

Proposals

2/2/2023

Overall impressions of your proposals

- Recommendation: Resubmit with minor revisions
 - Excellent on worth-doing
 - I asked many of you for more discussion of do-able
 - Timeline, Deliverables: What are we going to get when?
 - What do you hope to have for the midpoint review (and final review)?
 - Specifics on resources: data, compute, etc.
 - Some expressed concerns about your technical capabilities
 - Feel free to request one-on-one (virtual) meetings
- Homework for next week
 - Resubmit with minor revisions
 - Provide a status update (progress so far)

Government uses lots of acronyms/terms
(and forget that we don't all know what they mean)



Background

- This program is a Directorate-wide activity that represents the primary funding mechanism for CISE
- Goal is to support the development of new knowledge through
 - Transformative Research
 - Education Projects



Robust Intelligence

- ❖ Foundational computational research is needed to:
 - ❖ Understand and develop systems that can sense, learn, reason, communicate, and act in the world;
 - ❖ Exhibit flexibility, resourcefulness, creativity, real-time responsiveness and long-term reflection;
 - ❖ Use a variety of representation or reasoning approaches; a
 - ❖ Demonstrate competence in complex environments and social contexts.
- ❖ It contributes deeper understanding and new insights in and across:

<ul style="list-style-type: none">✓ artificial intelligence✓ machine learning✓ computer vision	<ul style="list-style-type: none">✓ human language technologies✓ robotics✓ computational neuroscience
--	---
- ❖ Novelty in the application and fielding of methods is encouraged.



IIS Core Programs

- ❖ Small Projects (up to \$500,000 => \$600,000, 3 yrs)
 - ❖ Well suited to one or two investigators and at least one student and/or postdoctoral researcher
- ❖ Medium Projects (up to \$1,200,000, 4 yrs)
 - ❖ well suited to one or more investigators and several students and/or postdoctoral researchers
 - ❖ comprehensive and well-integrated
 - ❖ greater than the sum of individual contributions
- ❖ Large Projects (up to \$3,000,000, 5 yrs)
 - ❖ no longer accepted in IIS core programs



IIS Core Programs

- ❖ Small Projects (up to \$500,000 => \$600,000, 3 yrs)
 - ❖ Well suited to one or two investigators and at least one student and/or postdoctoral researcher
- ❖ Medium Projects (up to \$1,200,000, 4 yrs)
 - ❖ well suited to one or more investigators and several students and/or postdoctoral researchers
 - ❖ comprehensive and well-integrated
 - ❖ greater than the sum of individual contributions
- ❖ Large Projects (up to \$3,000,000, 5 yrs)
 - ❖ no longer accepted in IIS core programs

Timeline:

- Data collection and cleaning: 3 weeks
- Data exploration and visualization: 3 weeks
- Model fitting and evaluation: 3 weeks
- Report preparation: 1 week
- Presentation: 1 week

Budget (Hypothesis):

- Data collection and cleaning: \$1,000
- Data exploration and visualization: \$1,500
- Model fitting and evaluation: \$2,000
- Report preparation: \$500
- Presentation: \$500
- Total budget: \$5,500

Timelines

Timeline:	
6 weeks	<ul style="list-style-type: none">• Data collection and cleaning: 3 weeks• Data exploration and visualization: 3 weeks
5 weeks	<ul style="list-style-type: none">• Model fitting and evaluation: 3 weeks• Report preparation: 1 week• Presentation: 1 week

Budget (Hypothesis):

- Data collection and cleaning: \$1,000
- Data exploration and visualization: \$1,500
- Model fitting and evaluation: \$2,000
- Report preparation: \$500
- Presentation: \$500
- Total budget: \$5,500

- Is this schedule realistic?
 - Likely to meet schedule?
 - Likely to meet budget?
- What will we have for
 - Midpoint Review (March 16)
 - 6 weeks from today
 - Final Review (April 20)
 - 5 weeks from Midpoint

11/52 weeks = 20% head count

if this is 1 of 4 classes → 5% head count

loaded head = 3 unloaded heads

@\$300k/head, 5% head = \$15k



Panel Objectives

- Provide *quality feedback* to the PIs, keeping in mind that PIs spend a great deal of time writing these proposals
- Provide *advice* to NSF Program Directors for funding recommendations



Triage

- ❖ NSF allows for the triage of proposals to allow for more focused panel discussion.
- ❖ (In this panel) Proposals receiving NO ratings above G and at least one lower than G may be removed from panel discussion.
- ❖ We will review a list of triage-eligible proposals at the beginning of the discussion agenda
 - ❖ Panelists (and moderators) can ask at any time that a proposal meeting the criteria for triage nonetheless receives a full discussion.
- ❖ Triaged proposals receive only your reviews, and no panel summary. It is treated as if “ad hoc reviewed”.



