EHR Core Research (ECR)
Overview of Solicitation and Proposal Submission

FY 19 - Solicitation NSF 19-508 (Replacing NSF 15-509)

National Science Foundation
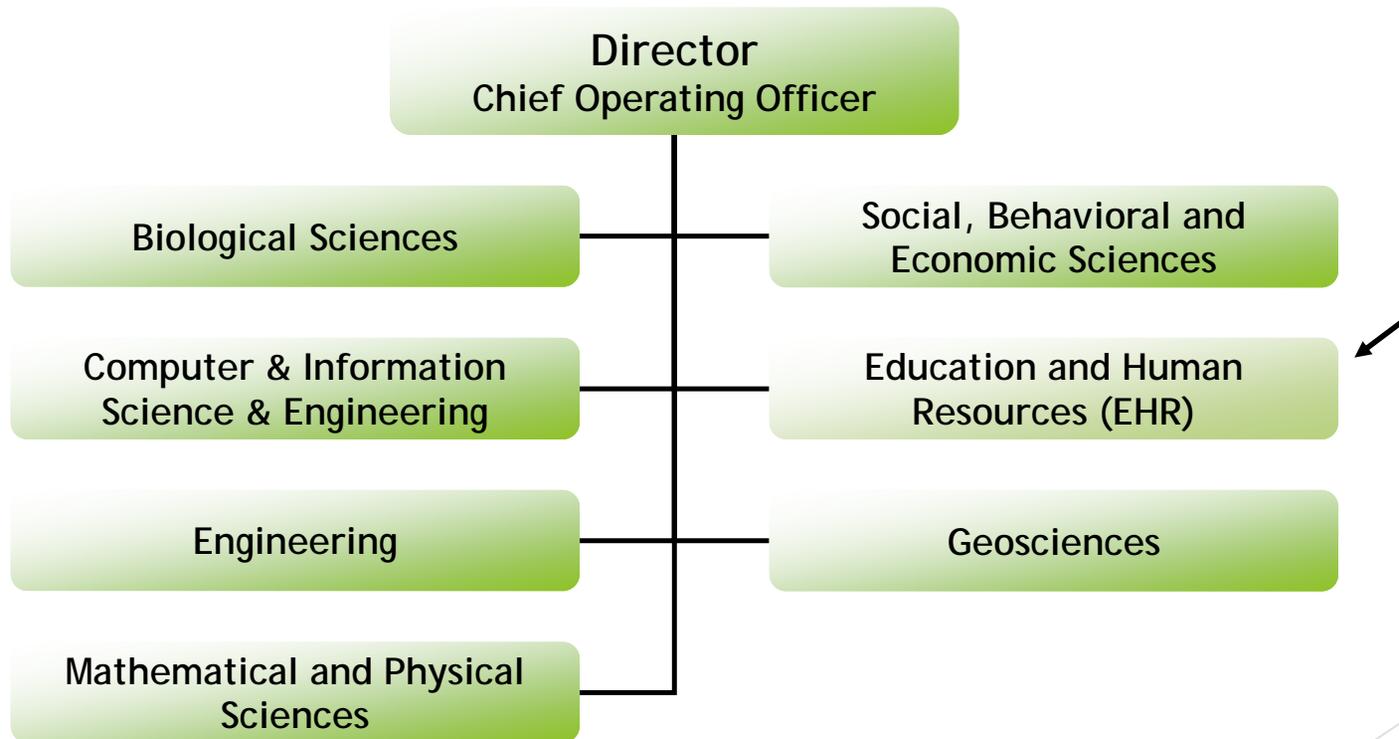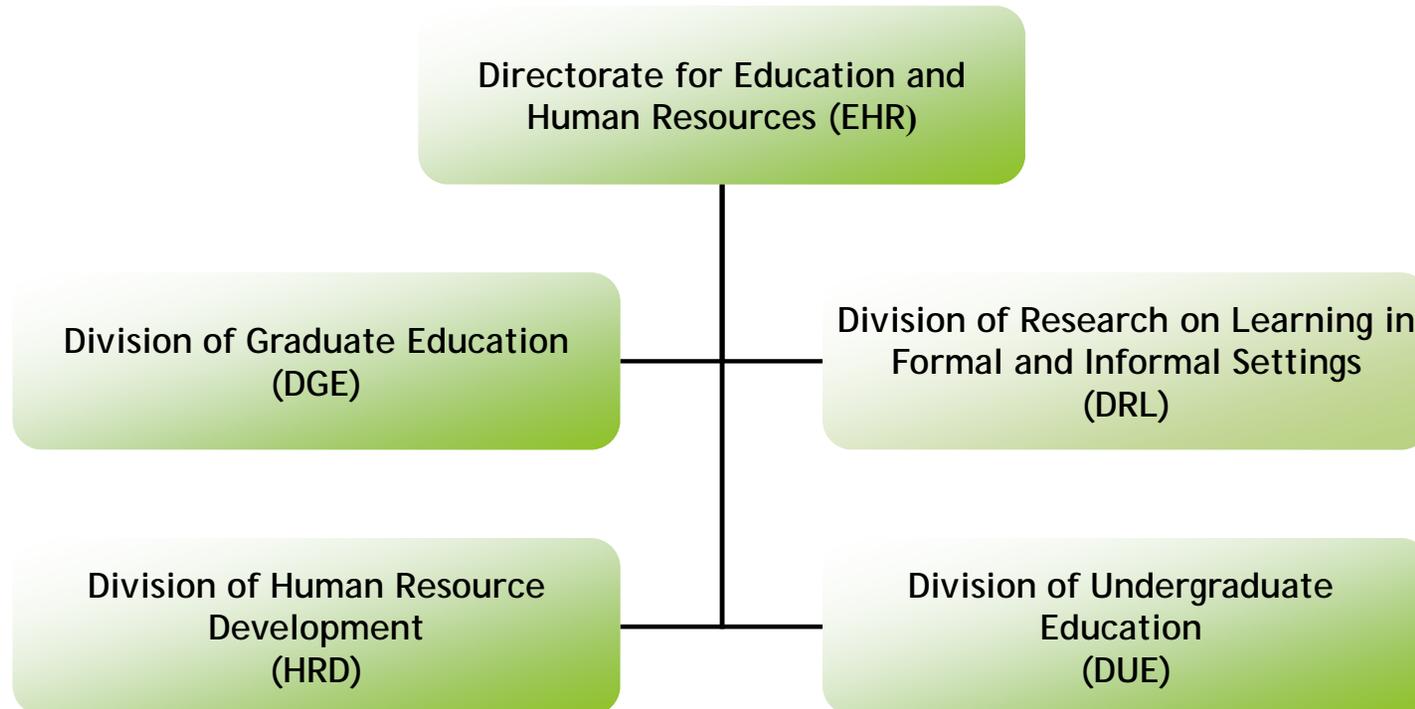Directorate for Education and Human Resources

