

National Science Foundation

NSF ITEST Solicitation Webinar #2:

“How to Write a Compelling Proposal”

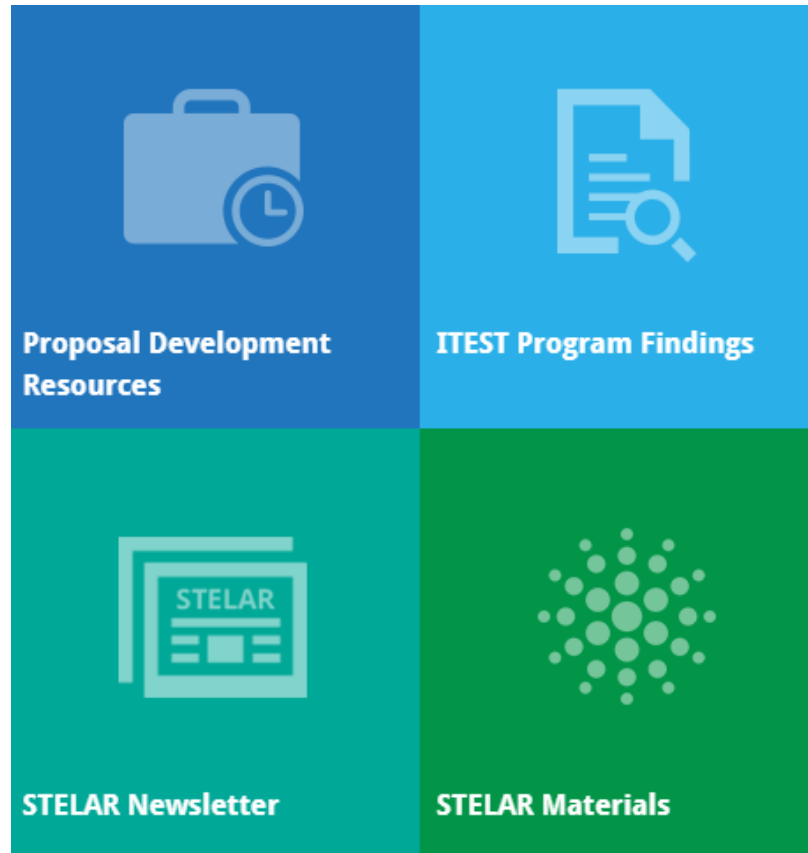
Wednesday, July 7, 2021

12-1 pm ET



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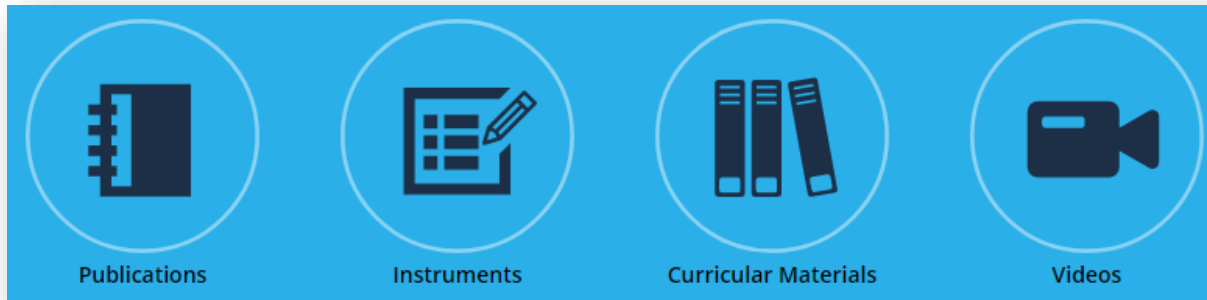
What STELAR does:



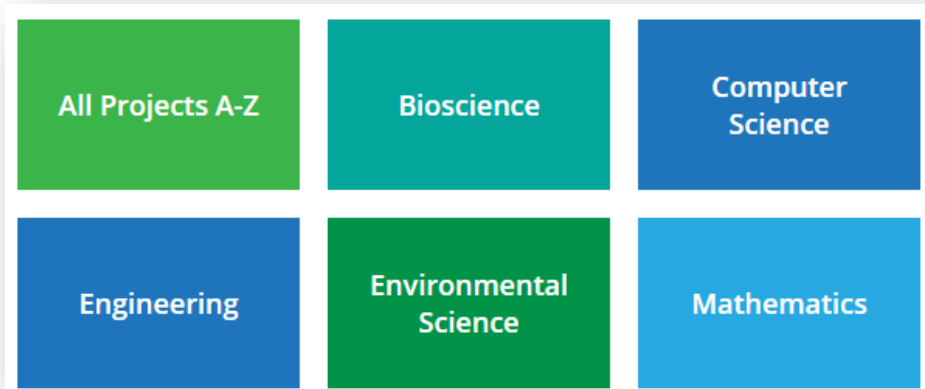
- Facilitate projects' success through **technical support**
- Inform and influence the field by **disseminating ITEST project findings** through project syntheses
- Deepen the impact and reach of the program by **broadening participation in the ITEST portfolio**

Resources STELAR provides:

Resource Library



ITEST Project Profiles



Proposal Development



For more information:

- Email the team at STELAR@edc.org
- Join the STELAR mailing list:
<https://go.edc.org/STELAR-MailingList>
- Follow us on Twitter: [@STELAR_CTR](https://twitter.com/STELAR_CTR)

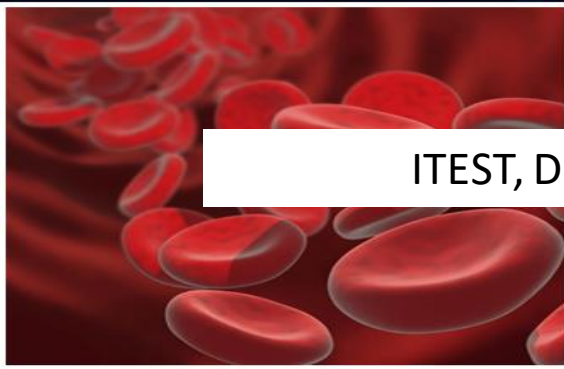


Welcome to...



Writing Competitive Proposals For the Innovative Technology Experiences for Students and Teachers (ITEST) Program

Alicia Santiago, Gavin Fulmer, and Robert L. Russell
ITEST Program Officers
July 2021



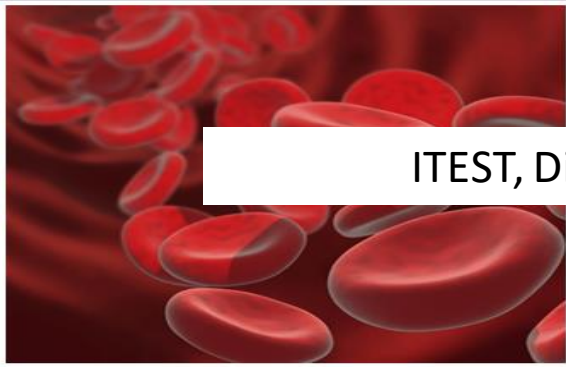
ITEST, Division of Research on Learning, EHR



Presented by



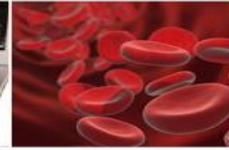
Alicia Santiago, Gavin Fulmer, and Robert L. Russell
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WHERE DISCOVERIES BEGIN

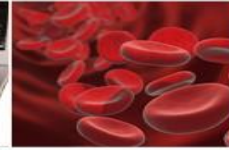


Webinar At A Glance

- Overview of ITEST Program
- Reviewers & The Review Process
- How to Present Your Project
- What to Say in 15 pages
- Research & Evaluation
- Avoiding Fatal Flaws
- Q & A

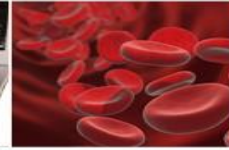


WHERE DISCOVERIES BEGIN



ITEST Program

ITEST is an applied research and development program designed to broaden participation in STEM/ICT careers and career pathways through providing pre-K through 12th grade youth with technology-rich learning experiences in formal or informal settings.



