EHR Core Research (ECR)

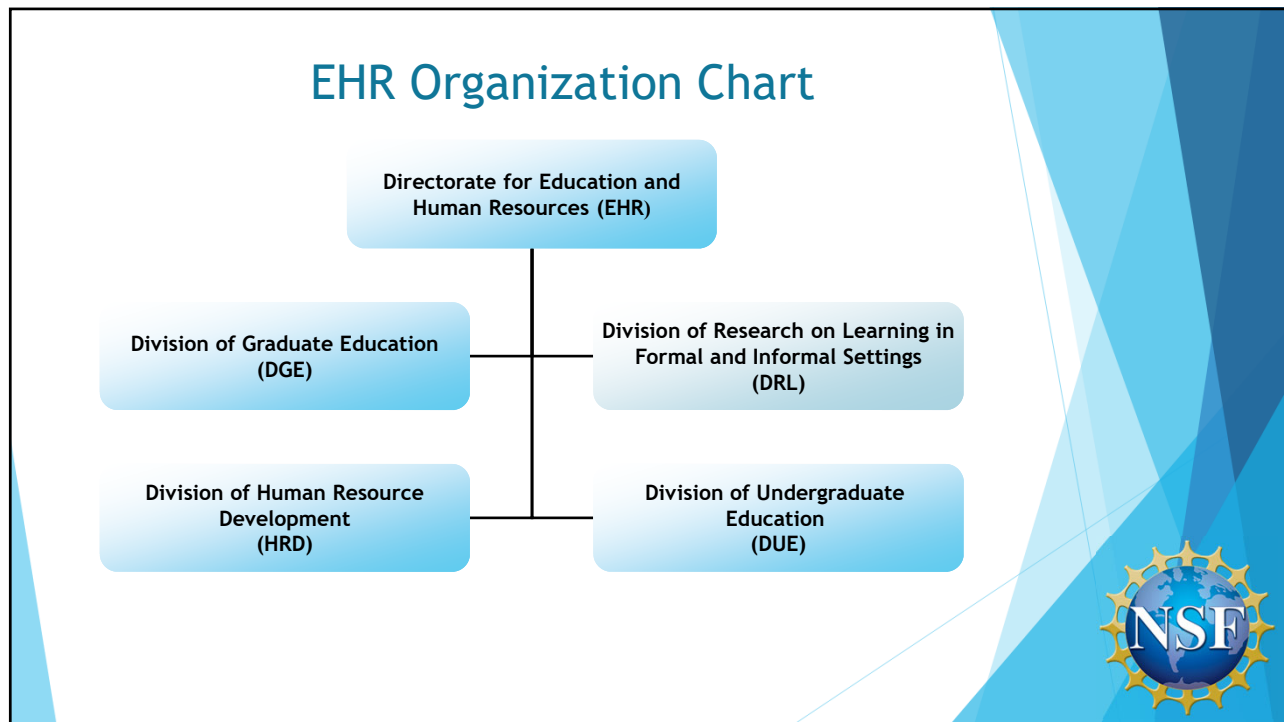## Overview of Solicitation and Proposal Submission

Directorate for Education and Human Resources

National Science Foundation

1

Outline of Webinar

- Quick overview of NSF and EHR
- EHR Core Research Solicitation: NSF 19-508
- Common Guidelines and Fundamental Research
- Components of an ECR Proposal
- Merit Review Criteria
- Useful Resources
- Other ECR Opportunities
- Questions and Contact Information

2

EHR Organization Chart

Directorate for Education and Human Resources (EHR)

Division of Graduate Education (DGE)

Division of Research on Learning in Formal and Informal Settings (DRL)

Division of Human Resource Development (HRD)

Division of Undergraduate Education (DUE)

3

EHR Core Research (ECR)
STEM Learning and Learning Environments, Broadening Participation, and Workforce Development

PROGRAM SOLICITATION
NSF 19-508

REPLACES DOCUMENT(S):
NSF 15-509

National Science Foundation
Directorate for Education & Human Resources
Division of Graduate Education
Division of Undergraduate Education
Division of Human Resource Development
Research on Learning in Formal and Informal Settings

