Deadline: Rolling.

PD 24-1340: Research in the Formation of Engineers (RFE)
NSF 24-028: DCL: NSF-Lemelson Initiative on Environmental and Social Sustainability in Engineering Education

Directorate of Engineering/Division of Engineering Education and Centers

Logistics

- Please stay muted unless you are speaking
- Use Zoom chat to submit questions during the lecture portion
- Use the ”reactions” > “raise hand” feature to ask a question live
- Real-time captions are available within Zoom

- The presentation slides and webinar recording, excluding Q&A, will be available on the RFE program description as soon as possible following the webinar.

Your NSF and Lemelson team

Alice Pawley
NSF-ENG-EEC

Matthew Verleger
NSF-ENG-EEC

Cindy Cooper
Lemelson Foundation

Email either of us at eer-programs@nsf.gov

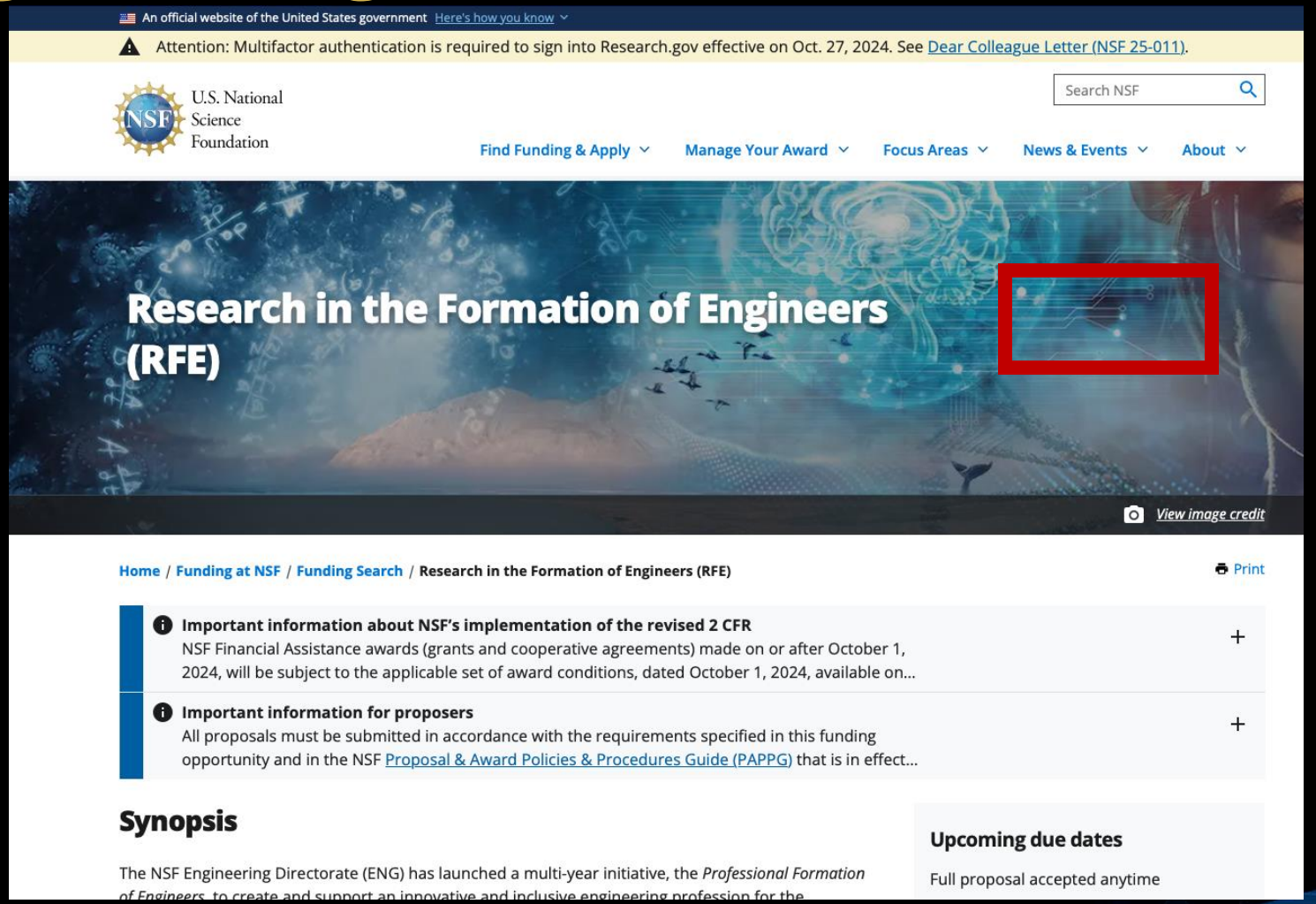
RFE in the EEC “Engineering Education Cluster”

NSF

- Directorate of Engineering
  - Division of Engineering Education and Centers
    - Engineering Education research cluster
      - RFE

“PD 24-1340” means

- Program description (hardly deviates from PAPPG)
- From 2024



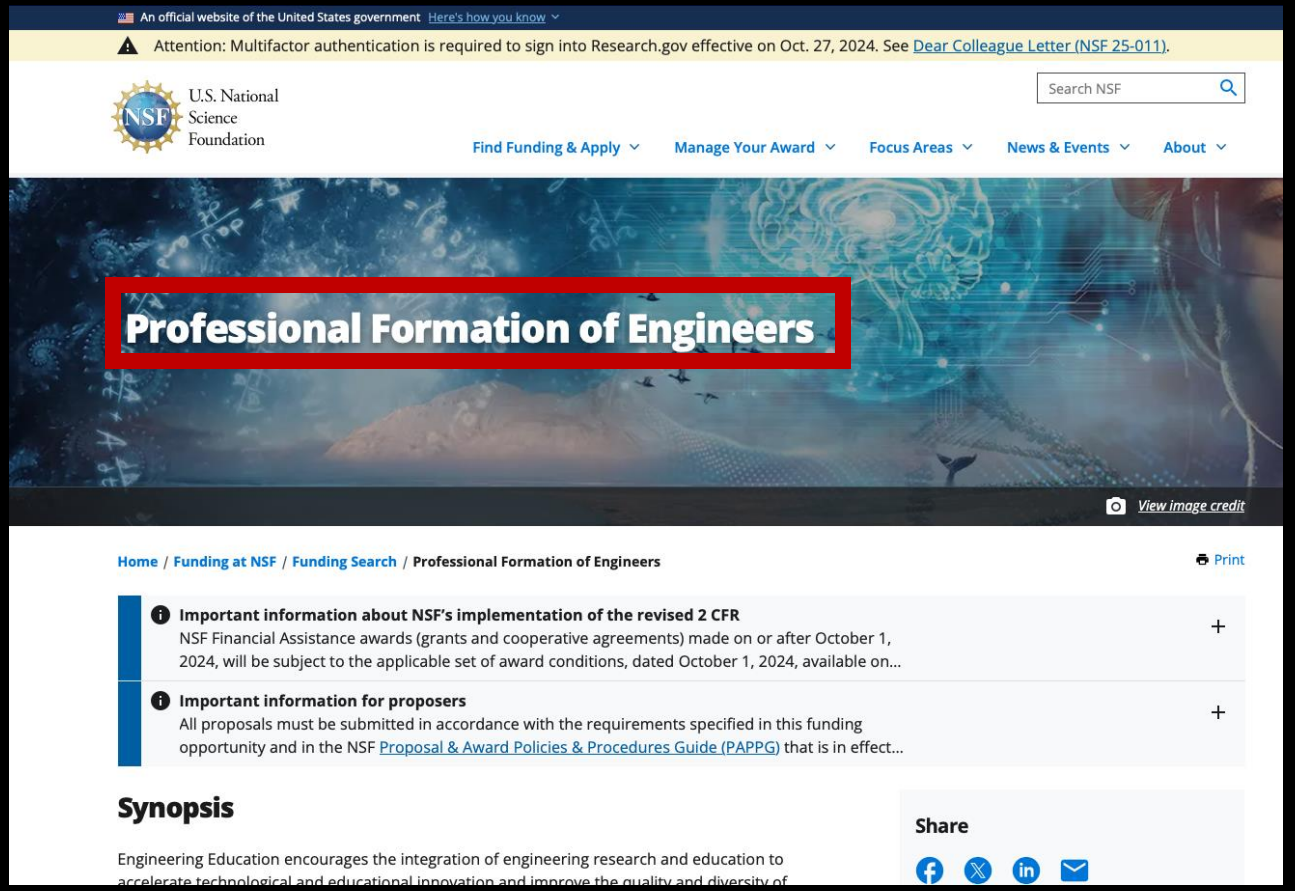
PD 24-1340: Research in Formation of Engineers (“R-F-E”)

- Goal: Support research in the Professional Formation of Engineers (PFE)

Say more about “PFE”…

Professional Formation of Engineers relates to:

1. The formal and informal processes and value systems by which people become engineers.
2. The ethical responsibility of practicing engineers to sustain and grow the profession.