What makes it an ITEST project?

- ...research on knowledge of and interest in STEM
- with an emphasis on careers and career pathways
- ...directly engages PreK-12 learners using technology
- ...grounded in relevant research
- ...contains explicit strategies to broaden participation of underrepresented and/or underserved populations in STEM careers and career pathways



ITEST Projects: Overview

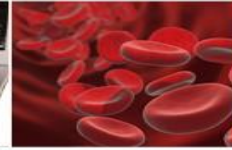
- Build on fundamental research and STEM education development literature and practice
- Advance the field through the development of innovative learning and teaching using technologies, research, assessment, resources, models and tools
- Have rigorous research and development plans
- Generate knowledge through research, development, & evaluation, asking “what is happening,” “to what extent,” “why,” “how,” “what works for whom,” and “under what circumstances”
- Identify learning outcomes
- Audience: Public and/or Professional



Project Types

Exploring Theory and Design Principles (ETD)	Designing and Testing Innovations (DTI)	Scaling, Expanding, and Iterating Innovations (SEI)
Up to 3 years	Up to 4 years	Up to 5 years
Up to \$400,000	Up to \$1,500,000	Up to \$3,000,000
<ul style="list-style-type: none"> Investigate conditions in the field Explore factors intended to increase knowledge and interest Research should build and advance theory, produce design principles or frameworks for innovations 	<ul style="list-style-type: none"> Design and test or implement the innovation Analyze outcomes Research should attend to how the design principles influence knowledge and interest in STEM careers or pathways 	<ul style="list-style-type: none"> Broaden an innovation at a significant scale (5-10x original) Extend innovation to new student populations, regions, ages, contexts Research should attend to transferability and generalizability and factors related to scale