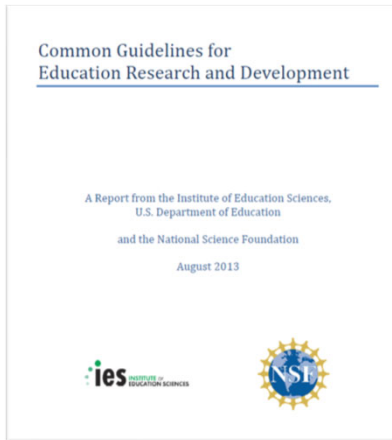**Full Proposal Deadline(s)** (due by 5 p.m. submitter's local time):

January 24, 2019

October 03, 2019

First Thursday in October, Annually Thereafter

Next Deadline:
October 1, 2020

4

EHR Core Research (ECR) Program: Common Guidelines (NSF 13-126)

Common Guidelines for
Education Research and Development

A Report from the Institute of Education Sciences,
U.S. Department of Education

and the National Science Foundation

August 2013

ies INSTITUTE OF EDUCATION SCIENCES

NSF

https://www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf13126

5

Fundamental Research: What do we mean?

- Curiosity-driven or use-inspired research that expands knowledge in a specific theoretical or research area.

- Research that addresses important research questions related to learning, broadening participation, or workforce development in STEM fields.

- Research that may have implications for policy or practice but need not have immediate applications in practice.

6

Fundamental Research:

- Is grounded in theoretical or empirical frameworks that inform research questions;
- Identifies and explores important new constructs in education, learning, broadening participation, or workforce development in STEM fields;
- Extends understanding of current constructs;
- Increases understanding of relationships among the constructs under investigation;
- Extends research or evaluation methodologies for advancing the evidence base to support improved policy or practice

7

ECR Proposals May Involve:

- Specific Content from any STEM field
- Learners of any age or level of education
- Any learning setting (e.g., formal, informal, or technology-supported)
- Theories, methodologies, or analytic techniques drawn from any discipline as long as it warrants the claims the PI hopes to make.

8

ECR Research Tracks

- Track I – Research on STEM Learning and Learning Environments

- Track II – Research on Broadening Participation in STEM

- Track III – Research on STEM Workforce Development

Examples of What Has Been Funded (Recent Awards Made Through This Program, with Abstracts) can be found on our web site.

9

Track I – Research on STEM Learning and Learning Environments

- Advance the fundamental knowledge necessary to improve STEM learning in the many environments and contexts in which such learning takes place.
- Examples include:
  - Neural, cognitive, behavioral, social, and affective aspects of learning and teaching;
  - The role of social interaction or science practice on STEM learning;
  - Creation of innovative assessments of learner or teacher conceptual knowledge.

10

Track II – Research on Broadening Participation in STEM

- Issues related to the learning and participation of members of groups underrepresented in STEM fields, at both the individual and institutional levels.
- Examples:
  - Culturally responsive pedagogy
  - Motivation, academic achievement, and sense of belonging
  - Intersectionality and the experiences of members of underrepresented populations in STEM education and workforce participation

11

Track III – Research on STEM Workforce Development

- STEM workforce development at all levels of education, from K-12 through higher education and the workplace.
- Examples:
  - Understanding PhD career pathways
  - The Role of peers, networks and demand on STEM career pathways
  - STEM training, employment in industry, and entrepreneurship

12

Funding Levels and Duration

- Amounts and duration
  - **Level I:** maximum of $500,000 over 3 years
  - **Level II:** maximum of $1,500,000 over 3 years
  - **Level III:** maximum of $2,500,000 over 5 years

13

Preparation OF AN ECR PROPOSAL

14

Proposal How-To: Preparation and Submission

- **Cover Sheet**
  - Select NSF 19-508 EHR Core Research (ECR)
  - The box for Human Subjects must be checked

- **Project Summary**
  - Specify Research Track, Synthesis, or Conference.
  - State specific STEM disciplinary content.
  - Think of this as your first draft of your award abstract should your project be funded.
  - It will also be used to determine which subpanel your proposal appears on

15

Proposal How-To: Preparation and Submission

- **Project Description**
  - Limit to 15 pages
  - Comply with all formatting requirements of the PAPPG.
- **Elements of ECR Proposals**
  - Logical Connections to an established research base
  - Detailed research and analysis plan
  - Plan to assess success
  - Plan for broader impacts and dissemination
  - Separate sections for Intellectual Merit and Broader Impacts

16

What makes for a successful ECR proposal ?