Why is the description for RFE so short? (1)

PD-1340: Because it doesn't deviate from PAPPG for the most part.

- Check you've expanded the "Synopsis"
- Generally, where solicitation is "silent", refer to PAPPG for expectations.

However:

Program contacts

Principal Investigators (PIs) without engineering education research or other social science research experience should consider applying to the Research Initiation in Engineering Formation solicitation (https://www.nsf.gov/funding/pgm_summ.jsp?pims_id=503603) rather than Research in the Formation of Engineers. PIs can contact a cognizant program officer to discuss which program is more appropriate.

Average award size for RFE is $350,000 for 36 months. PIs who wish to submit a proposal with a budget greater than $350,000 must contact a cognizant program officer prior to submission.

Why is the description for RFE so short? (2)

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PIs should have EER or other social science expertise (otherwise apply to RIEF!)

Why is the description for RFE so short? (3)

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PIs should have EER or other social science expertise (otherwise apply to RIEF!)

No timeframe (except < 6 years)
No budget cap (except 😱)

Why is the description for RFE so short? (2)

PD-1340: Because it doesn't deviate from PAPPG for the most part.

- Check you've expanded the "Synopsis"
- Generally, where solicitation is "silent", refer to PAPPG for expectations.

However:

- Title need to designate the type of proposal (Common Guidelines):
  - "Research" proposals
  - "Design and Development proposals"
- Titles going to Lemelson call need to include "NLI:"

What does NSF mean by "research"? (1)

"Common guidelines for educational research"

- Purpose
- Policy or practical significance
- Theoretical and empirical basis
- Project outcomes
- Research plan
- External feedback plan