Additional types: Conference, 1 year, \$100,000; Synthesis, 2 years, \$300,000

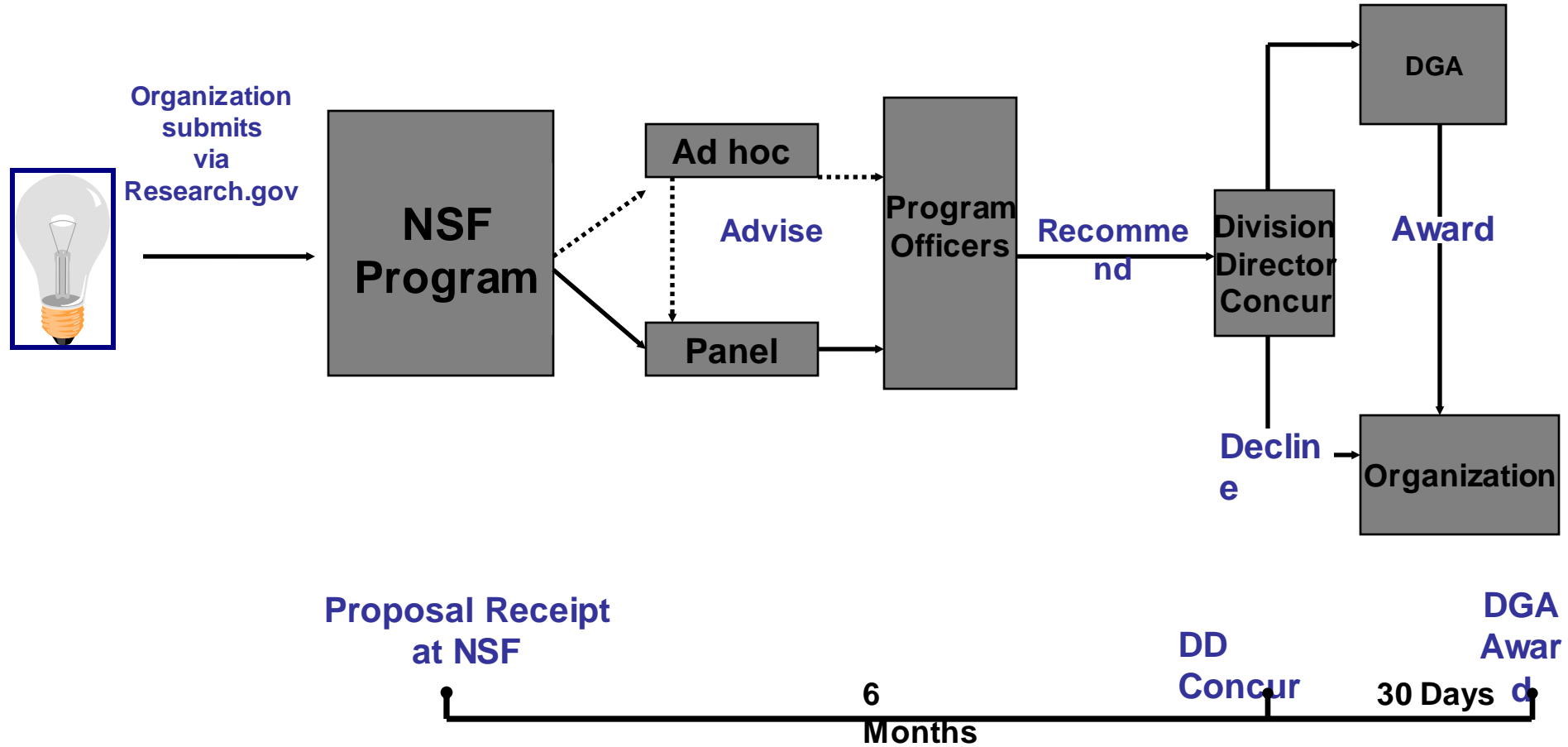


Considering Your Reviewers

- The Review Process
- Merit Review Criteria
- Who are the reviewers & what do they do?
- How should you present your project?



Proposal Review Process and Timeline





NSB Report on Merit Review Criteria:

Two Review Criteria

When evaluating NSF proposals, reviewers consider what the proposers want to do, why they want to do it, how they plan to do it, how they will know if they succeed, and what benefits would accrue if the project is successful. These issues apply both to the technical aspects of the proposal and the way in which the project may make broader contributions. To that end, reviewers evaluate all proposals against two criteria:

- **Intellectual Merit:** The Intellectual Merit criterion encompasses the potential to advance knowledge; and
- **Broader Impacts:** The Broader Impacts criterion encompasses the potential to benefit society and contribute to the achievement of specific, desired societal outcomes.



Who are the panelists?

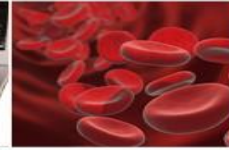


Panelists belong to a wide mix of academic communities:

- Scientists
- Education & Learning researchers
- Informal education practitioners (museums, science outreach programs, etc.)
- University administrators



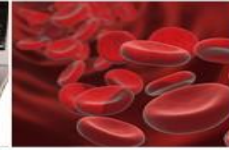
WHERE DISCOVERIES BEGIN



How much work does a reviewer do?

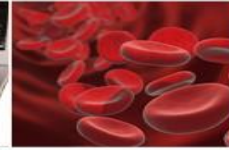


- A LOT!!!!
- **No more than 12 proposals** per reviewer.
- Proposals are sent to panelists about **one month** in advance.
- Reviews are entered into Fastlane.