- Builds upon existing theory and evidence from relevant fields.
- Draws on current related literatures.
- Reports **pilot results** where appropriate
- Provides examples of **anticipated findings** that might result from the proposed studies and how they would be interpreted.

17

What makes for a successful ECR proposal ?

- Explicitly describes the research design including:
  - underlying methodological assumptions
  - target population and sampling
  - measures and instruments
  - data gathering and analysis plan.
- Data collection procedures should be well-specified, including information on reliability, validity, and appropriateness of proposed measures and instruments or plans for establishing them.

18

What makes a successful ECR proposal ?

- Proposals involving **quantitative** research should include:
  - **descriptions of the statistical methods** to be used;
  - their assumptions and how they will be tested;
  - details on how potential threats to validity will be addressed;
  - results of power analyses for proposed sample sizes; and
  - estimates of effect sizes.

19

What makes a successful ECR proposal ?

- Proposals involving **qualitative** research should:
  - explain data collection, coding, and reduction procedures:
  - Data analysis procedures and the specific conceptual frameworks that will guide analyses;
  - Details about the sample and sample selection;
  - How validity will be assessed and addressed.

20

Proposal How-To: Preparation and Submission

- **Budget and Budget Justification**
  - Budgets should be in NSF format and include up to five pages of budget justification in narrative form and with detailed explanations for each line item.
  - Budgets should be appropriate for the work proposed.
  - Include funds for the principal investigator or a project member to attend a two-day grantees' meeting in the Washington, D.C. area each award year.
  - For a comprehensive webinar about Preparing Clear and Effective Budgets and Budget Justifications please see the recording at: http://informalscience.org/projects/funding/nsf-aisl

21

Proposal How-To: Preparation and Submission

- **Supplementary Documents**
  - Postdoctoral Mentoring Plan
  - Data Management Plan
  - Letters of Collaboration
  - List of project personnel
- **Collaborators and other Affiliations**
  - submitted using the instructions and spreadsheet template found at https://www.nsf.gov/bfa/dias/policy/coa.jsp

22

Data Management Plans

- Guidance on Data Management Plans may be found at the link below and by consulting your university, institutional review board, professional associations and other resources.

- Generic Data Management Plans should be avoided!

- Each plan should describe the data, metadata, samples, software, curricula, documentation, publications and other materials generated in the course of the research proposed.

- Of increasing importance to NSF is the reproducibility and replication of research. Your DMP should describe how data and related materials are generated to allow for reproducibility, and should support the sharing of data, products and methods for understanding, validation, and replication of research findings.

- Companion Guidelines on Replication & Reproducibility in Education Research may be found at: https://www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf19022

- EHR Guidance on Data Management Plans may be found at: https://www.nsf.gov/bfa/dias/policy/dmpdocs/ehr.pdf

23

Merit Review Criteria:
Intellectual Merit
and Broader Impacts

24

Merit Review Criteria

All NSF proposals are evaluated through two merit review criteria:

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

25

Merit Review Elements

The following **five elements** are considered in the review of both intellectual merit <u>and</u> 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?

26

Merit Review Elements, cont.

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?