Credit: Olga Pierrakos

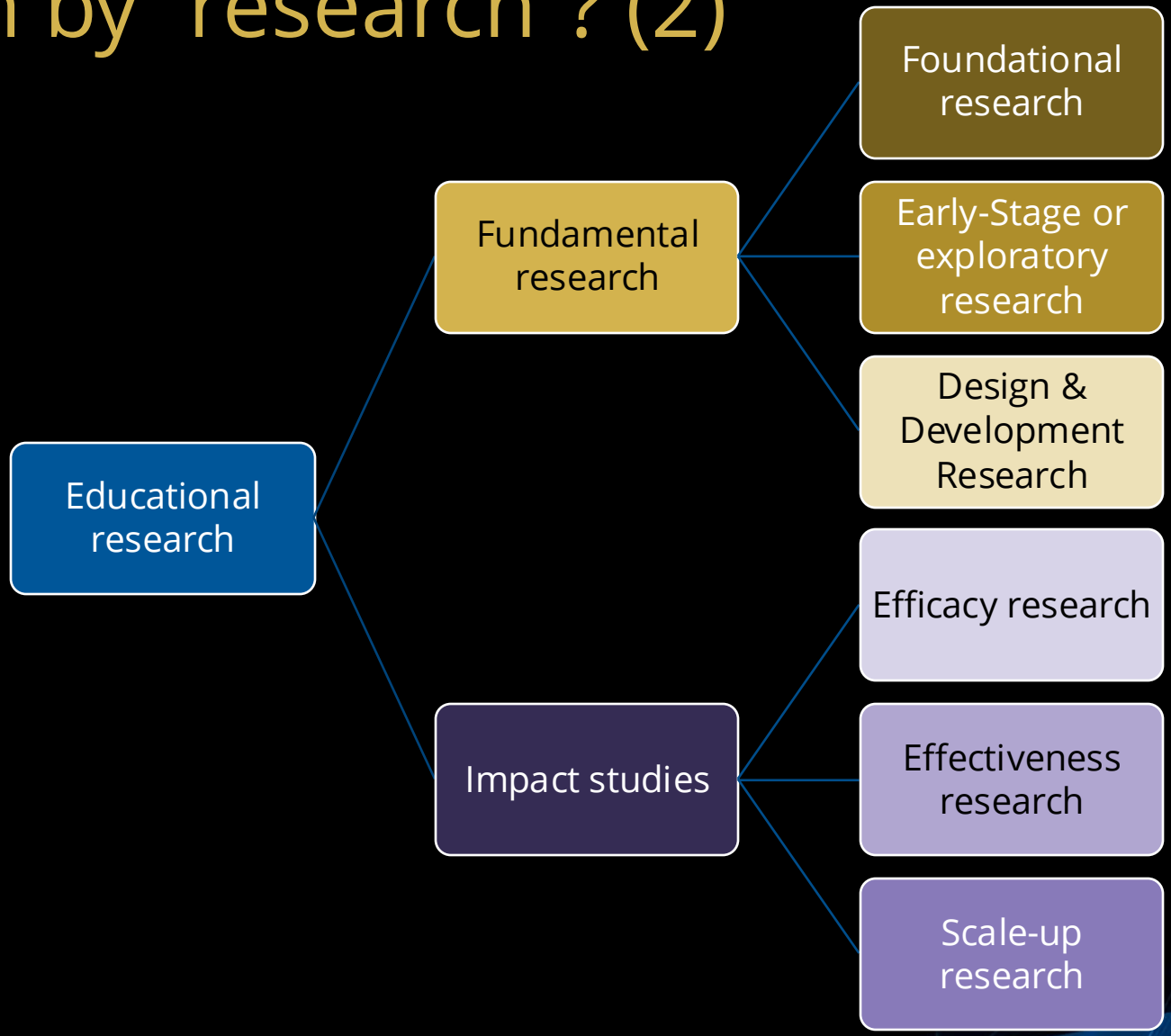
EDUCATION RESEARCH TYPE & GUIDELINES

Justification Guidelines	*Contributes to Core Knowledge*		*Develops Solutions*	*Contributes to Evidence of Impact*		
	1. Foundational Research	**2. Early State or Exploratory Research**	**3. Design & Development Research**	**4. Efficacy Research**	**5. Effectiveness Research**	**6. Scale-up Research**
Purpose	❑ Advance the frontiers of education and learning ❑ Develop and refine theory & methodology ❑ Provide fundamental knowledge about teaching and learning.	❑ Investigate approaches to education problems to establish the basis for design & development of new interventions or strategies, and/or provide evidence for efficacy study	❑ Develop new or improved interventions or strategies to achieve well-specified learning goals or objectives	❑ Determine whether an intervention or strategy can improve outcome under "ideal" conditions	❑ Estimate the impacts of an intervention or strategy when implemented under routine practice conditions	❑ Estimate the impacts of an intervention or strategy under conditions of routine practice and across a broad spectrum of diverse populations and settings
Policy or Practical Significance	❑ Specify and justify research problem(s) to be addressed ❑ Identify research questions	❑ Specify and justify practical education problem(s) or issue(s) to be addressed ❑ Details significance of knowledge to be generated	❑ Specify and justify practical education problem(s) or issue(s) to be addressed ❑ Describes significance & potential of the intervention or strategy	❑ Specify and justify practical education problem(s) or issue(s) to be addressed ❑ Describes significance & potential of the intervention or strategy	❑ Specify and justify practical education problem(s) or issue(s) to be addressed ❑ Describes significance & potential of the intervention or strategy	❑ Specify and justify practical education problem(s) or issue(s) to be addressed ❑ Describes significance & potential of the intervention or strategy
Theoretical and Empirical Basis	❑ Describe and justify theoretical & empirical bases ❑ Describe and justify relevant constructs	❑ Describe and justify theoretical & empirical bases ❑ Describe and justify relevant constructs	❑ Describe and justify theoretical & empirical bases ❑ Describe and justify theory of action or logic model	❑ Describe and justify empirical bases and empirical evidence	❑ Describe and justify empirical bases and empirical evidence	❑ Describe and justify empirical bases and empirical evidence of the support for the intervention or strategy
Project Outcomes	❑ Advance theory, methodology, & understanding of relevant constructs ❑ Include methodological rigor	❑ Include empirical evidence ❑ Specify conceptual framework or theoretical explanation ❑ Include methodological rigor	❑ Include design research ❑ Specify theory of action ❑ Describe design iterations and resulting evidence ❑ Describe empirical evidence and methodological rigor	❑ Detail study goals, design and implementation, data collection and quality, and analysis of findings ❑ Discuss implications of the finding for the theory of action or adjustments	❑ Detail study goals, design and implementation, data collection and quality, and analysis of findings ❑ Discuss implications of the finding for the theory of action or adjustments	❑ Detail study goals, design and implementation, data collection and quality, and analysis of findings ❑ Discuss implications of the finding for the theory of action or adjustments
Research Plan	❑ Describe hypotheses, research questions, and research objectives ❑ Detail study design, study population(s), sampling, methods for data collection, methods for data analysis	❑ Describe hypotheses, research questions, and research objectives ❑ Detail study design, study population(s), sampling, methods for data collection, methods for data analysis	❑ Describe methods for developing the intervention ❑ Detail methods for collecting evidence of feasibility and methods for obtaining pilot data (pilot study)	❑ Detail study design, key outcomes of interest for the impact study, setting(s) and population(s), sampling, methods for data collection, methods for data analysis ❑ Address reliability & validity	❑ Detail study design, key outcomes of interest for the impact study, setting(s) and population(s), sampling, methods for data collection, methods for data analysis ❑ Address reliability & validity	❑ Detail study design, key outcomes of interest for the impact study, setting(s) and population(s), sampling, methods for data collection, methods for data analysis ❑ Address reliability & validity
External Feedback Plan	❑ Include external, critical reviews of its design and activities ❑ Describe plan for continuous improvement of activities and findings	❑ Include external, critical reviews of its design and activities ❑ Describe plan for continuous improvement of activities and findings	❑ Include external, critical reviews of its design and activities ❑ Describe plan for continuous improvement of activities and findings	❑ Include external, critical reviews of its design and activities ❑ Describe plan for continuous improvement of activities and findings	❑ Include external, critical reviews of its design and activities ❑ Describe plan for continuous improvement of activities and findings	❑ Include external, critical reviews of its design and activities ❑ Describe plan for continuous improvement of activities and findings

What does NSF mean by “research”? (2)

“Common guidelines for educational research”

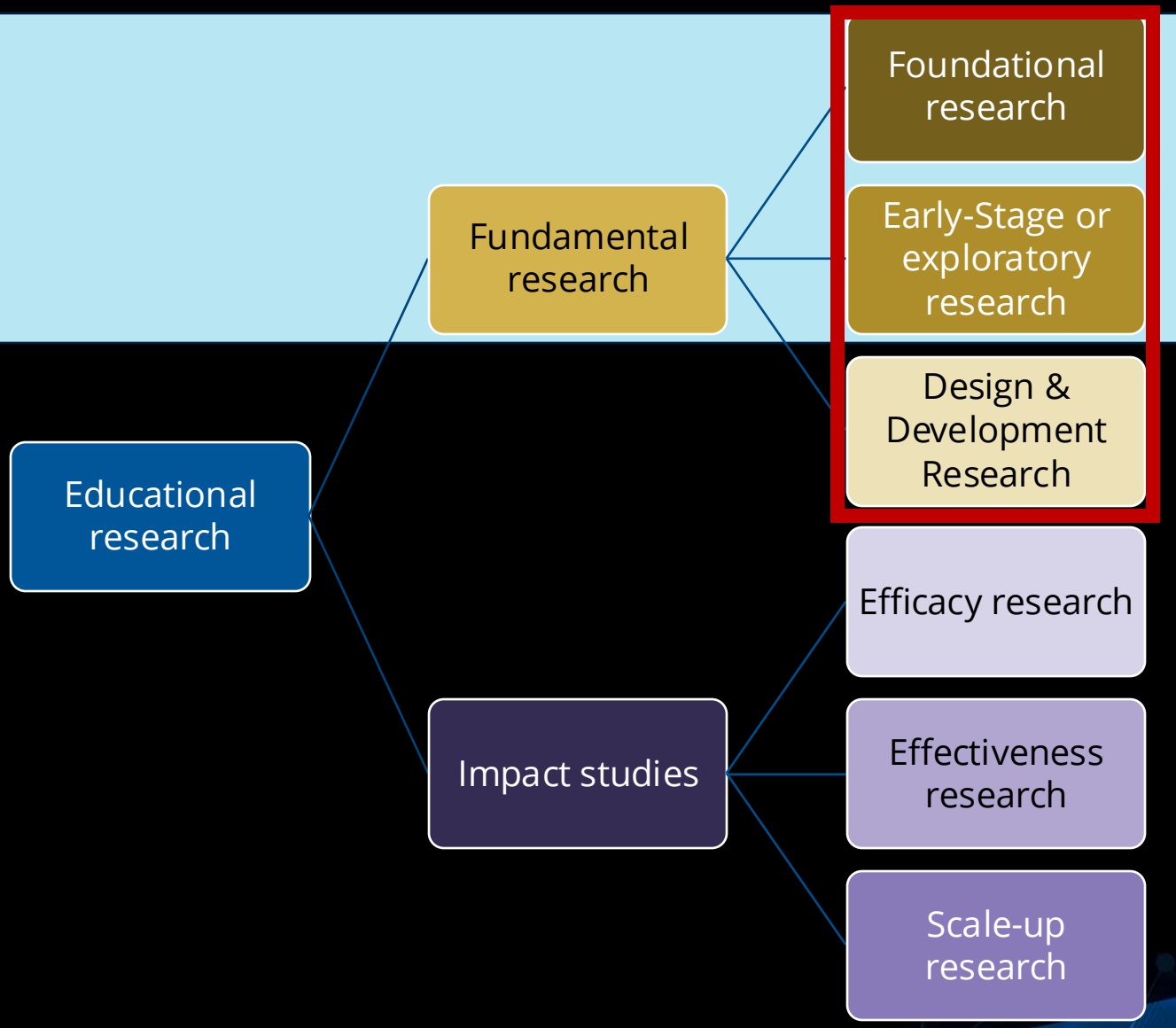
- Purpose
- Policy or practical significance
- Theoretical and empirical basis
- Project outcomes
- Research plan
- External feedback plan



Page 12 especially!!