How to Present Your Project

- Proposal writing vs. academic writing
- Terminology
- How to make your proposal reviewer friendly
- Tone & Content



Understand the Genre

EFFECTIVE Academic Writing

- Grant proposals are a very specific genre of academic writing
 - ✓ Specific on required details (e.g., project sites)
 - ✓ More focused (e.g., overview, not detailed review, of relevant research)
- Similar but not the same as research articles (e.g., not simply **blind judgment of intellectual merit**).
- Important Differences:
 - ✓ **Not blinded** (the person behind the proposal does matter)
 - ✓ Relevance **beyond the research world**
 - ✓ Projection of **future research** (not retrospective reporting)



Do not presume shared knowledge/terminology

- Reviewers come from diverse research/ discourse communities.
- Reviewers can feel overwhelmed by the massive amount of information in the proposals.
- Avoid assuming that they share your:
 - specialized knowledge
 - technical vocabulary

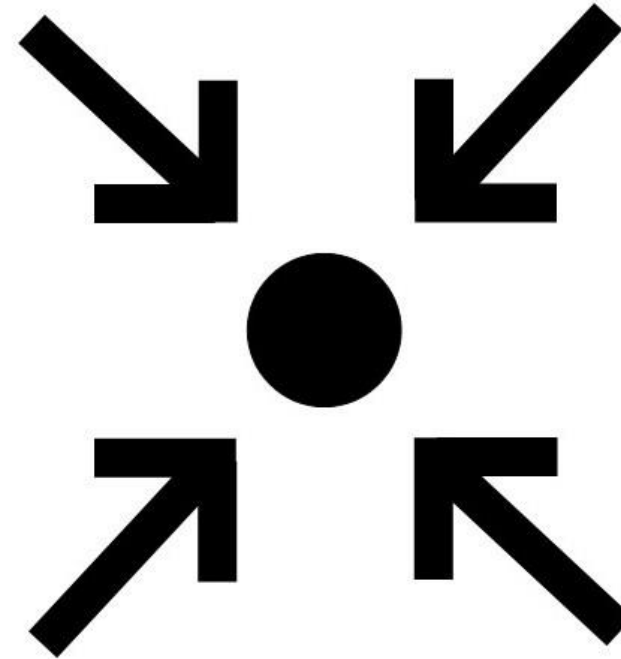


Can lead to cognitive overload



Get to the point!

- Reviewers should be able to easily get a sense of what the proposal is about upfront (project summary and introduction).
- Make what they are looking for easy to find, using the language of the review criteria and headings to highlight the elements of the project description.





Use a Reviewer-Friendly Format

An ***easy-to-follow format*** can go a long way:

- Use same labels as those used in the call.
- Use bold and leave some blank space (indentations).
- Include some figures/diagrams.
- Clearly structured texts are less overwhelming for readers.
- Synthesis, explain.
- Although space is limited (15 pages), an excessive number of words per page does not necessarily make your proposal stronger!

Can lead to cognitive overload





Mind your Tone

“The meek shall not inherit the grants” (ITEST Program Officer)

- Try to **project a positive image** of the intended research, but also a positive “self image” (as a competent/confident yet careful researcher).
- Applicants can come across as **arrogant** and **unrealistic**.
- Understatement and toning down one’s language not to over-claim the importance of the work is recommended. (Your project is probably not “the only” or “the first.”)

**CAUTIOUSLY
OPTIMISTIC.**



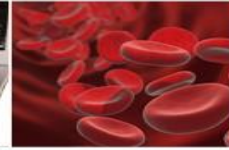
In terms of Content

- Do not just “give lip service” to the issues being raised; explain.
- Explicit statement about how the proposal addresses the goals of the ITEST program.
- Back up assertions with evidence, especially when discussing potential future impacts of proposed research.
- Consider discussing risks or challenges to project and mitigation strategies
- Have a colleague (not involved in your project) give your proposal a critical read.

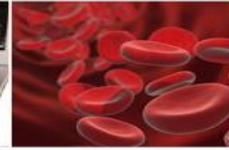




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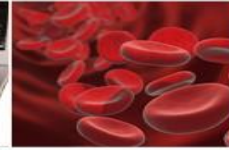


