



NATIONAL SCIENCE FOUNDATION  
4201 WILSON BOULEVARD  
ARLINGTON, VIRGINIA 22230

NSF 15-045

## Frequently Asked Questions (FAQs) for Engineering Education and Center's Professional Formation of Engineers: Research Initiation in Engineering Formation (PFE: RIEF) Program, [NSF 15-539](#)

---

1. What are the overall goals of the PFE: RIEF program?
2. How do I determine if my idea is a good fit to the PFE: RIEF program?
3. Can you provide additional details on the types of projects that the PFE: RIEF program is looking for?
4. The program solicitation lists six topics that need to be addressed in the project description. Does my proposal have to address these topics in the order given?
5. I have an idea to create a new course, series of courses, or laboratory for engineering students. Can this be funded through the PFE: RIEF program?
6. Does this program fund initial investigations only, or can I apply to continue a project that is ending?
7. What are the most common issues with PFE: RIEF proposals that reviewers identify?
8. Is an external evaluator required on PFE: RIEF proposals?
9. Are interdisciplinary partnerships required on PFE: RIEF proposals?
10. May the budget on a PFE: RIEF proposal exceed \$150,000?
11. Can an institution submit more than one proposal or may an individual serve as a co-PI on multiple proposals?
12. I am part of an NSF research center which includes an education mission. Can I submit a PFE: RIEF proposal?
13. Are PFE: RIEF proposals eligible for supplements?
14. What do I choose on Fastlane to submit a proposal?
15. Fifteen pages is not enough space to describe the project and the topics listed in the solicitation. Are appendices allowed?
16. I have a project with several partners. Should I include them as coPIs, consultants, or submit collaborative proposals?

### OVERALL PROGRAM GOALS

---

#### 1. What are the overall goals of the PFE: RIEF program?

The PFE: RIEF program focuses on engaging engineering faculty in robust, formal research in engineering formation. Since the theoretical background, experimental methods, and tacit knowledge of research in engineering education and related fields addressing engineering formation are likely unfamiliar to most engineering faculty, the PFE: RIEF program is designed to create long-term partnerships between engineers and researchers in the social and learning sciences and related disciplines.

#### 2. How do I determine if my idea is a good fit to the PFE: RIEF program?

Unlike many other NSF research programs, the PFE: RIEF program focuses primarily on initiating rather than completing an engineering formation research project. Proposals which are successful in the PFE: RIEF program propose a research project with an appropriate scope supported by partnerships with experts in engineering formation, engineering education or related fields.

Proposals that are NOT appropriate for the PFE: RIEF solicitation include:

- Projects which focus primarily on course, tool, or content development.
- Projects which do not include a strong partnership between engineering faculty and experts from non-engineering disciplines.
- Projects which fail to address research questions, propose a hypothesis to be tested, or utilize a theoretical framework.

The best way to determine if your ideas fit the program is to contact the cognizant program officer via e-mail or by phone. All potential Principal Investigators (PIs) are strongly encouraged to contact the program director prior to proposal preparation.

### 3. **Can you provide additional details on the types of projects that the PFE: RIEF program is looking for?**

The PFE: RIEF program does not seek research on specific topics or outcomes. Rather this program seeks to support new collaborative efforts between engineering formation experts and engineering researchers to address the national issue of creating a highly qualified engineering workforce for the United States.

The Engineering Education and Centers division (EEC) that sponsors the PFE: RIEF program is in the Engineering directorate at NSF (ENG). EEC seeks to initiate and nurture discoveries and innovations that inform engineering formation processes and systems that can dynamically and rapidly adapt to meet the changing needs of society and the nation's economy, be equally accessible to all members of society, and constantly improve the quality and diversity of graduates ready to enter the technical workforce.

Given its foundation in the Engineering Directorate, the PFE: RIEF program considers engineering formation to be a professional responsibility of engineers to sustain and grow the profession. It is a holistic process that comprises not only education but also cultural and social processes and value systems and thus requires insights from engineers and non-engineers to fully understand. Compared to programs which focus primarily on advancing scientific knowledge of learning-such as EHR Core Research (ECR) - or on leveraging this knowledge for curricular, pedagogical, and institutional change - such as Improving Undergraduate STEM Education (IUSE) - the PFE: RIEF program seeks to develop collaborative partnerships to discover how such understanding and resources can be effectively applied to improve the *systems and holistic processes* that form US engineers. Such partnerships initiate cross-disciplinary research to identify and correct bottlenecks and inefficiencies and suggest systemic improvements to engineering formation. Although such research may result in new discoveries, new directions for scientific research, or new products, the focus is on discovering how to combine engineering tools, knowledge, and perspectives with those from social and learning sciences to "engineer" the education system for better performance.

Across the entire domain of research on professional formation of engineers, the PFE: RIEF program reserves some funding for highly transformative, "blue sky" ideas that can inform significant change.