Outline

▶ Quick overview of NSF and EHR

▶ EHR Core Research Solicitation: NSF 19-508

▶ Common Guidelines and Fundamental Research

▶ ECR Research Tracks, Funding Levels and Duration

▶ Components of an ECR Proposal

▶ Merit Review Criteria

▶ Useful Resources

▶ Other ECR Opportunities

▶ Questions and Contact Information

NSF Directorates

Director
Chief Operating Officer

Biological Sciences	Social, Behavioral and Economic Sciences
Computer & Information Science & Engineering	Education and Human Resources (EHR)
Engineering	Geosciences
Mathematical and Physical Sciences	

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)

ECR Solicitation: NSF 19-508

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

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

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

Fundamental Research: What do we mean?

▶ Curiosity driven research that expands knowledge in a specific theoretical or research area.

▶ In the case of ECR, fundamental research addresses important research questions related to education, learning, broadening participation, or workforce development in and across STEM fields.

▶ While the research may have implications for policy or practice, ECR research doesn't necessarily generate findings with immediate applications at the practical level.

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

Research Supported:

▶ Topics in: STEM learning and learning environments, broadening participation in STEM, and STEM professional workforce development

▶ Proposals may include/involve:

  ➢ Any age of learner, across the life course

  ➢ Any level of education

  ➢ Any setting (e.g., formal, informal, technological)

  ➢ Assessments of learning

  ➢ Career pathways & transitions

  ➢ Emerging practices, changing contexts & workforce needs

  ➢ Learning, persistence of groups, and underrepresentation in STEM fields

  ➢ Theory, techniques, perspectives from wide range of disciplines & contexts

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

Track I – Research on STEM Learning and Learning Environments

▶ ECR supports research projects that seek to advance the fundamental knowledge necessary to improve STEM learning in the many environments and contexts in which such learning takes place.

▶ Examples of topics of ECR Track I awards include:

  ▶ Assessments of learner or teacher conceptual knowledge;

  ▶ Neural, cognitive, behavioral, social and affective aspects of learning and teaching;

  ▶ The role of social interaction or science practice on STEM learning;

  ▶ Among many other topics…

  ▶ For more examples see: What Has Been Funded (Recent Awards Made Through This Program, with Abstracts) on our web site.

Track II – Research on Broadening Participation in STEM

▶ ECR supports fundamental research investigating issues related to the learning and participation of groups underrepresented in STEM fields, at both the individual and institutional levels.

▶ Examples of topics of ECR Track II awards include:

  ▶ Innovative and culturally responsive pedagogy

  ▶ Motivation, academic achievement and sense of belonging

  ▶ Intersectionality and the experiences of women of color faculty in engineering

  ▶ Among many other topics…

  ▶ For more examples see: What Has Been Funded (Recent Awards Made Through This Program, with Abstracts) on our web site.

Track III – Research on STEM Workforce Development

- ECR supports fundamental research on STEM workforce development at all levels of education, from K-12 through higher education and the workplace.

- Examples of topics of ECR Track III awards include:

  - Understanding PhD career pathways

  - The Role of peers, networks and demand on STEM career pathways

  - STEM training, employment in industry, and entrepreneurship

  - Among many other topics…

  - For more examples see: What Has Been Funded (Recent Awards Made Through This Program, with Abstracts) on our web site.
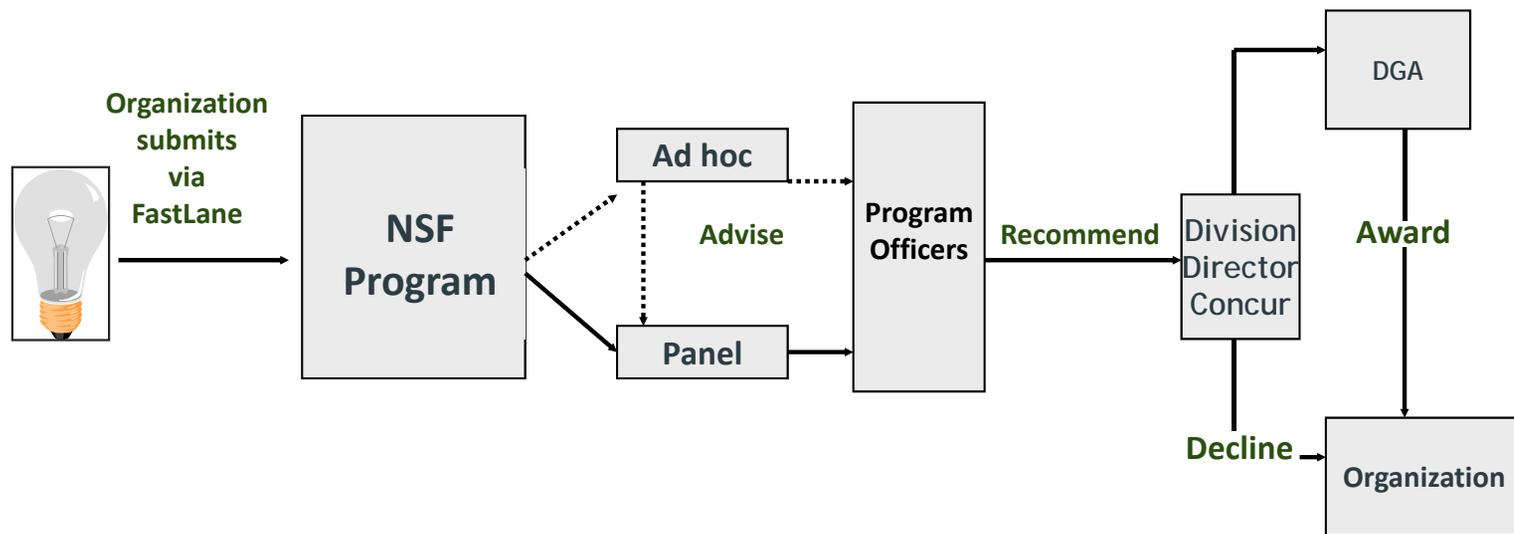
Funding Levels and Duration