RFE exception 1

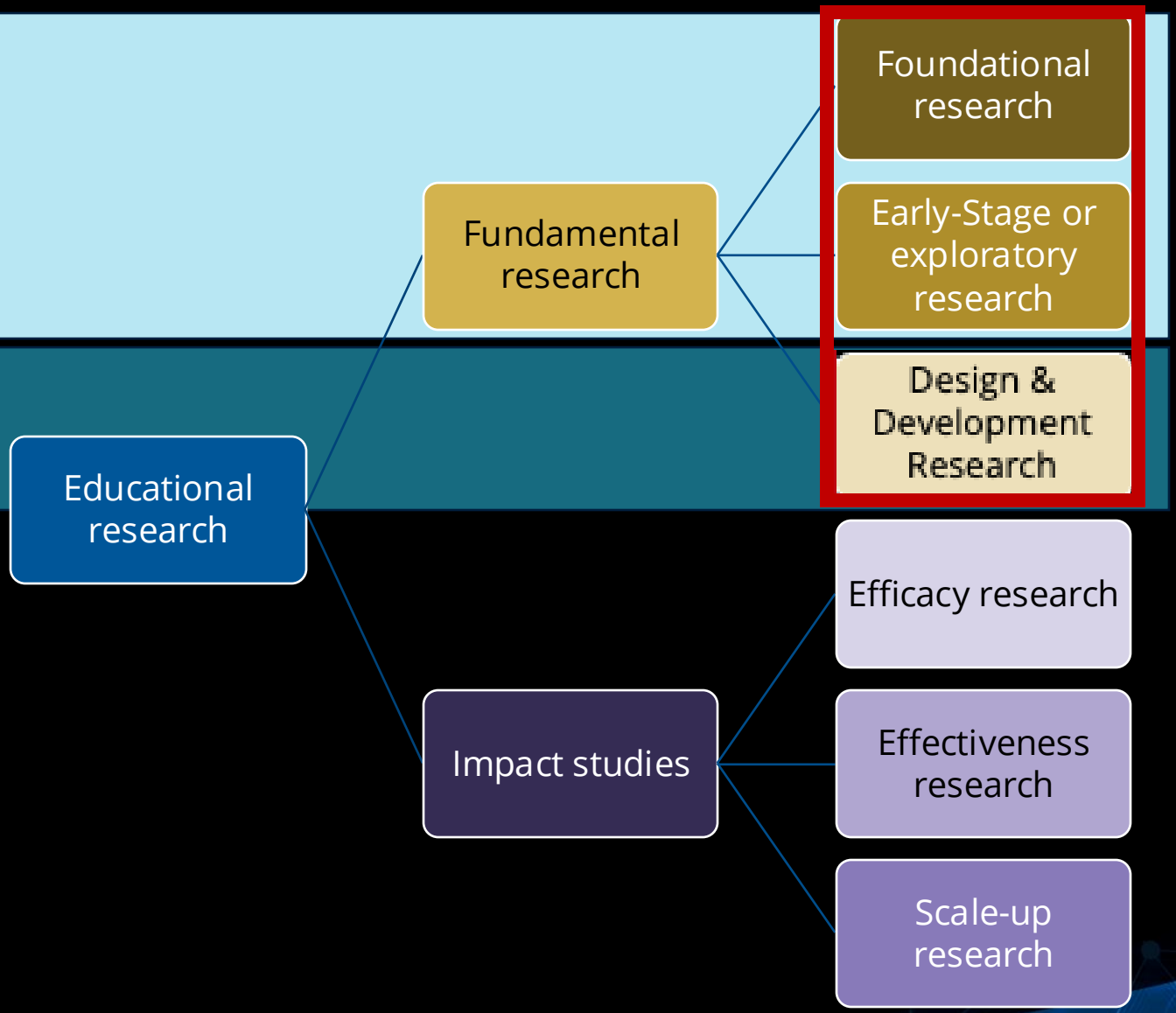
All possible participants relating to PFE



RFE exception 2

All possible participants relating to PFE

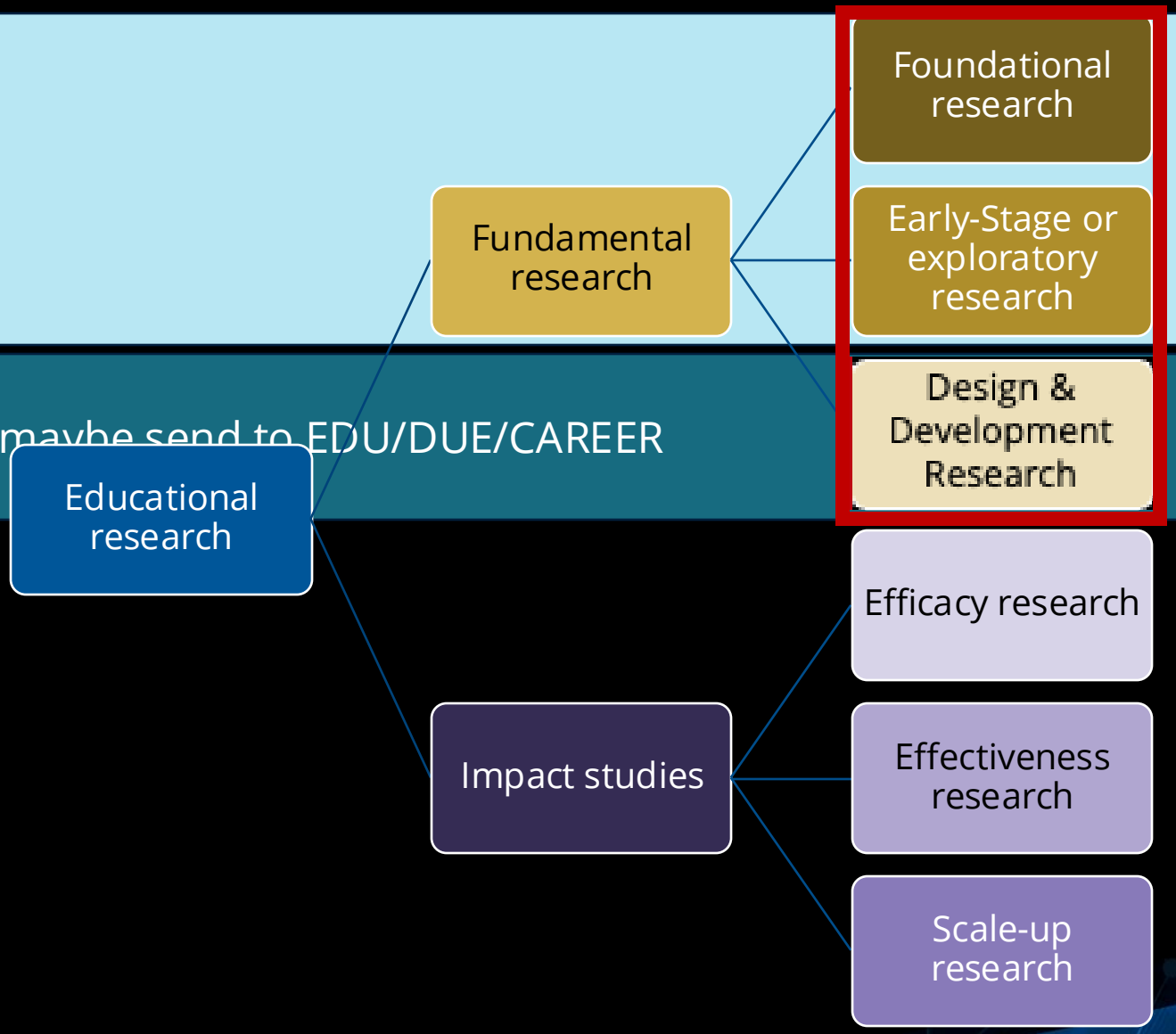
All possible participants relating to PFE



PFE exception 3

All possible participants relating to PFE

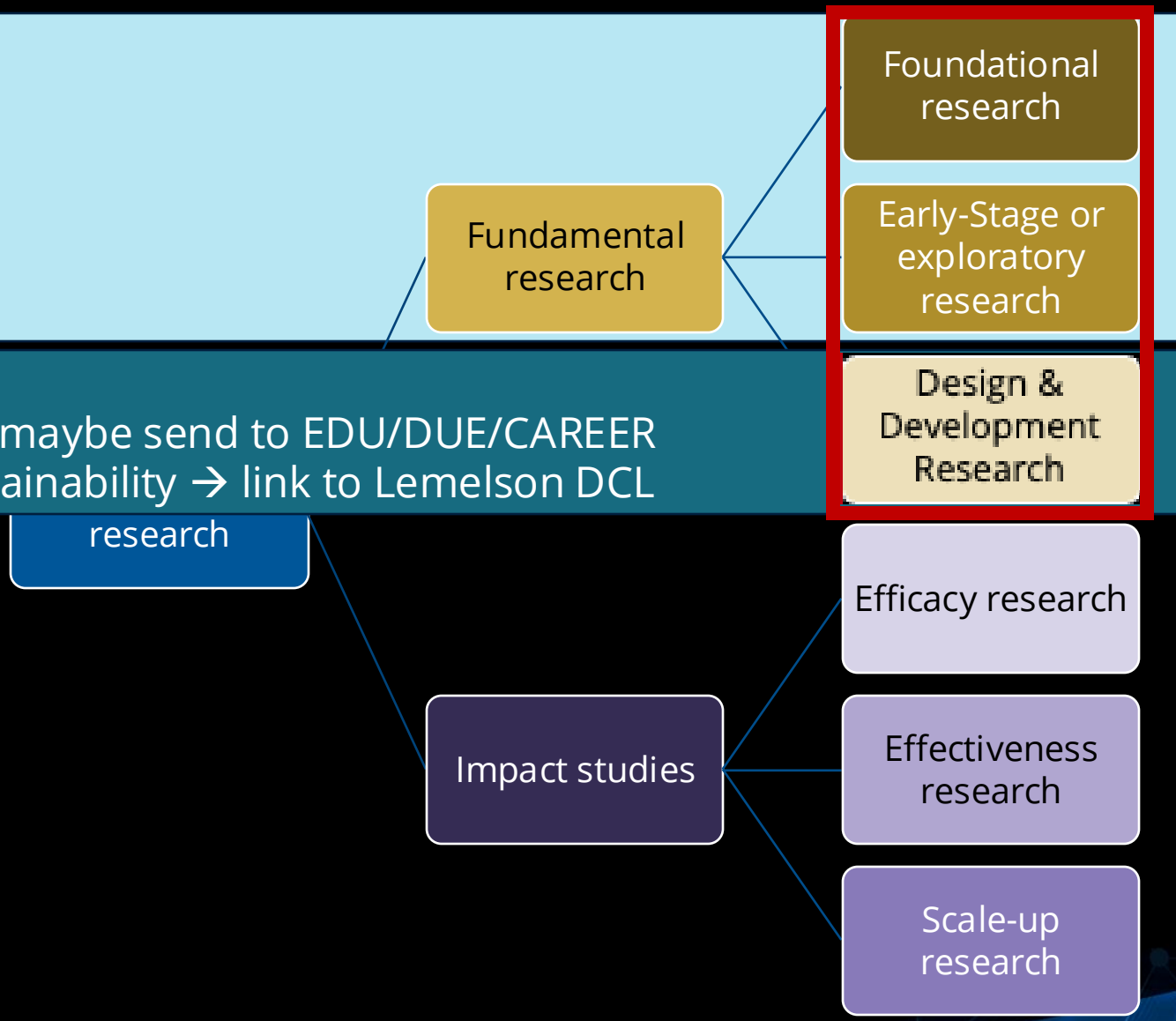
All possible participants relating to PFE
EXCEPT – undergraduate D&D → maybe send to EDU/DUE/CAREER



