



Welcome to...



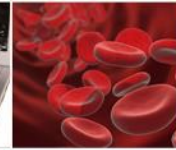
# Writing Competitive Proposals For the Advancing Informal STEM Learning (AISL) Program

Robert L. Russell & Catherine Eberbach,  
AISL Program Officers



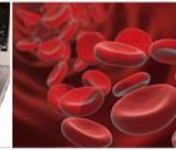
AISL, Division of Research on Learning, EHR





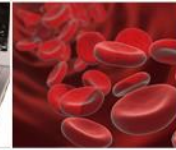
# Webinar At A Glance

- Overview of AISL Program
- Reviewers & The Review Process
- How to Present Your Project
- What to Say in 18 pages
- Research & Evaluation
- Avoiding Fatal Flaws
- Q & A



# AISL Program

- **Advancing** – Innovative projects that advance the field through building knowledge via innovative approaches and research.
- **Informal** – Out-of-School learning that makes learning lifelong, life wide, & life deep.
- **STEM** – Not just focused on science, but all of NSF-funded STEM Fields.
- **Learning** – Learning outcomes include: interest, engagement, motivation, behavior, identity, persistence, understanding, awareness, knowledge, and use of STEM content and practices, and 21st century skills.



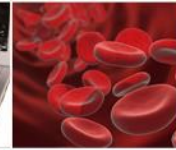
# AISL Projects: Overview

- Build on fundamental research and STEM education development literature and practice
- Advance the field through the development of innovative 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

- **Pilots/Feasibility Studies:** Exploratory development work or feasibility studies
- **Research in Service to Practice:** Advances knowledge & provides evidence base for practice
- **Innovations in Development:** Builds knowledge through the development of innovative products
- **Broad Implementation:** Expands models, programs, technologies, assessments, or other advances
- **Conferences, Symposia:** Focus on communities of practice, field-advancing practice, assessments, & research agendas
- **Literature Reviews, Syntheses, Meta-Analyses**



# Considering Your Reviewers

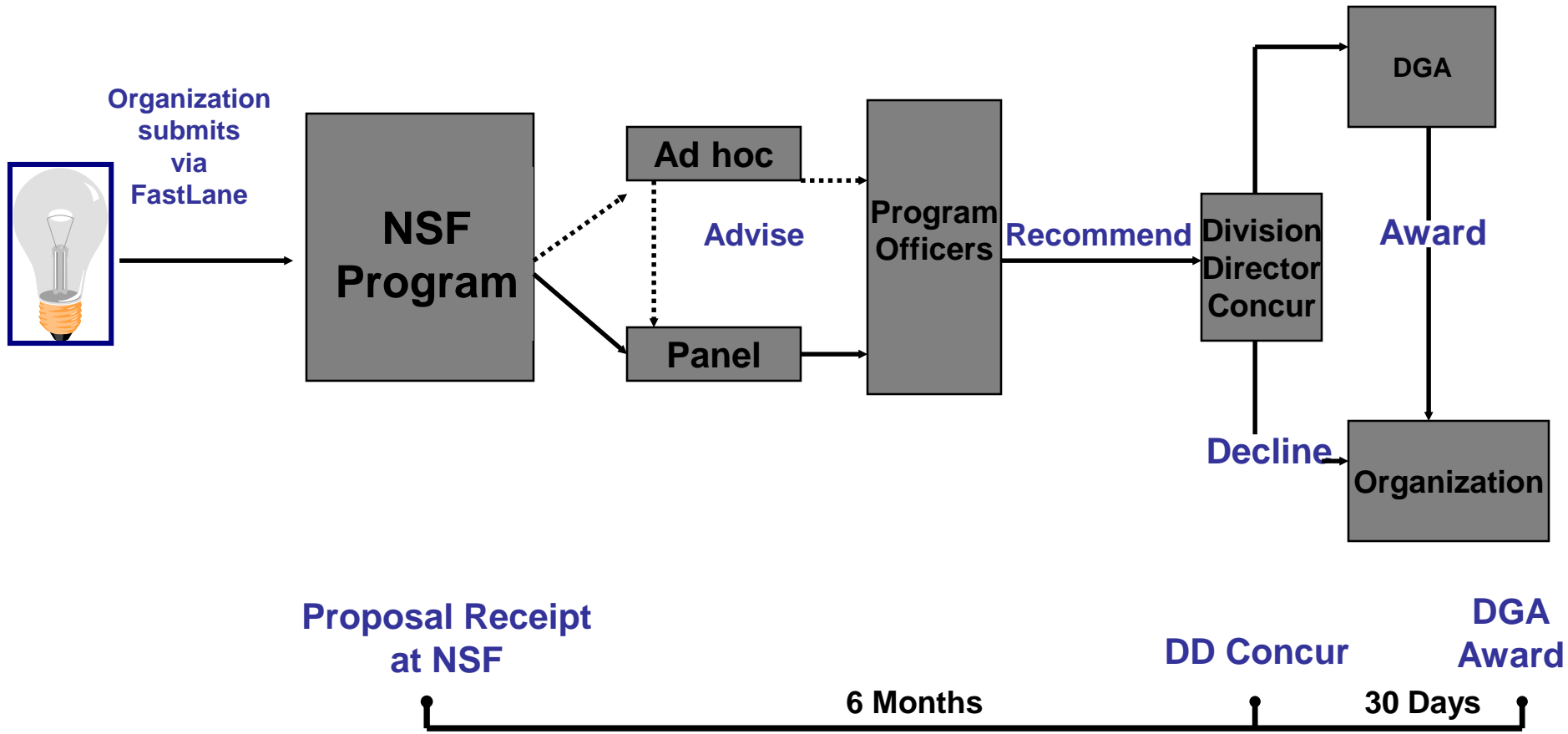
- The Review Process
- Merit Review Criteria
- Who are the reviewers & what do they do?
- How should you present your project?



