

Directorate for Education and Human Resources (EHR)
and The Boeing Company

EHR Core Research: Production Engineering Education and Research (ECR:PEER)

Program Announcement: NSF 19-557





Introductions and Guidelines

- ▶ Introductions
- ▶ Webinar etiquette
 - Please place your phone on MUTE if you are not asking a question or not responding to the presenters.
 - If you encounter problems viewing the presentation or hearing the audio, please contact the host/presenter through the chat feature in WebEx.



Thank You

- ▶ We appreciate your service!
- ▶ Your expertise and input is essential to the mission of the National Science Foundation and we greatly appreciate your efforts!



Reviewers should have:

- ▶ Panel assignment information
 - Panel ID number
 - Contact information for cognizant program officer
 - Panel dates
 - For virtual panelists: connection information and access to appropriate computer resources
- ▶ Access to proposals in Fastlane
 - System-generated, temporary password
- ▶ Role for each proposal



Resources

- ▶ PEER Program Page Website:

<https://www.nsf.gov/pubs/2019/nsf19557/nsf19557.htm>

- ▶ NSF Proposal & Award Policies and Procedures Guide (PAPPG), February 2019 (nsf190001)

- ▶ Tips for Reviewers:

<https://tipsforreviewers.nsf.gov>



ECR:PEER Overview

- ▶ New Initiative from NSF and the Boeing Company
- ▶ Training in critical skill areas for engineering and advanced manufacturing workforce
- ▶ Design, development, deployment, and **research** of creative online curricula
- ▶ Workshops to imagine the future of production engineering education



Five Focal Areas

- ▶ Five focal areas
 - Model-based systems engineering
 - Software engineering
 - Mechatronics
 - Data science
 - Artificial Intelligence



Two Proposal Tracks

- ▶ Track 1: Course, Curriculum and Evaluation (CCE) awards
 - \$2,000,000 maximum for up to three years

- ▶ Track 2: Workforce Development Workshops
 - \$100,000 maximum for up to one year

- ▶ Anticipate up to 5 awards in each track in FY19, pending availability of funds

Required Elements of All Proposals



- ▶ Learning science research is required
- ▶ Successful proposals will collect, analyze and utilize rich data sources beyond only click stream data, as appropriate to the:
 - Proposed research
 - Focal area
 - Details of the learning environment



Required Elements of All Proposals

- ▶ Will include cybersecurity, privacy, and ethical concerns as design elements
- ▶ NSF encourages the engagement of a range of disciplines:
 - Engineering, engineering education, computer science, information science, computational science, mathematics, statistics, and cognitive science

Track 1: Course, Curriculum and Evaluation awards



- ▶ **Goal:** Revolutionize production engineering education and significantly improve the quality, quantity and diversity of the STEM workforce for production engineering.
- ▶ **Mechanism:** Develop coordinated learning opportunities across two-year, undergraduate, and professional educational environments.



Track 1: 10 Components

- ▶ All Track 1 proposals must address each component explicitly in the project narrative
 1. Design, develop and deploy integrated curricular materials that are vertically coherent at the (a) professional, (b) four year, and (c) two-year college levels.
 2. Align with industry to address workforce critical STEM skill gaps and to ground academic theories in practical work realities of production manufacturing.



10 Components, cont.

3. Specify learning objectives that are sufficiently challenging and rigorous to bring about enhanced mastery of fundamentals, sophisticated conceptual understandings, and ways of thinking essential to allow students to demonstrate success in the STEM workforce.
 - Competitive proposals will engage learners in active learning activities and meaningful projects tied to the needs of the STEM workforce



10 Components, cont.

4. Draw on the insights from Engineering Education research such that content and context of the learning experience is responsive to disciplinary concerns
5. Provide tools for those in the professional workforce to improve their current skills and acquire new skills
6. Develop critical STEM skills at the two-year college level that prepare students of the workplace and/or prepare them for an effective transition to study at the undergraduate level



10 Components, cont.

7. Develop critical STEM skills at the undergraduate level that prepare students for the workplace and prepare them for an effective transition to study at the graduate level
8. Integrate the development and application of valid and reliable mechanisms to inform and assess the effectiveness of the curriculum and delivery mechanisms
9. Incorporate the principles of open science, open data and the access principles of OER for all curricular materials and learning analytics techniques and algorithms



10 Components, cont.

10. Modularize the learning materials so that students can learn and obtain certification of their competency in selected areas
- ▶ See solicitation regarding open access licensing guidelines