PFE exception 4

All possible participants relating to PFE

All possible participants relating to PFE
EXCEPT – undergraduate D&D → maybe send to EDU/DUE/CAREER
EXCEPT when about sustainability → link to Lemelson DCL



NSF 24-028: DCL: NSF-Lemelson Initiative on Environmental and Social Sustainability in Engineering Education

- DCL = Dear Colleague Letter
- Must be either “research” or “design & development” project
- Title must include “NLI”
- EOP as potential but not required framework
- Cindy Cooper

What goes into proposals, usually? (1)

- PAPPG – “proposal contents”
  - https://www.nsf.gov/policies/pappg/24-1/ch-2-proposal-preparation#d-proposal-contents-171
- Cover sheet (automatically generated)
- Project summary (not an “abstract”; must include broader impact explicitly described) – 1 p
- Table of contents (automatically generated)
- Project Description (15 pages, we’ll come back to this)
- Reference cited
- Budget (produced by your sponsored programs people)
- Budget justification (you write, but use your SPS’s categories).

https://www.nsf.gov/policies/pappg

What goes into proposals, usually? (2)

- PAPPG – “proposal contents”
  - https://www.nsf.gov/policies/pappg/24-1/ch-2-proposal-preparation#d-proposal-contents-171
- Facilities, Equipment and Other Resources
  - No template. Should show reviewers you have the research tools and space to do what you propose to do.
- Senior/Key Personnel Documents – per PI
  - Biosketch – use standard tool
  - Current & Pending – work with your SPS
  - Collaborators and other affiliations – so we avoid your COIs – helps to include the personnel from this proposal!
  - Synergistic activities – what relevant experiences do you have to show you will be able to do what you are proposing?

https://www.nsf.gov/policies/pappg

What goes into proposals, usually? (3)

- PAPPG – “proposal contents”
  - https://www.nsf.gov/policies/pappg/24-1/ch-2-proposal-preparation#d-proposal-contents-171
- Supplementary Documentation
  - Mentoring plan – if the grant would fund a graduate student or postdoctoral researcher. No template. (More in a minute.)
  - Data Management and Sharing Plan
    - ENG: https://www.nsf.gov/eng/data-management-plans
      - Products of research
      - Data formats and standards
      - Dissemination, access, and sharing of data
      - Reuse, redistribution and production of derivatives
      - Archiving of data.
    - Other considerations: IP, IRB, use of AI, who will maintain

https://www.nsf.gov/policies/pappg

What goes into proposals, usually? (4)

- PAPPG – “proposal contents”
  - https://www.nsf.gov/policies/pappg/24-1/ch-2-proposal-preparation#d-proposal-contents-171
- Single copy documents
  - Authorization to deviate from proposal requirements (like if you miss the deadline because of a hurricane.)
  - List of suggested reviewers, or reviewers not to include
  - Any proprietary information (not usually applicable here)
  - Proposal certifications by your institution (takes time – so build into your timeline for submission.)
    - Includes certification of “safe and inclusive working environments for off-campus or off-site research” which you can request to see
    - Includes proposal certifications from PIs/key personnel (certifying info is true in biosketch, C&P, and malign foreign talent recruitment programs)

https://www.nsf.gov/policies/pappg

Single copy: Mentoring plan (for postdoc/grads)

- For both postdoctoral researchers and graduate student researchers
  - Budget: B. Other Personnel or F. Participant Support Costs
- Limited to one page total
  - (even if both graduate students and postdoctoral scholars are on project)
  - Excess content can be included within Project Description page limit.
- Reviewed under the Broader Impacts criterion
  - Does the plan effectively address both research mentoring and broader career and professional development?
  - Will the mentoring activities support the development of skills and competencies needed for the proposed project? For the trainee's continuing professional growth?
  - Will the mentoring activities help grad students graduate and postdocs advance to their next career step?
  - Does the plan reference the annual use of Individual Development Plans (IDPs) for trainees receiving "substantial" support?

Research or Impacts on Tribal Lands

Proposals that may impact the resources or interests of a federally recognized American Indian or Alaska Native Tribal Nation (Tribal Nation) will not be awarded by NSF without prior written approval from the official(s) designated by the relevant Tribal Nation(s).

- Proposers seeking NSF funding for such proposals must… Include at least one of the following:
  i. a copy of the written request to the relevant Tribe(s) to carry out any proposed activity/activities that may require prior approval from the Tribal Nation(s);
  ii. written confirmation from the Tribal Nation(s) that review and approval is not required; or
  iii. a copy of a document from the relevant Tribal Nation(s) that provides the requisite approval.
- All such documentation must be uploaded into "Other supplementary documents" in Research.gov. If only (i) is provided, the proposer will still be required to submit either (ii) or (iii) before NSF will make an award decision.

“Research” proposals (p. 12)

- “Foundational” research goals
  - Advance frontiers of education and learning
  - Develop and refine theory and methodology
  - Provide fundamental knowledge about teaching and/or learning
- “Early-stage or exploratory” research goals
  - Investigate approaches to education problems to establish the basis for design and development of new interventions or strategies
  - Provide evidence for whether an established intervention or strategy is ready to be to be tested in an efficacy study

EDUCATION RES

Justification Guidelines	*Contributes to Core Knowledge*	
	1. Foundational Research	**2. Early State or Exploratory Research**
Purpose	❑ Advance the frontiers of education and learning ❑ Develop and refine theory & methodology ❑ Provide fundamental knowledge about teaching and learning.	❑ Investigate approaches to education problems to establish the basis for design & development of new interventions or strategies, and/or provide evidence for efficacy study
Policy or Practical Significance	❑ Specify and justify research problem(s) to be addressed ❑ Identify research questions	❑ Specify and justify practical education problem(s) or issue(s) to be addressed ❑ Details significance of knowledge to be generated
Theoretical and Empirical Basis	❑ Describe and justify theoretical & empirical bases ❑ Describe and justify relevant constructs	❑ Describe and justify theoretical & empirical bases ❑ Describe and justify relevant constructs
Project Outcomes	❑ Advance theory, methodology, & understanding of relevant constructs ❑ Include methodological rigor	❑ Include empirical evidence ❑ Specify conceptual framework or theoretical explanation ❑ Include methodological rigor
Research Plan	❑ Describe hypotheses, research questions, and research objectives ❑ Detail study design, study population(s), sampling, methods for data collection, methods for data analysis	❑ Describe hypotheses, research questions, and research objectives ❑ Detail study design, study population(s), sampling, methods for data collection, methods for data analysis
External Feedback Plan	❑ Include external, critical reviews of its design and activities ❑ Describe plan for continuous improvement of activities and findings	❑ Include external, critical reviews of its design and activities ❑ Describe plan for continuous improvement of activities and findings

“Design and Development” proposals

- Goals
  - Develop new or improved interventions or strategies to achieve well-specified learning goals or objectives (including making refinements on basis of small-scale testing
- Usually involves one or more stages:
  - Develop solution based on well-specified theory of action appropriate to well-defined user (or user group)
  - Create measures to assess the implementation of a solution
  - Collect of data on feasibility of implementing solution(s) in typical delivery setting by intended users
  - Conduct pilot study to examine promise of generating intended outcomes.