- 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

- Other types of funding:
  - CAREER
  - Synthesis
  - Conference & workshop
  - EAGER
  - RAPID

Proposal Review Process and Timeline

Some Things to 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.
  - Put together an Advisory board and have them read a draft.
  - Make it readable for tired middle-aged eyes reading quickly.

COMPONENTS OF AN ECR PROPOSAL

NSF 19-508

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, if appropriate.
  - Think of this as your first draft of your award abstract should your project be funded.

Proposal How-To: Preparation and Submission

- **Project Description**
  - 15 pages
  - comply with all formatting requirements of the PAPPG.
  - Focused research questions or hypotheses related to one or more of the three Research Tracks.
- **Elements of ECR Proposals**
  - Logical Connections to an established research base
  - Detailed research plan
  - Plan to assess success
  - Plan for broader impacts and dissemination
  - Separate sections for Intellectual Merit and Broader Impacts

What makes a successful ECR proposal ?

- ➢ Builds upon existing theory and evidence from relevant fields.

- ➢ Draws broadly on the current relevant literatures and also on the specific literature in any STEM domain of central focus.

- ➢ 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.

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.
- 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.
- Reporting **pilot results** and providing examples of **anticipated findings** that might result from the proposed studies will strengthen the competitiveness of proposals.

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.
    - Each subaward must include a separate budget and budget justification of no more than five pages.
    - 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

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

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

Merit Review Criteria:
Intellectual Merit and Broader Impacts

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

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?

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?

Merit Review Criteria in the Proposal

▶ The Project Summary and the Project Description must each contain separate sections within the narrative labeled "Intellectual Merit" and "Broader Impacts".

Useful Resources

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

▶ Proposals & Award Policies & Procedures Guide (PAPPG), February 2019:
https://www.nsf.gov/publications/pub_summ.jsp?ods_key=papp

▶ 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)
https://www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf19565

ECR: Building Capacity in STEM Education Research (BCSER) NSF 19-565

- ▶ supports projects that build individuals' capacity to carry out high quality fundamental STEM education research in STEM learning and learning environments, broadening participation in STEM fields, and STEM workforce development.

- ▶ Individual Investigator Development (IID) in STEM Education Research: Early Career up to $350,000 for 2 years

- ▶ Individual Investigator Development (IID) in STEM Education Research: 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 from $25,000 to $100,000

Current ECR Dear Colleague Letters and Webinars

- 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: Webinar August 15, 2019 at 2pm ET [REGISTER HERE](#)

- NSF 19-033 Dear Colleague Letter: Research to Improve STEM Teaching and Learning, and Workforce Development for Persons with Disabilities: Webinar August 19, 2019 2pm ET [REGISTER HERE](#)

- 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: Webinar August 20, 2019 at 2pm ET [REGISTER HERE](#)

- NSF 19-025 Dear Colleague Letter: STEM Workforce Development Using Flexible Personal Learning Environments: Webinar August 21, 2019 at 2pm ET [REGISTER HERE](#)

- NSF 19-036 Dear Colleague Letter: Developing and Testing New Methodologies for STEM Learning Research, Research Syntheses, and Evaluation: Webinar TBA

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