2: Crafting Your One-Page ECR Research Project Summary

Part 3: Engaging NSF Program Officers to Refine and Forward Your Proposal Idea



Part 1: Developing YOUR Idea for an ECR Research Project



ECR Supports Curiosity-Driven and Use-Inspired Basic Research or “Fundamental Research”

Fundamental Research

- Fundamental research generates knowledge and understanding with the potential for broad relevance.
- While the research may have implications for policy or practice, ECR research does not necessarily generate findings with immediate applications at the practical level.

ECR: Core Research Areas

- Research Area I – Research on STEM Learning and Learning Environments
- Research Area II – Research on Broadening Participation in STEM
- Research Area III – Research on STEM Workforce Development



Fundamental research is grounded in theoretical or empirical frameworks that inform the research questions.

It may:

Identify and explore new constructs;

and
/or

Extend our understanding of current constructs;

Increase our understanding of relationships among the constructs under investigation;

and
/or

Extend research or evaluation methodologies;

...in one or more of the ECR research areas: STEM learning and learning environments, broadening participation in STEM, and STEM workforce development.



Your Research Idea Matrix

In 25 words or less, articulate your research idea:

Example: My research will explore how identity, agency and institutional context influence the academic achievement, persistence, and career choice of first-generation, high-achieving African American mathematics majors who study at HBCUs.

Considerations:

- Explore new constructs?
- Extend understanding of existing constructs?
- Increase understanding of existing constructs?
- Extend methodology?



Identifying the EDU Core Research (ECR) Area for YOUR Project

- Research Area I – Research on STEM Learning and Learning Environments
- Research Area II – Research on Broadening Participation in STEM
- Research Area III – Research on STEM Workforce Development



ECR: Research Area I – Research on STEM Learning and Learning Environments

- Fundamental research projects that advance general, explanatory knowledge and understanding about STEM teaching and learning in the many environments and contexts in which such teaching and learning take place.
- Studies may inform or draw upon research from multiple disciplines that study learning at the level of the learner, the teacher, the learning environment, or the broader institutional or systemic context, as well as other organizations or individuals that may influence STEM learning.



ECR Research Area II – Research on Broadening Participation in STEM

- Fundamental research investigating issues related to broadening participation in STEM education and the STEM workforce.
- Broadening participation research may focus on the individual and/or the organizational factors that positively or negatively impact individuals from diverse groups in STEM. The phrase “diverse groups” refers to people of various races and ethnicities, genders, sexual orientations, and ability who are currently underrepresented in their participation in STEM education and the STEM workforce. See the solicitation for more details.



ECR: Research Area III – Research on STEM Workforce Development

- Fundamental research on STEM workforce development invites proposals that strengthen general explanatory knowledge and understanding about STEM workforce participation, skill-building approaches, workplace knowledge and competencies, learning in workplace contexts, and critical shifts in STEM workforce trends.
- ECR investments address basic questions concerning how best to prepare a STEM workforce that is ready to capitalize on the latest advances in technology and science, as well as to tackle current and future social and economic challenges.



Where Does Your Research Fit and Why?

For your research idea, create a short elevator pitch that justifies which of the ECR research areas your potential project fits and WHY you think it will advance **fundamental research** in that area?

In your pitch, draw on how your research project can potentially:

- Explore new constructs
- Extend understanding of existing constructs
- Increase understanding of existing constructs
- Extend methodology



My Example

Much of the research documenting the experiences of African-American students in the STEM pipeline has focused on the factors that impede their success and persistence in STEM and related disciplines. Further, there is limited discussion of how these students' experiences at HBCUs contribute to robust mathematics identities and agency (McGee, 2020). Research shows that student identity and agency has been shown to have impact on these students' success and persistence in STEM. Research has not examined how identity and agency impacts highly successful first generation African- American mathematics majors attending HBCU's. This broadening participation study will extend our understanding how the HBCU context support these students' development of robust mathematics identities and agency and how they foster high academic achievement, persistence and career choice in mathematics and related disciplines.