	ɛARCH TY
Justification Guidelines	*Develops Solutions*
	3. Design & Development Research
Purpose	❑ Develop new or improved interventions or strategies to achieve well-specified learning goals or objectives
Policy or Practical Significance	❑ Specify and justify practical education problem(s) or issue(s) to be addressed ❑ Describes significance & potential of the intervention or strategy
Theoretical and Empirical Basis	❑ Describe and justify theoretical & empirical bases ❑ Describe and justify theory of action or logic model
Project Outcomes	❑ Include design research ❑ Specify theory of action ❑ Describe design iterations and resulting evidence ❑ Describe empirical evidence and methodological rigor
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External Feedback Plan	❑ Include external, critical reviews of its design and activities ❑ Describe plan for continuous improvement of activities and findings

Merit Review Criteria

Why is this project worth taxpayers' investment?

Intellectual Merit (1)

"Encompasses the potential to advance knowledge."

What is your argument that this is worth taxpayers' investment?

1. IM - It's a great idea, with a great plan, as evidenced by grounding in existing research, data, and norms

Intellectual Merit (2)

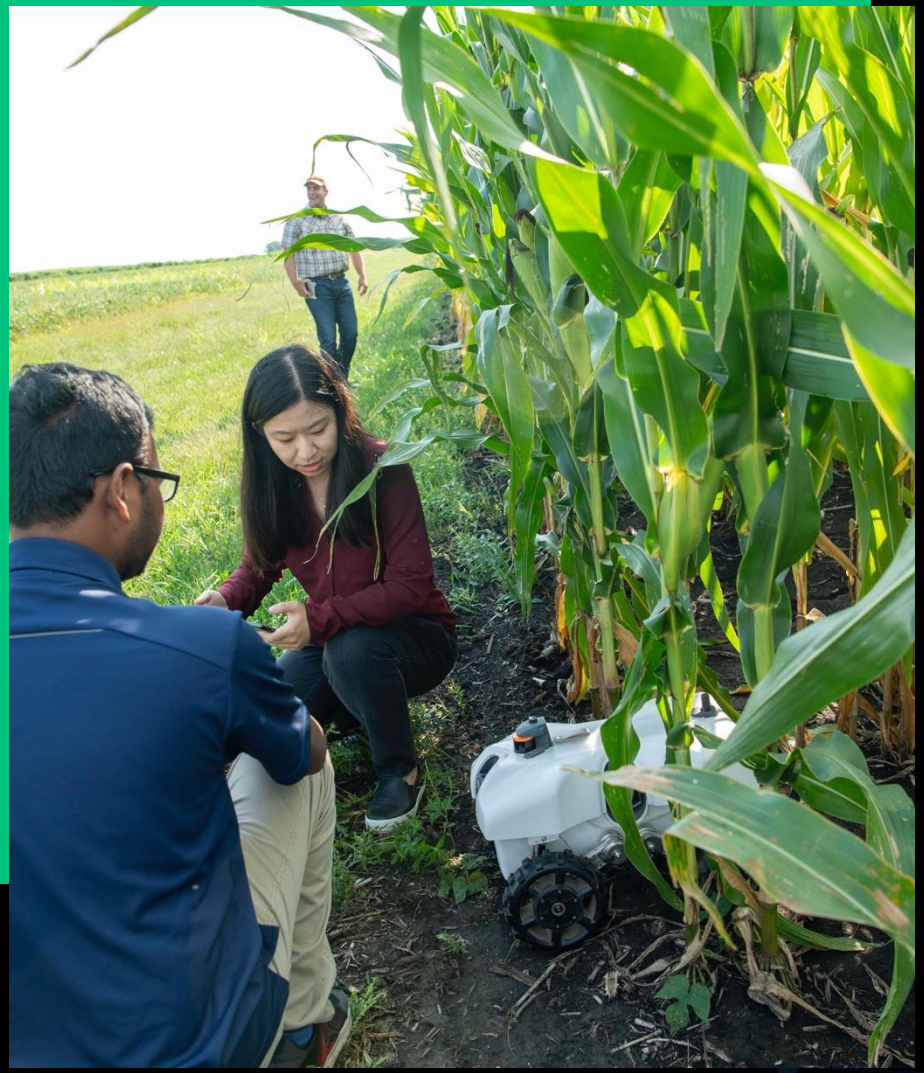
- Should this be done?
  - Will it advance knowledge and understanding?
  - Does it matter within the field and across fields?
  - Does it constitute creative, original, or potentially transformative research?
  - What is the significance of the expected contributions?
- Can this be done? (How well conceived and organized is the proposed activity?)
  - Soundness and feasibility of approach, evaluation, research plan given the resources requested and resources available at the institution
  - How qualified is the team to conduct the proposed research?
  - Will the team's plan curate data appropriately, mentor staff appropriately?
  - Does the team have access to necessary equipment and facilities?

Broader Impacts (1)

What is your argument that this is worth taxpayers' investment?

2. BI – It will benefit society in specific, concrete ways.
    - Inclusion – broadening participation
    - Improve STEM education at any level
    - Increase public science literacy and engagement with STEM
    - Improving societal well-being
    - Developing a better global workforce
    - Build partnerships between academia and industry or others
    - Improve national security
    - Increase economic competitiveness
    - Enhance infrastructure for research and education

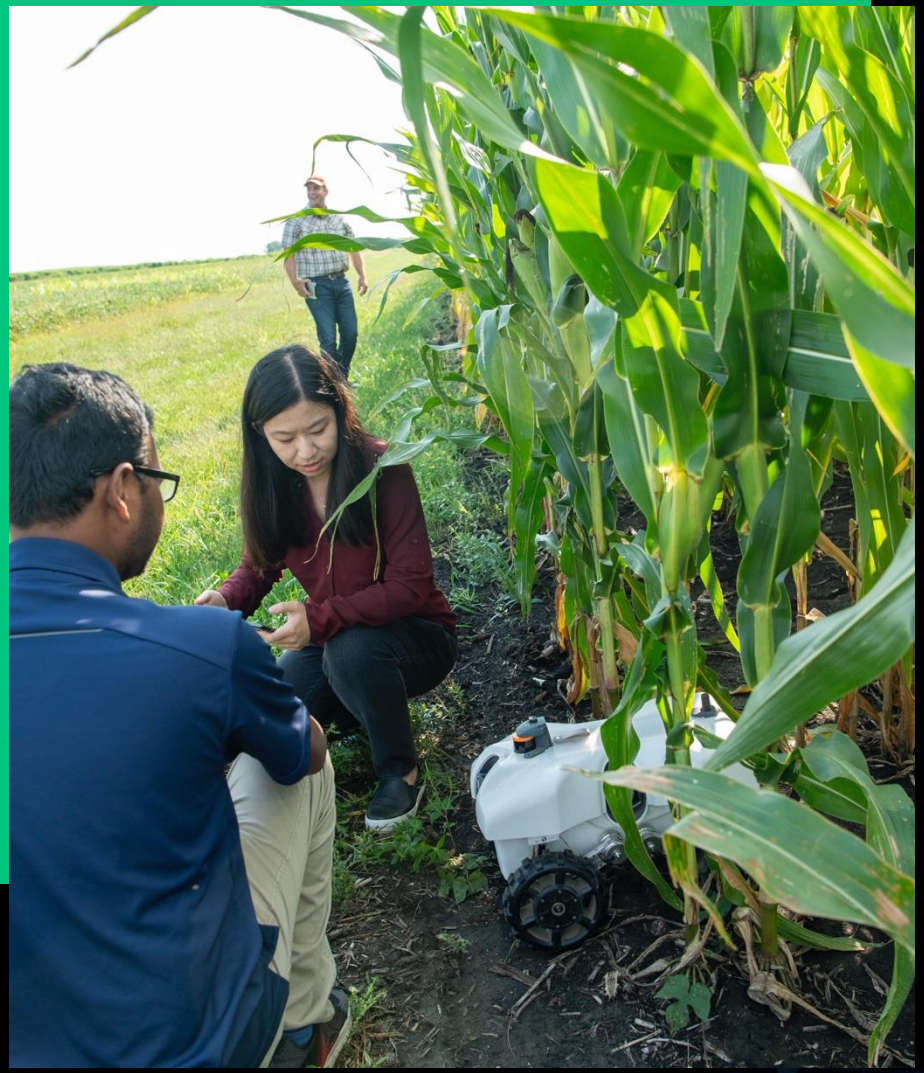
https://www.nsf.gov/funding/learn/broader-impacts