WHERE DISCOVERIES BEGIN



# 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.



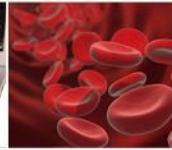


# Who are the panelists?



Panelists belong to a wide mix of academic communities:

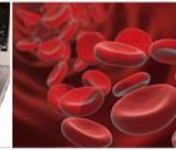
- Scientists
- Education & Learning researchers
- Informal education practitioners (museums, science outreach programs, etc.)
- University administrators



# How much work does a reviewer do?

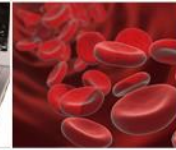


- A LOT!!!!
- **No more than 12 proposals** per reviewer.
- Proposals are sent to panelists about **one month** in advance.
- Reviews are entered into Fastlane.



# 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
- 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)

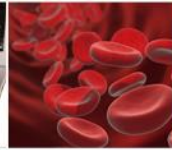


# Do not presume shared knowledge/terminology

- 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

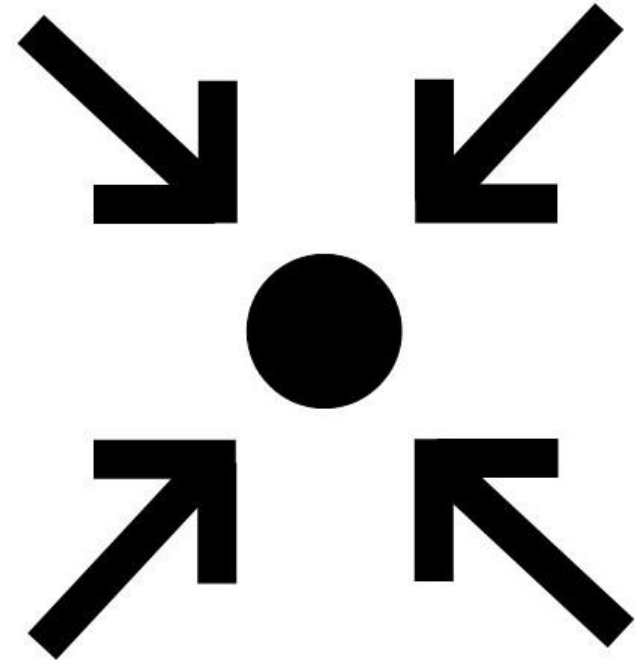


Can lead to cognitive overload



# 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.





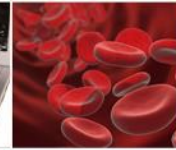
# Use a Reviewer-Friendly Format

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.
- Although space is limited (18 pages), an excessive number of words per page does not necessarily make your proposal stronger!

Can lead to cognitive overload





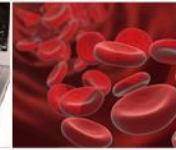
# Mind your Tone

“The meek shall not inherit the grants”  
(Myers, 1990)

- 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.**





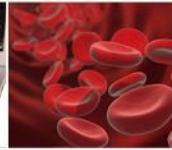
# In terms of Content

- Do not just “give lip service” to the issues being raised.
- Explicit statement about how the proposal addresses the goals of the AISL program.
- Have a colleague (not involved in your project) give your proposal a critical read.

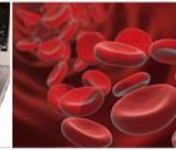




WHERE DISCOVERIES BEGIN

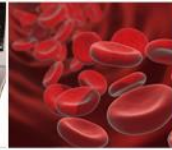


# ***What to Say in 18 pages***



# 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/pubs/2013/nsf13127/nsf13127.jsp>
  - Read the solicitation carefully and multiple times.
  - Check the NSF Awards Search Page for examples.
  - Visit the CAISE website, which is the AISL 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.



# 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

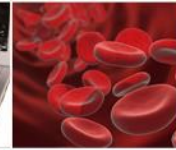


WHERE DISCOVERIES BEGIN