Comprehensive Research Plan: Explaining the How

1. Proposes well-focused fundamental research questions or testable hypotheses that reflect the current state of knowledge and theory
2. Uses the methods to answer the research questions or test the hypotheses
3. Describes the measures, instruments, and procedures to be used in the data collection and data analysis strategies
4. Transformative Idea and contribution to fundamental research



My Example: How?

Research question:

- *How does mathematics identity and agency influence first-generation high-achieving African American mathematics majors at HBCU's success, persistence, and mathematics career choice? What might an asset-based model look like that explains how institutional context informs the development of positive identity and student agency?*
- 30 African American mathematics majors from 12 HBCUs will be interviewed using phenomenological qualitative research design using grounded theory techniques.
- Focus group interviews and survey instruments will be developed and tested.
- Qualitative and quantitative data analysis techniques will be used to answer questions and develop a descriptive model that describes the relationship between institutional context, mathematics, identity, and agency on student outcomes.



Activity: Addressing Essential How Elements



Part 2: Crafting Your One-Page ECR Research Project Summary



Crafting a One-Page Project Summary

Three Elements of a One-Page Project Summary:

1. **Overview:** 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.
2. **Intellectual Merit:** The statement on intellectual merit should describe the potential of the proposed activity to advance knowledge in the discipline.
3. **Broader Impacts:** 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.



1. Overview

- Identify knowledge gaps
- State overall aims, objectives, and research questions
- Craft a compelling rationale for your research (advancing fundamental understanding in STEM education)
- Methodological overview
- Conclude why what you are proposing is creative, unique, and will forward our basic understanding in STEM education (focused on your research area)



My Example

The research objective of this broadening participation proposal is to explore the relationship between identity, agency, and institutional context on the success, persistence, and career choice of 30 high-achieving African-American mathematics majors at 12 HBCUs using surveys, interviews, and documents. African American students' stories of mathematics success, particularly those from HBCUs who have success with this population, are critically needed in the research literature. Insights gained from African American mathematics majors will help improve efforts to recruit, retain, and graduate high-ability students. Highly successful African American mathematics majors' experiences can provide insights into the relationship between institutional factors, identity development, and student agency in the successful outcomes of this unique population of students and fill the need to develop assets-based development models that promote success for other minoritized students.



Crafting the Overview: Activity

For each of the overview areas, write 1-2 sentences that describe your research project. Please be creative and expressive without concern about the wording, grammar, etc. This activity is designed to help you develop your research idea to share for feedback. It will not be your final project overview; it is just a starting point.



Merit Review Criteria

The following **five elements** are considered in the review of both intellectual merit and broader impacts.

1. What is the potential for the proposed activity to
 - a. **Advance knowledge** and understanding within its own field or across different fields (Intellectual Merit) and
 - b. **Benefit society** or advance desired societal outcomes (Broader Impacts)?
2. To what extent do the proposed activities suggest and explore creative, original, or **potentially transformative** concepts?



Merit Review Criteria *continued*

3. Is the plan for carrying out the proposed activities well-reasoned, well-organized, and based on a sound rationale? Does the plan incorporate a mechanism to assess success?
4. How well-qualified is the individual, team, or organization to conduct the potential activities?
5. Are there adequate resources available to the PI (either at the home organization or through collaborations) to carry out the proposed activities?



2. Intellectual Merit

- Define the contribution to your field
- Describe how this contribution will advance your field
- Describe how this contribution will impact the ECR research area of focus
- Explain why your contribution will be transformative (without being trite)



3. Broader Impacts

- State which desired societal outcomes will be advanced
- Explicitly describe how the activities will result in advancement (be as specific as possible)
- Summarize the dissemination plan
- Describe how attaining desired outcomes will benefit society



Tracking the "Ripples" of YOUR Research Project



My Example: Intellectual Merit and Broader Impacts

Contributions: (Intellectual Merit)

- Field?
- ECR research focus area?
- Transformative Idea?
- Project team expertise?

Benefits: (Broader Impacts)

- Institutional?
- Historically marginalized groups?
- Dissemination?
- Field?
- Society?



Next Steps

- Finalize your one-page project summary
- Email your project summary to ECR@nsf.gov to discuss your proposal idea with a program officer