Broader Impacts (2)

Accomplished through

- the research itself;
- activities that are directly related to specific research projects (like postdoc/grad mentoring plan is evaluated as part of BI)
  AND / OR
- activities that are supported by, but complementary to the project.



Merit review criteria - summary

Intellectual merit

1. What is the potential for the proposed activity to advance knowledge and understanding within its own field or across different fields?
2. To what extent do the proposed activities suggest and explore creative, original, or potentially transformative concepts?
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 proposed activities?
5. Are there adequate resources available to the PI (either at the home organization or through collaborations) to carry out the proposed activities?

Broader impact

1. What is the potential for the proposed activity to benefit society or advance desired societal outcomes?
2. To what extent do the proposed activities suggest and explore creative, original or potentially transformative concepts?
3. Is the plan for carrying out the proposed activities well-reasoned, well-organized and based on sound rationale? Does the plan incorporate a mechanism to assess success?
4. How well qualified is the individual, team or institution to conduct the proposed activities?
5. Are there adequate resources available to the principal investigator (either at the home institution or through collaborations) to carry out the proposed activities?

Merit review criteria – specifics (1)

Intellectual merit

1. What is the potential for the proposed activity to advance knowledge and understanding within its own field or across different fields?
2. Project summary; Project description
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 proposed activities?
5. Are there adequate resources available to the PI (either at the home organization or through collaborations) to carry out the proposed activities?

Broader impact

1. What is the potential for the proposed activity to benefit society or advance desired societal outcomes?
3. Is the plan for carrying out the proposed activities well-reasoned, well-organized and based on sound rationale? Does the plan incorporate a mechanism to assess success?
4. How well qualified is the individual, team or institution to conduct the proposed activities?
5. Are there adequate resources available to the principal investigator (either at the home institution or through collaborations) to carry out the proposed activities?

Merit review criteria – specifics (2)

Intellectual merit

1. What is the potential for the proposed activity to advance knowledge and understanding within its own field or across different fields?
2. To what extent do the proposed activities suggest and explore creative, original, or potentially transformative concepts?
3. IM – literature/grounding
   Ex. How will research results be conceptually important to researchers in EER?
   How is your research plan both innovative and grounded?
4.
5. Are there adequate resources available to the PI (either at the home organization or through collaborations) to carry out the proposed activities?

Broader impact

1. What is the potential for the proposed activity to benefit society or advance desired societal outcomes?
2. To what extent do the proposed activities suggest and explore creative, original or potentially transformative concepts?
3. BI - literature/grounding; dissemination
   Ex. How will research results be concretely important to participants/other target audiences/your institution?
   EX. How is your dissemination plan particularly impactful?
4.
5. Are there adequate resources available to the principal investigator (either at the home institution or through collaborations) to carry out the proposed activities?

Merit review criteria – specifics (3)

Intellectual merit

1. What is the potential for the proposed activity to advance knowledge and understanding within its own field or across different fields?
2. To what extent do the proposed activities suggest and explore creative, original, or potentially transformative concepts?
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. I
5. A

Broader impact

1. What is the potential for the proposed activity to benefit society or advance desired societal outcomes?
2. To what extent do the proposed activities suggest and explore creative, original or potentially transformative concepts?
3. Is the plan for carrying out the proposed activities well-reasoned, well-organized and based on sound rationale? Does the plan incorporate a mechanism to assess success?

Project description: research design, timeline, plan for who is driving what.

Assess success: evaluation plan, evaluator, or advisory board (takes $$$)

Budget: participant incentives, PI time, evaluator resources (10%?), EEC PI meeting

Mentoring plan: will this help grad students and postdocs advance their careers as well as do the work you need done??

DMSP: are they working to find a way to share data, even qualitative data? Even with protections?

Merit review criteria – specifics (4)

Intellectual merit

1. What is the potential for the proposed activity to advance knowledge and understanding within its own field or across different fields?
2. To what extent do the proposed activities suggest and explore creative, original, or potentially transformative concepts?
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 proposed activities?
5.

Broader impact

1. What is the potential for the proposed activity to benefit society or advance desired societal outcomes?
2. To what extent do the proposed activities suggest and explore creative, original or potentially transformative concepts?
3. Is the plan for carrying out the proposed activities well-reasoned, well-organized and based on sound rationale? Does the plan incorporate a mechanism to assess success?
4. How well qualified is the individual, team or institution to conduct the proposed activities?

Project description: Distribution of responsibilities, evaluation/advisory board description and plan
PI team: prior NSF support, biosketches, synergistic activities

Merit review criteria – specifics (5)

Intellectual merit

1. What is the potential for the proposed activity to advance knowledge and understanding within its own field or across different fields?
2. To what extent do the proposed activities suggest and explore creative, original, or potentially transformative concepts?
3. [illegible]
4. [illegible]
5. Are there adequate resources available to the PI (either at the home organization or through collaborations) to carry out the proposed activities?

Broader impact

1. What is the potential for the proposed activity to benefit society or advance desired societal outcomes?
2. To what extent do the proposed activities suggest and explore creative, original or potentially transformative concepts?
3. [illegible]
4. [illegible]
5. Are there adequate resources available to the principal investigator (either at the home institution or through collaborations) to carry out the proposed activities?

Are you asking for the right resources given what you're proposing?
Do you have what else you need, given what you're proposing and what is in budget?
Facilities and equipment: rooms necessary, library resources, computing and software resources, administrative support, secure data storage, open access publishing repositories etc.

Common mistakes

1. Submitting the wrong idea to this program

- Submitting intervention design and evaluation projects to RFE
  - Submitting Design & Development projects (and no Lemelson) on undergrads to RFE rather than IUSE
- Not clearly filing the project as “research” or “D&D”
- Ignoring the “PFE” designation (focusing on STEM generically, on science specifically, not drawing the line to engineers at some point)

2. Taking lots of space to tell the reviewers the wrong things

- Only talking about broader impacts waaaaaaaaay down the road
- Only describing the magnitude of problems nationally or globally (but not at their own institutions)
- Describing facilities and equipment that have nothing to do with the proposed project
- In the explicit IM and BI sections, getting contributions in the wrong place, and missing obvious contributions. (Line them up with NSF's descriptions and questions!)

3. Taking not enough space to tell reviewers the right things

- What (specifically) are you going to do with the time and money you receive? When? Who is going to make sure it happens?
- (General) Where are the plans/descriptions that the solicitation says are required?
- Who is going to care about the outcome of the research, and how are you going to make sure they know what you found out?
  - Do you go beyond "pubs and conference presentations" in your dissemination plan?
  - Is this the right mechanism to teach your audience the thing you found out?
    - (For example – do people really change their course designs or pedagogy because they read a paper of yours or came to your ASEE presentation? What is the research basis for how they do come to change what they do?)
- Help the reviewers …
  - answer the merit review questions!
  - tell NSF that this project meets NSF's mission, goals, priorities

Best practices

1. See what previous RFE projects have done, and learn from them.

Where to look:

- Published papers should be in NSF's PAR - "Public Access Repository" – read and reference them in your proposal.
- Active and expired awards funded in PEC 1340 – "Research" or "Design & Development" and/or "NLI" in the title
- ASEE papers are online at peer.asee.org.