Strategies for Course Development and Roll Out

- ▶ Opportunities for professional audiences should be designed and deployed first
- ▶ All courses should include gathering and analysis of multiple data sources to inform design effectiveness and theory development
- ▶ Subsequent courses should be **vertically coherent** with the professional courses
- ▶ All courses my address ethical and privacy issues with proposed data analytics



Scaling and Equipment Support

- ▶ Follow Open Educational Resources (OER) guidelines
- ▶ Technology to support courses should not exceed 10% of the budget



Research and Evaluation

- ▶ Include BOTH a research plan and an evaluation plan
- ▶ Research plan must include:
 - Research questions
 - Description of subjects and recruitment
 - Data collection methods
 - Data analysis plan
 - Plan for dissemination of outcomes
- ▶ See *Common Guidelines for Education Research and Development*

Track 2: Workforce Development Workshops



- ▶ Goal: solicit and synthesize insights from experts in academic, for-profit and non-profit sectors to describe the future of production engineering and production engineering education for one of the five focal areas.
- ▶ Encourage participation from a range of disciplines
- ▶ Outcomes should include recommendations for improving the quality, quantity, and diversity of the STEM workforce
- ▶ See solicitation for workshop design guidelines



NSF Merit Review Criteria

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

Both criteria, **Intellectual Merit** and **Broader Impact**, will be given full consideration during the review and decision-making processes. Proposers must fully address **both** criteria.

Merit Review Considerations



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

Merit Review Considerations



- ▶ How well qualified is the individual, team, or organization to conduct the proposed activities?
- ▶ Are there adequate resources available to the PI (either at the home institution or through collaborations) to carry out the proposed activities?
- ▶ Review Facilities, Equipment and Other Resources, Data Management Plan, and Postdoctoral Researcher Mentoring Plan



Solicitation-Specific Criteria

- ▶ **Both Tracks**
 - Evaluation plan
 - Dissemination plan
- ▶ **Track 1**
 - Course quality: content and delivery
 - Research plan (separate from evaluation plan)
 - Addressing workforce needs
 - Certifications
 - Vertical Integration
 - Sustainability
- ▶ **Track 2**
 - Coordination with Track 1 projects
 - Research Hubs
 - Industry Involvement



Writing Your Review

- ▶ Use template
- ▶ Separate strengths and weaknesses under Intellectual Merit and Broader Impacts
- ▶ Include Solicitation-specific criteria
- ▶ Check for consistency of comments and overall rating (no split ratings)
- ▶ Okay to modify reviews during panel
- ▶ Watch out for crazy MS Word symbols when pasting into Fastlane.



Informative Reviews

- ▶ Positive tone
- ▶ Adequate details explaining strengths and weaknesses
- ▶ Audience: PI, NSF Program Officers, Others
- ▶ Understandable, specific, and complete statements (read out loud)
- ▶ Be specific about how proposal could be strengthened



Budgets

- ▶ Does the budget match the scope?
 - Sufficient resources to accomplish project goals
 - Reasonable estimates for time and money required
- ▶ Budgets can and probably will be negotiated where needed



Letters of Collaboration

- ▶ All collaborations should be documented with letters.
- ▶ Letters should only state intent to collaborate and commit time and resources.
- ▶ Letters of endorsement are not allowed and should be ignored.



Panel Procedures

- ▶ Each proposal will usually have 5 or 6 reviews
- ▶ On some panels, you may not be assigned to read all of the proposals
- ▶ Roles
 - Primary Reviewer/Scribe
 - Secondary Reviewer
 - Panelist



Panel Summaries

- ▶ Written after panel discussion
- ▶ Responsibility of scribe
- ▶ Reflects panel discussion (not a restatement of individual reviews)
- ▶ Written in third person
- ▶ Reviewed and approved by entire panel



Proposer Receives

- ▶ Reviews (anonymous)
- ▶ Panel Summary (anonymous)
- ▶ Context Statement
- ▶ Award/Declination Letter
 - Program Officer Comments



Confidentiality

- ▶ Proposals and proposers are confidential
- ▶ No discussion of proposals outside of panel
- ▶ You must not copy, quote from, otherwise use or disclose material from any proposal you review
- ▶ The fact that you are reviewing ECR: PEER proposals must also be kept confidential



Questions

- ▶ Please type questions into the chat box and the moderator will respond to the group as a whole.
- ▶ Questions can be emailed to EHRPEER@nsf.gov or you can call the Program Officer in charge of your panel

Address questions to the
program via:

ECRPEER@nsf.gov

