



# Professional Formation of Engineers

The formal and informal processes and value systems by which people become engineers.

“To form is more ontological than to instruct or educate, for one’s entire being is at stake.”

## Elements of PFE

- Introductions to the profession at any age.
- Acquisition of deep technical and professional skills, knowledge, and abilities in both formal and informal settings/domains.
- Development of outlooks, perspectives, ways of thinking, knowing, and doing.
- Development of identity as an engineer and its intersection with other identities.
- Acculturation to the profession, its standards, and norms.



## Engineering Education Research in EEC

- *Research in in the Formation of Engineers* program description
  - Replaces *Research in Engineering Education*
- *Research Initiation in Engineering Formation* solicitation
- *IUSE/PFE: Revolutionizing Engineering and Computer Science Departments* solicitation
- CAREER awards
- Workshops, supplements, cross-cutting opportunities, etc...

### **Current Elements of the Program**

- Advancing holistic engineering formation
- Diversifying pathways to and through engineering
- Exploring citizen engineering, credentialing, and expertise
- Developing engineering-specific theories of how engineers are formed
- Understanding how change in engineering formation processes travels, translates, diffuses, and/or scales



## Research in the Formation of Engineers

- Five categories of interest
  - Advancing holistic engineering formation
  - Diversifying pathways to and through engineering
  - Exploring citizen engineering, credentialing, and expertise
  - Developing engineering-specific theories of how engineers are formed
  - Understanding how change in engineering formation processes travels, translates, diffuses, and/or scales
- Typical awards are \$300-\$350K for three years
  - Talk to program director if you want to go beyond that
- Review looks at the value of the proposal = impact/cost
  - Larger projects need to have a correspondingly larger impact
  - Small, exploratory, and speculative projects are encouraged

**Proposal Deadlines:**  
*Third Wed in Sept, Fourth  
Wed in Jan annually*



## Research Initiation in Engineering Formation

- *RIEF* is intended to increase capacity for engineering education research
- It supports researchers new to engineering education research
- Solicitation requirement is that PI must not have received engineering education funding in last three years
  - In practice PI should have little to no experience in engineering education research
- Co-PI acts as a mentor to the PI
- Research should not be an extension of the co-PI's research
- Professional development plan and plans for future research should have equal weight with the proposed research



# IUSE:EHR Program



## Engaged Student Learning

## Institutional and Community Transformation

Two Approaches

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**Exploration & Design**  
(smaller scale)

**Development & Implementation**  
(larger scale)

**Exploration & Design**  
(smaller scale)

**Development & Implementation**  
(larger scale)

Up to \$300K  
Up to 3 yrs

Level I:  
Up to \$600K Up to 3 yrs  
Level II:  
\$601K to \$2M Up to 5 yrs

Up to \$300K  
Up to 3 yrs

Up to \$3M  
Up to 5 yrs

*Focuses on design, development, implementation of and research on STEM learning models, approaches, and tools*

*Focus on approaches to increase the propagation of highly effective methods of STEM teaching and learning*

**Deadlines (Both tracks):**  
**Exploration/Design: TBD**  
**Development/Implementation: TBD**