What to Say in 15 pages



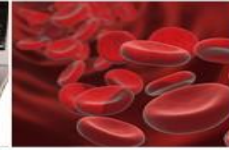
Before You Begin Writing

- Do your homework:
 - Familiarize yourself with the NSF website.
 - Download a copy of the *NSF Proposal & Award Policies & Procedures Guide* (PAPPG):
https://www.nsf.gov/publications/pub_summ.jsp?ods_key=pappg
 - Read the solicitation carefully and multiple times.
 - Check the NSF Awards Search Page for examples.
 - Visit the STELAR website, which is the ITEST program resource center and network.
- Talk to NSF Program Officers about your ideas:
 - Schedule a call with a PO.
 - POs may ask you to send a 1-2 page summary in advance.
 - Submit inquires to: DRLITEST@nsf.gov



Project Summary

- **One page maximum**
- **First Sentence**
 - Type of Proposal (Project Type)
- **A general description of the project to be designed, implemented, and evaluated.**
- **Intellectual Merit and Broader Impacts**
 - Must include separate statements on each of these two NSB criteria



Project Description Should Include...

Background

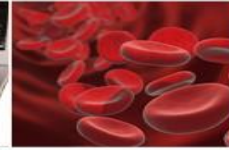
- Project overview and rationale
- Goals and objectives
- Principles guiding the project, brief synthesis of relevant literature, theoretical framework

Project Design

- Description of the innovation, the learning environment (content, resources/materials, activities/experiences), and the research context
- Research questions and plan
- Anticipated results

Solicitation Specific Criteria (explicitly address the four criteria)

Prior NSF Support (if any): Summary of Intellectual Merit and Broader impacts that results and relevance (if any) to the proposed research



Project Description (2)

Prior NSF Support (if any):

- Summary of Intellectual Merit and Broader impacts that results and relevance (if any) to the proposed research

Evaluation

- Plan for independent review of project progress and success of implementation [Project Evaluation, formative and summative]

Dissemination Plan

- Dissemination plan [Identify constituencies and how you will communicate findings to them]

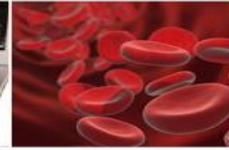
Management, personnel, and partnerships

- Management, Qualifications of key personnel who will coordinate the project



Overview/Rationale: What Makes This Project Important?

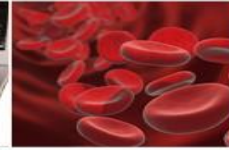
- How is it innovative or potentially transformative?
- How will it advance knowledge and move the field forward?
- What are the anticipated outcomes or products of this project?
- Who will be interested in these outcomes, and how will you target dissemination of findings to them?
- How might these products or findings be useful on a broader scale?



Theoretical Framework:

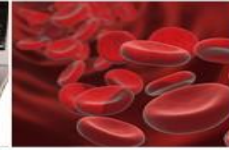
What Have You And Others Done?

- Describe the theoretical and research basis on which the proposal is based.
- How has the prior research influenced this project?
- Discuss how the proposal is innovative and different from similar projects.
- If you have previously been funded by NSF for similar work, provide evidence about the **effectiveness** and **impact** of that work.



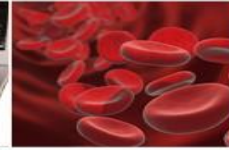
Results of Prior Research

- Does this project build on the results of related prior projects by the PI's?
- If yes, is there evidence provided about the intellectual merit and broader impacts of the prior project(s)?
- How has the prior project influenced this project?



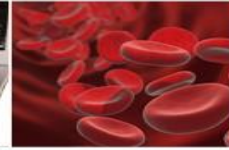
Description of Intervention/Learning Environment

- Provide an overview and concrete details of the learning environment such as content, standards, experiences, and related participant experience.
- The learning environment can be experiences that might include an exhibit, game, media production, field experience, professional development approach and activities (for teachers), or other STEM learning experiences that provides the opportunity for the project's research.
- An overview of the learning environment helps reviewers understand how and why the project has the potential for researching the experiences, learning processes, and impacts hypothesized in your proposal.



Dissemination: How Will Others Learn About The Project?

- Plan specific strategies for **Dissemination** of products or findings to researchers, policy makers, practitioners, and other relevant constituency groups. Identify the relevant groups.
- Applicants are encouraged to bring the same levels of insight and creativity to the dissemination aspect of their proposal as they do to their educational research and development design.