# Project Description Should Include...

- Project overview and rationale
- Project goals and objectives
- Summary of effectiveness and impact of prior support
- Explanation of principles that guided the project design, informed by the literature [Theoretical Framework]
- Description of intervention, learning environment (e.g., game, exhibit, experiences, media, etc.), or context of research
- Intervention/Learning Environment
- Anticipated results
- Research questions and plan
- Plan for independent review of project progress and success of implementation [Project Evaluation, formative and summative]
- Dissemination plan [Identify constituencies and how you will communicate findings to them]
- Management, Qualifications of key personnel who will coordinate the project



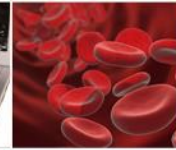
## Overview/Rationale: What Makes This Project Important?

- 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?

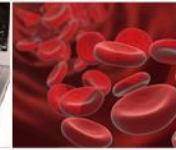
- Describe the theoretical and research basis on which the proposal is based.
- How has the prior research influenced this project?
- Discuss how the proposal is innovative and different from similar projects.
- If you have previously been funded by NSF for similar work, provide evidence about the **effectiveness**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



## Results of Prior Research

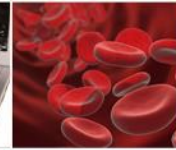
- Does this project build on the results of related prior projects by the PI's?
- If yes, is there evidence provided about the intellectual merit and broader impacts of the prior project(s)?
- How has the prior project influenced this project?





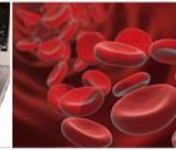
## Description of Intervention/Learning Environment

- Provide an overview and concrete details on the informal learning environment and related participant experience.
- The learning environment can be an exhibit, game, media production or other informal STEM learning experience that provides the opportunity for the project's research.
- An overview of the learning environment helps reviewers understand how and why it has the potential for research 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 bios for all senior personnel
- Include the mentoring plan if Post-Docs are involved.



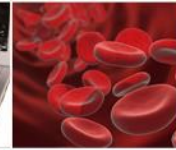
# Research & Evaluation

- Research & Evaluation in AISL 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.