More expensive proposals are expected to have correspondingly larger impact.

Contact your program officer if you get stuck.

2. Make a page budget for your project description

Project description (RESEARCH)	15 pages. How to distribute?
Motivation	
Literature review	
Research questions	
Data collection and analysis	
Dissemination	
Project evaluation	

2. Make a page budget - mistakes

Project description (RESEARCH)	15 pages. How to distribute?
Motivation	Spends too long here.
Literature review	Focuses largely on motivation and not on research design
Research questions	Hides these, or they're evaluation questions
Data collection and analysis	Only talks about data collection Gives mention of analysis – but only cites "survey" source (e.g. Creswell or similar) Chooses wrong analytical technique for the questions and data
Dissemination	Omits altogether Has traditional plan – conferences, journals, no specifics Only goes as far as ASEE, JEE Will post to a project-specific website
Project evaluation	Omits entirely; forgets to describe credentials of evaluator or advisory board, or a plan for what they will do for the project, or sufficient funds in the project

2. Make a page budget – a better EXAMPLE

Project description (RESEARCH)	15 pages. How to distribute?
Motivation	1 page Clearly states intellectual merit and broader impact
Literature review	3-4 pages, includes empirical approach, cites method-specific sources
Research questions	0.5 page – highlighted somehow
Data collection and analysis	3-4 pages – separates participant group (if applicable), data collection strategy, data analysis strategy, includes timeline
Dissemination	1 page-ish Lists specific conferences, journals that align with who will care about research results Based on a strategy of how target audience will learn and take up results to change their practice
Project evaluation	2 pages Describes expertise (eval reports to be submitted) Describes tasks they will be asked to do, timeline

3. Involve the right colleagues from the beginning.

- Do you have the right research expertise (EER, other)?
  - If not – apply for RIEF first, or partner with EER colleague
    - Collaborative projects or subawards to expert colleagues
- Do you have the right broader impacts expertise?
  - If not – who will you partner with, or put on your advisory board?
- Find a good evaluator, or advisory board member or two who have the expertise you need. Fund them sufficiently. Ask for their advice on the research design.
  - Note PAPPG for structure of letters.

4. Make sure to check the new NSF priorities and FAQs relating to the EOs (updated regularly)

- What has changed:
  - No specific activities or data collection (or research questions) focused on demographically-identified “protected groups”.
  - Broadening participation activities about providing access “to all Americans.”
    - Not limited to citizens, though.
- What hasn’t changed:
  - RFE solicitation
  - Merit review criteria
  - The community of reviewers and what they care about
  - Who receives the award (your institution - and they have to be ok with what you’re submitting (as always).
  - Recruitment or outreach to groups that are not “protected” or identified by institution type or geographic location
- If you are not sure if your idea meets the new agency priorities – set up an appointment with your program officer.

5. Ask your program officers questions

- Book us through our Bookings page or by emailing eer-programs@nsf.gov
  - https://bit.ly/NSF-EEC-EER
- Send a 1-page description of your idea before the meeting (include a description of how you plan to spend the money and time).
- Listen to our feedback, and please make revisions based on it.
- Try to get a subsequent meeting to follow-up!
- Don’t submit before you’re ready (no deadline!)

Final thoughts

- NOTE THE TITLE REQUIREMENTS
  - Be sure to include, as appropriate: “Research”, “Design & Development” , “NLI”
  - “Collaborative” then “NLI” then “R”/”D&D”
- Solicitations can change but NSF will provide notice well before deadlines.
- Grant-writing, grant management, and other resources available at the Engineering Education Community Resource: http://engineeringeducationlist.pbworks.com

Thank you!

Send questions to eer-programs@nsf.gov

We'll stop the recording, and move now to Q&A.

Links from the chat

Links from the chat (1)

- Solicitation: https://www.nsf.gov/funding/opportunities/pfe-rief-pfe-research-initiation-engineering-formation
- “Common Guidelines for Educational Research”: https://www.nsf.gov/pubs/2013/nsf13126/nsf13126.pdf
- PAPPG: https://www.nsf.gov/policies/pappg/24-1
  - Part I, Chapter II has the main “Proposal Preparation Instructions”: https://www.nsf.gov/policies/pappg/24-1/ch-2-proposal-preparation
- Link to SciENcv: https://www.ncbi.nlm.nih.gov/sciencv/
  - Also found in the PAPPG section on the “Senior/Key Personnel Documents” - https://www.nsf.gov/policies/pappg/24-1/ch-2-proposal-preparation#ch2D2h
- IUSE solicitation
  - https://new.nsf.gov/funding/opportunities/improving-undergraduate-stem-education-directorate

Links from the chat (2)

- Lemelson DCL: https://www.nsf.gov/funding/opportunities/dcl-nsf-lemelson-initiative-environmental-social-sustainability
- Engineering for One Planet (EOP): https://engineeringforoneplanet.org/eop-framework/

Questions and answers from the chat

Is international travel allowed?

The PAPPG gives details on international travel here: (https://www.nsf.gov/policies/pappg/24-1/ch-11-other-post-award-requirements#f-international-considerations-e74).

Read the full details in the PAPPG, but in general, you do not need NSF permission for international travel unless your institution's policy requests that you get it.

The key restriction is that you have to use a US-Flag Air Carrier if possible.

How do we contact Cindy?

From Cindy:

Feel free to reach out to me via info@engineeringforoneplanet.org or LinkedIn https://www.linkedin.com/in/cindycooperpdx/

PD 24-1340 doesn't have a live link on the Research in the Formation of Engineers (RFE) website. Is it housed somewhere else? Or am I not understanding?

This goes to the idea that it’s a Program Description (and thus the “PD” in PD 24-1340). It loosely describes the kinds of projects we’re interested in, but all the specifics of what you put into it are entirely defined by the PAPPG.

Could you please list the list of grants for RFE?

Sure it is linked here

And it looks like this:

https://www.nsf.gov/awardsearch/advancedSearchResult?PIId=&PIFirstName=&PILastName=&PIOrganization=&PIState=&PIZip=&PICountry=&ProgOrganization=&ProgEleCode=134000&BooleanElement=All&ProgRefCode=&BooleanRef=All&Program=&ProgOfficer=&Keyword=NLI&AwardNumberOperator=&AwardAmount=&AwardInstrument=&ActiveAwards=true&OriginalAwardDateOperator=&StartDateOperator=&ExpDateOperator=

This question is related to the NSF Lemelson Initiative proposal application: for a 2-year community college (also MSI) applicant, what unique barriers or opportunities should we address in our proposal? -- we do plan to integrate EOP in our engineering curriculum. Thank you!

You'll want to make sure you talk about the unique issues associated with being at a community college and how your project will either overcome them or why they aren't actually issues. Think about things like your students being more transient or not necessarily being on a traditional path. Ultimately, you'll need to convince the panel that you're able to do the project you're proposing, but they shouldn't be biased against you being at a community college.

How do we pay undergraduates to work on research?

- Hourly. You can absolutely include them in your budget. It's just that graduate student funding often also includes tuition remissions (which aren't "taxed" for indirect costs), so they are on a separate line item. But there is a budget line for undergraduate researchers. You pick an appropriate rate and how many hours you want to use them for and then put that in the budget and justification.

If the project has to do with undergraduates and sustainability, then do we tag NLI and submit to PFE, or to IUSE?

- IUSE is for all the “I want to try this thing in my undergraduate course and it isn’t about sustainability” projects. (This is also a grossly oversimplified description of all the things IUSE can do.)

The NSF webpage on new NSF "Priorities" lists that broadening participation is no longer a priority. Should we avoid mentioning the so-called protected groups?

- I wouldn’t necessarily avoid mentioning protected groups, but you cannot limit your project around those groups and I wouldn’t generally rely solely on the effect on a protected class to motivate why the work should be done. The key areas where you cannot use protected classes are outreach, recruitment, or participation.

Should we mention Prior NSF Support and are we encouraged to build the proposal on a pilot study?

- If you have prior funding, the PAPPG requires you to include a discussion of prior funding in the proposal. And if you have a pilot study (or are able to do one), they are never a bad thing. Panels have never looked at a pilot study and thought “eh, that wasn’t worth including”. But it isn’t required.

K12 education + sustainability = RFE?

- Yes.