Staffing/Management: Who Will Do the Work?

- Briefly describe the expertise of the persons included on the proposal and why they are needed:
 - Education/Learning researchers and evaluators
 - Teachers and/or practitioners
 - Community and/or industry
 - STEM-related content experts
- How will the project team & collaborating organizations work together
- Upload two-page NSF-format biosketches for all senior personnel
- Include the mentoring plan if Post-Docs are involved.



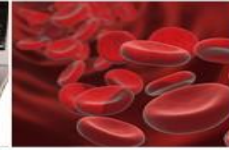
Research & Evaluation

- Research & Evaluation in ITEST proposals emphasize knowledge building capacity.
- The Merit Review elements require that proposals include mechanisms: 1) for iterative improvement, and 2) to assess success.
- Both research and evaluation can be used to support these purposes.



Research & Plan Elements

- **ITEST supports research that advances knowledge and the evidence base for practices, assumptions, broadening participation, or emerging educational arrangements related to STEM career learning: Contextualize the research in prior work.**
 - State clear, focused research questions & hypotheses that the project will investigate.
 - Describe the theoretical framework, research methods, including data sources, sampling, analyses, and assessments.
 - Describe the plan for developing, modifying, or implementing the proposed innovation.
 - Describe the work plan and timeline.
 - Strong research/practice collaborations



Common Guidelines for Education Research & Development

- You are encouraged to be familiar with the Common Guidelines for Educational Research and Development—specifically the NSF FAQs—in the preparation of proposals.
<https://www.nsf.gov/pubs/2013/nsf13127/nsf13127.jsp>
- The Guidelines describe research types that are most relevant for ITEST projects, including: Foundational, Early Stage or Exploratory, and Design and Development Studies.



Evaluation in ITEST Proposals

ITEST evaluations should provide formative feedback to allow for mid-course corrections, and summative evaluation to document the extent to which: the project objectives were carried out as intended and achieved document project objectives.

All ITEST project proposals are asked to:

1. Articulate evaluation questions that define what the project needs to learn to define success.
2. Discuss activities and data that will generate evidence addressing the questions, including who will provide independent oversight (e.g, independent, third-party evaluator or external advisory committee.)
3. Describe how the project will use the evaluation evidence and for what purpose.



What Evaluation is About

The objectives of the evaluation include:

- Recommending evidenced-based adjustments to project plans.
- Determining the effectiveness and impact of the products or processes.
- Attesting to the integrity of outcomes reported by the project.
- Assessing whether the project is making satisfactory progress toward its goals.

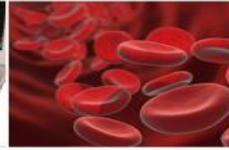


Project Evaluation Elements

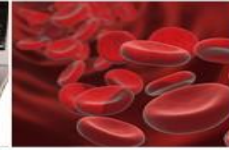
- Proposals should describe critical features of the evaluation design:
 - Evaluation questions
 - Data to be gathered & Sampling methods
 - Data analysis plans
 - Expertise of those responsible for evaluation.
- Proposals should ***distinguish*** evaluation from other critical research components. This does not mean that research & evaluation have no relationship.



WHERE DISCOVERIES BEGIN



Avoiding Potentially Fatal Flaws



Common Reasons for Return Without Review

- Violation of formatting rules of the PAPPG (e.g. font, page length etc.).
https://www.nsf.gov/publications/pub_summ.jsp?ods_key=pap
pg
- Failure to address specifically intellectual merit and broader impact in the project summary and description.
- Failure to include Data Management Plan or Post-Doc mentoring plan (if budget includes post-doc)
- Including unauthorized appendix or other supplementary material.
- Including URL's/website links.



Common Reasons Proposals are Rated Non-Competitive

Importance

- Proposed problem not seen as nationally important.
- Weak, vague, or no connection to STEM content.
- Relevant literatures not cited, weak or no theoretical framework.
- Do not address the solicitation specific review criteria.