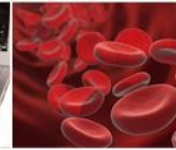
# Research & Plan Elements

- **AISL supports research that advances knowledge and the evidence base for practices, assumptions, broadening participation, or emerging educational arrangements in STEM learning in informal environments, including the science of science communication.**
  - 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

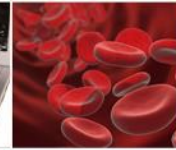
- You are encouraged to be familiar with the Common Guidelines for Educational Research and Development—specifically the NSF FAQs—in the preparation of proposals.  
<https://www.nsf.gov/pubs/2013/nsf13127/nsf13127.jsp>
- The Guidelines describe research types that are most relevant for AISL projects,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



# Evaluation in AISL Proposals

All AISL project proposals are required to specify the external review and evaluative processes they would be used to achieve the following goals:

- 1. Support iterative improvement.** Evaluative processes should ensure that a project gets appropriate, rigorous, external input throughout the life of the project. Such input is essential for project monitoring, management, and continuous quality improvement. External feedback should enrich (and potentially challenge) teams' perspectives.
- 2. Promote accountability.** Evaluative processes should address questions such as: Is the project addressing its stated goals? What is the quality of the work?

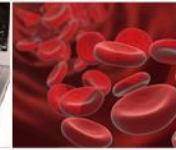


# What Evaluation is About

## 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.



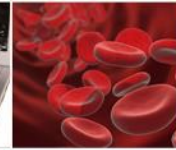


# Project Evaluation Elements

- 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

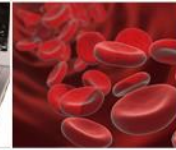


# Avoiding Potentially Fatal Flaws



# Common Reasons for Return Without Review

- Violation of formatting rules of the PAPPG (e.g. font, page length etc.).  
<https://www.nsf.gov/pubs/2013/nsf13127/nsf13127.jsp>
- 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.

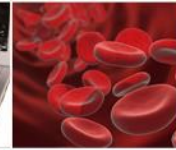
## Methods

- 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.



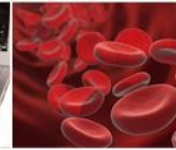
# Adequately Address Broader Impacts

- 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:
  - Does proposal identify characteristics and needs of targeted underrepresented groups to be served?
  - Does it include specifics plans or strategies for addressing or accommodating particular needs of participants of these groups?



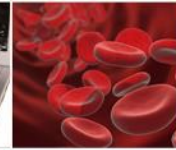
# Some Things POs Suggest You Avoid

- 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](http://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:  
[stemforall2016.videohall.com](http://stemforall2016.videohall.com)



# Resource Centers

- **AISL:** Center for Advancement of Informal Science Education (CAISE) [informalscience.org/community](http://informalscience.org/community)
- **DRK-12:** Community for Advancing Discovery Research in Education (CADRE) [cadrek12.org](http://cadrek12.org)
- **ITEST:** STEM Learning and Research Center (STELAR) [stelar.edc.org](http://stelar.edc.org)
- **EM+C:** *Math and Science Partnership Network (MSPnet)* [hub.mspnet.org](http://hub.mspnet.org)
- **CIRCL:** <http://circlcenter.org>





WHERE DISCOVERIES BEGIN



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

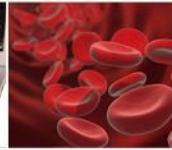
**[DRLAISL@nsf.gov](mailto:DRLAISL@nsf.gov)**

**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.



WHERE DISCOVERIES BEGIN

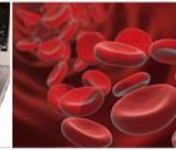


***Questions***

A large, 3D, metallic question mark is centered on the page. The word "Questions" is written in a bold, italicized, black serif font across the middle of the question mark.



WHERE DISCOVERIES BEGIN



# Thanks for Participating!

We look forward to receiving your proposals.