## **PROPOSAL PREPARATION**

---

**4. The program solicitation lists six topics that need to be addressed in the project description. Does my proposal have to address these six topics in the order given?**

While all six topics—background of PI, motivation, the problem addressed, interdisciplinary partnerships, development plan, and future research—need to be addressed in the project description, it is up to the author to determine how to best incorporate these into the narrative.

**5. I have an idea to create a new course, series of courses, or laboratory for engineering students. Can this be funded through the PFE: RIEF program?**

No. The PFE: RIEF program funds initial *research* in engineering formation that is generalizable and/or transferable. If the course(s)/lab will be the vehicle through which the research is done, then a better case for funding can be made. The review of the proposal will be based on the research, however, not on the novelty or importance of the course(s)/lab.

**6. Does this program fund initial investigations only, or can I apply to continue a project that is ending?**

Renewal of existing projects will **not** be considered in the PFE: RIEF program. While PIs are expected to continue the research initiated in the PFE: RIEF program, this program is not appropriate for funding renewal. Programs where PFE: RIEF projects may receive additional funding include but are not limited to: the Research in Engineering Education (REE) program and other PFE programs in the Division of Engineering Education and Centers (EEC) in the Engineering Directorate (ENG), or Improving Undergraduate STEM Education (IUSE) or EHR Core Research (ECR) in the Education and Human Resources (EHR) Directorate.

**7. What are the most common issues with PFE: RIEF proposals that reviewers identify?**

In no particular order:

- The partnership between engineering faculty and experts from social sciences, education, etc. is weak or perfunctory. Plans for creating a strong, synergistic partnership are vague or lacking.
- The proposed research plan is flawed or incomplete. It often seems that the engineering PI did not engage their partners in framing and identifying research questions, developing an appropriate methodology, or matching the scale of the project to the available resources before submitting the proposal. The proposal should be developed collaboratively by the partners.
- The project is focused on development of courses, tools, or content rather than on research. The proposal should clearly state research questions to be investigated, identify a theoretical framework appropriate for analyzing data, and outline a methodology appropriate to the questions and resources. Your partner should be able to help you address these issues when writing the proposal.
- The project is too broad or ambitious for available resources or duration. Given the fact that the PFE: RIEF program is designed to initiate research, the scope of the project should be appropriate and help to build a foundation for future research.
- The plans for professional development (travel, conferences, course buy-out, etc.) are not linked to the research question, theoretical framework, and methodology. While professional development is encouraged and supported by PFE: RIEF, it needs to be focused and directed by the needs of the project and future plans of the PI.
- Partnerships are built around locally available individuals rather than disciplinary experts. Just as there are many sub-specialties of engineering, the same is true in other disciplines.

**8. Is an external evaluator required on PFE: RIEF proposals?**

The need for external evaluators typically depends on the size and complexity of the project. While project evaluation is always beneficial, given the limited resources available through the PFE: RIEF program, external evaluation is not required. Contact a program director if you have questions.

**9. Are interdisciplinary partnerships required on PFE: RIEF proposals?**

Yes. Engineering formation research projects require both technical engineering knowledge as well as knowledge from social/education sciences and benefit from interdisciplinary partnerships. The purpose of the PFE: RIEF program is to engage engineering faculty with experts from other disciplines to stimulate new research directions and ideas.

**10. May the budget on a PFE: RIEF proposal exceed \$150,000?**

No. Budgets larger than \$150,000 that are submitted by a PI will be returned without review.

**BUDGET/PROPOSAL PREPARATION**

**11. Can an institution submit more than one proposal or may an individual serve as a co-PI on multiple proposals?**

Yes. There is no limit on proposals per PI or institution.

**12. I am part of an NSF research center which includes an education mission. Can I submit a PFE: RIEF proposal?**

Yes. However the proposed PFE: RIEF research must address research questions not already funded in the center's award. We particularly encourage submissions from Engineering Research Centers (ERCs) in their early phases since the ten year mission of ERCs allows longitudinal studies to be conducted that are difficult to perform otherwise.

**13. Are PFE: RIEF proposals eligible for supplements?**

Except in specific circumstances that bar supplemental funding, PFE: RIEF projects may request supplements. Note that due to NSF limits on the amount of supplements and the \$150,000 limit on PFE: RIEF awards, supplemental funding is limited.

**14. What do I choose on Fastlane to submit a proposal?**

Submit to [NSF 15-539](#). If submitting via Grants.gov, the program solicitation number will be pre-populated by Grants.gov on the NSF Grant Application cover page.

**15. Fifteen pages is not enough space to describe the project and the six topics listed in the solicitation. Are appendices allowed?**

No.

**16. I have a project with several partners. Should I include them as co-PIs, consultants, or submit collaborative proposals?**

This is up to the PI and the organization(s) submitting the proposal based on what is most suitable for the proposed project.