Methods

- Inadequate or inappropriate research design.
- Vague or inappropriate data collection & analyses.
- Too much data being collected.
- Appropriate expertise not represented on team.
- Cost at small scale prohibitive when scaled up.



Address Broader Impacts

- Do not discount the importance of Broader Impacts as a review criterion.
- Means more than having diversity among participants.
- Means more than locating a project in a area where there are diverse populations.
- Don't forget other underrepresented groups, including those with disabilities and English Language Learners.
- In addressing Broader Impacts, make sure to address the Solicitation Specific Review Criteria (details on next slide).

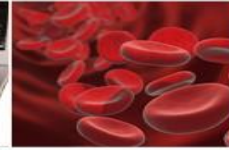


Solicitation-Specific Review Criteria

To what extent does the proposal:

1. Include explicit and adequate strategies for recruiting and selecting participants
2. Describe approaches to address diversity, access, equity, and inclusion
3. Describe research-informed instructional approaches to build on strengths and challenges
4. Explain how innovations with technology are developmentally and age-appropriate

Note: Make it clear in the proposal how are addressing these issues.



Some Things POs Suggest You Avoid

- Ignoring requirements stated in the solicitation or the PAPPG
- The “Trust Me” approach. Provide citations or evidence for critical assertions made.
- The “Oversell” of yourself or your project; take a neutral tone and let the evidence speak.
- Pages of general, vague, or rambling narrative without precision and details.
- Overemphasis of rationale for the project at the expense of methodology and details of what will actually be implemented.

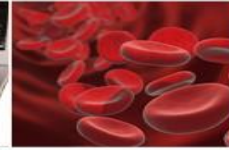


Online Resources

- NSF Advanced Award Search:
www.nsf.gov/awardsearch/advancedSearch.jsp
- Secret Information: Element Codes
 - ECR: 7980
 - DRK-12: 7645
 - ITEST: 7227
 - STEM+C: 005Y
 - AISL: 7259
- STEM Video Showcase:
<https://stemforall2021.videohall.com/pages/about/about-event>



WHERE DISCOVERIES BEGIN



Resource Centers

- **AISL:** Center for Advancement of Informal Science Education (CAISE)
informalscience.org/community
- **DRK-12:** Community for Advancing Discovery Research in Education (CADRE) cadrek12.org
- **ITEST:** STEM Learning and Research Center (STELAR) stelar.edc.org
- **CIRCL:** <http://circlcenter.org>



WHERE DISCOVERIES BEGIN



NSF Important Notice: Research.gov is now required for submission of ITEST proposals

Resources to guide you through proposal submission via research.gov:

Research.gov Video Tutorial:

<https://www.research.gov/common/attachment/Desktop/psmvideo1.html>

How a PI Initiates a New Proposal in research.gov:

https://www.research.gov/common/attachment/Desktop/How_PIs_Initiate_New_Rgov_Proposals_Final_508.pdf

Full library of NSF Proposal Preparation Resources:

https://www.research.gov/research-portal/appmanager/base/desktop?_nfpb=true&_pageLabel=research_node_display&_nodePath=/researchGov/Service/Desktop/ProposalPreparationandSubmission.html



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General inquiries regarding this program and program solicitation should be made to:

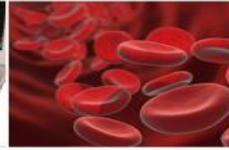
DRLITEST@nsf.gov

What should you do if you have a specific inquiry regarding your project or proposal?

Using the email address above, in the body of the email or as in attachment, send a brief (max 2 pages) summary of the research or R&D you are planning to conduct. The synopsis should include a very brief rationale for the work, how it will contribute to the knowledge base on informal learning, and what you believe the broader impacts to be. Be sure to also include your specific questions.



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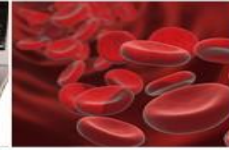


Questions

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WHERE DISCOVERIES BEGIN



Thanks for Participating!

We look forward to receiving your proposals.