27

ECR: Building Capacity in STEM Education Research (BCSER) NSF 20-521

- Supports projects that build individuals' capacity to carry out high quality fundamental STEM education research
  - ➢ Individual Investigator Development (IID) in STEM Education Research: **Early and Mid Career** up to $350,000 for 2 years
  - ➢ Institutes in Research Methods (IRM) up to $1,000,000 for up to five years
  - ➢ Conferences (NSF 20-521 and 19-1)

FY 2021 Deadline February 26, 2021

28

Current ECR Dear Colleague Letters

- NSF 19-044: Dear Colleague Letter: Fundamental Discipline-Based Education Research (DBER) Focused on Undergraduate and Graduate STEM Education within the EHR Core Research (ECR) Program:
- NSF 19-033 Dear Colleague Letter: Research to Improve STEM Teaching and Learning, and Workforce Development for Persons with Disabilities
- NSF 19-035 Dear Colleague Letter: Fundamental Research on Equity, Inclusion, and Ethics in Postsecondary Academic Workplaces and the Academic Profession within the EHR Core Research Program
- NSF 19-025 Dear Colleague Letter: STEM Workforce Development Using Flexible Personal Learning Environments
- NSF 19-036 Dear Colleague Letter: Developing and Testing New Methodologies for STEM Learning Research, Research Syntheses, and Evaluation
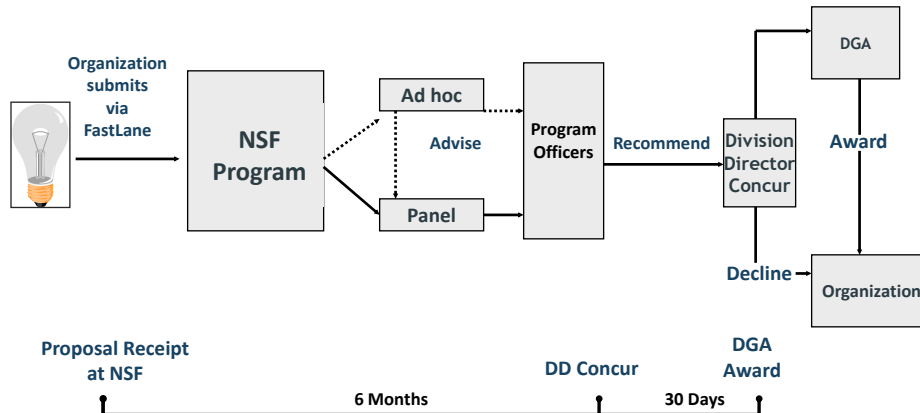
29

Other mechanisms

- CAREER (NSF 17-537)
- Synthesis (NSF 19-508)
- Conferences (NSF 19-508 and 19-1)
- EAGER (NSF 19-1)
- RAPID (NSF 19-1)

30

Proposal Review Process and Timeline

31

Bear in Mind...

- ECR has multidisciplinary panels
  - Make sure the contribution to your specific literature is clear.
  - Also make sure the contribution is clear to someone not in your field, but who might be an expert in the topic area.
  - Nobody knows every literature, but make sure you are able to demonstrate that you know what is critical both within and across fields.

- You only have 15 pages for the project description
  - You will have to be vague about something.

32

Advisory Board

- They provide advice and formative evaluation (reporting to you, not to NSF).
- Figure on about 4 or 5 members, including those from different disciplines.
  - With expertise that complements yours
  - Include members of stakeholder communities
- Get them a draft and get their feedback
- In the proposal, describe them and their roles
- Convene at least once before you begin actual work
- Pay them

33

Useful Resources

- Solicitation: NSF 19-508
  https://www.nsf.gov/pubs/2019/nsf19508/nsf19508.htm

- Proposals & Award Policies & Procedures Guide (PAPPG), June 2020:
  https://www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf20001&org=NSF

- You may now prepare and submit proposals in Research.gov
  https://www.research.gov/research-web/, Fastlane www.fastlane.nsf.gov
  and Grants.gov www.grants.gov

- Prospective New Awardee Guide, January 2018:
  https://www.nsf.gov/publications/pub_summ.jsp?ods_key=pnag

- ECR Building Capacity in STEM Education Research (ECR:BCSER)
  NSF 20-521
  https://www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf20521

34

Questions?

ECR@nsf.gov

Or visit the NSF EHR Core Research website:

https://www.nsf.gov/funding/pgm_summ.jsp?pims_id=504924&org=EHR&from=home

35