NSF merit review criteria

- ***Intellectual Merit***

How important is the proposed activity to advancing knowledge and understanding within its own field or across different fields? How well qualified is the proposer to conduct the project? To what extent does the proposed activity suggest and explore creative, original, ***or potentially transformative*** concepts? How well conceived and organized is the proposed activity? Is there sufficient access to resources?

- ***Broader Impacts***

How well does the activity advance discovery and understanding while promoting teaching, training, and learning? How well does the proposed activity broaden the participation of underrepresented groups? To what extent will it enhance the infrastructure for research and education, such as facilities, instrumentation, networks, and partnerships? Will the results be disseminated broadly to enhance scientific and technological understanding? What may be the benefits of the proposed activity to society?



What does “potentially transformative” mean?

- revolutionizing entire disciplines
- creating entirely new fields
- disrupting accepted theories and perspectives
- endeavors which have the potential to change the way we address challenges in science, engineering, and innovation



Additional Review Criteria

❖ Postdoctoral mentoring

- ❖ Each proposal that requests funding to support postdoctoral researchers must include, as a supplementary document, a description of the mentoring that will be provided to all postdoctoral researchers supported by the project.

❖ Data management

- ❖ All proposals must include a supplementary document describing plans for data management and sharing of the products of research, which may include the types of data or materials to be produced, standards to be used for data and metadata, policies for access and sharing, policies and provisions for re-use/re-distribution/production of derivatives and plans for archiving and preservation of access. (More on a subsequent slide.)

❖ Collaboration

- ❖ All Medium projects with more than one investigator must have a collaboration plan, which may be included as a supplementary document, describing how the different expertise of the PIs will be integrated and how effective collaboration will be achieved during the award period. Small collaborative projects should have a collaboration plan included in the project description.

❖ Human subjects research

- ❖ Please point out if a proposal includes human subject research and thus needs Institution Review Board (IRB) approval.



Panelist Review of BPC Plan

In the review of a proposal, a panelist should include (at a minimum) a **YES** or **NO** response to the following five elements for all PIs and co-PIs:

1. **Context:** Does the plan describe a goal using institutional or local data?
2. **Intended population(s):** Does the plan identify the characteristics of participants from an underrepresented group, including school level (e.g., African-American undergraduates or female high-school students)?
3. **Strategy:** Does the plan describe activities that address the goal(s) and intended population(s)? Is there a clear role for each PI and co-PI?
4. **Preparation:** Does the plan describe how the PI is prepared (or will prepare or collaborate) to do the proposed work?
5. **Measurement:** Is there a plan to measure the outcome(s) of the activities?

Note: Underrepresented populations in computing include women, African Americans, Hispanics, American Indians, Alaska Natives, Native Hawaiians, Pacific Islanders, and persons with disabilities.



Panel Summary for BPC Plan

In the panel summary of a reviewed proposal, the panel should

- (1) state whether the BPC Plan is meaningful or not (YES or NO) and
- (2) provide constructive feedback to the investigators if the plan needs to be improved. (BPCnet.org offers resources and consultants to assist PIs in creating meaningful plans.)

Notes:

- A meaningful BPC plan should answer positively for all five elements for all PIs and co-PIs.
- The BPC Plan activities do not need to relate to the proposed research.
- Novelty in the BPC plan is not required, e.g., PIs can implement a best practice.
- There are two types of project plans: a stand-alone plan and a connected plan (where the PIs connect their plan to a departmental plan that s/b verified by BPCnet.org).
- Do not confuse broader impacts with broadening participation. Proposed projects require both. The proposed activities for the two can be related.

Diversity Drives Innovation—Take Action to Broaden Participation in Computing (BPC)

The BPCnet Resource Portal is a clearinghouse for the community to learn about and engage with ongoing projects to address underrepresentation in computing. This includes people who are women, persons with disabilities, Blacks and African Americans, Hispanics and Latinos, American Indians, Alaska Natives, Native Hawaiians, and other Pacific Islanders. (While [additional groups](#) may also be included, BPCnet defines underrepresentation in computing according to [current NSF CISE guidelines](#).) BPCnet serves two key roles:

1. Increase awareness of ongoing BPC efforts and research-based best practices for BPC.
2. Assist departments and NSF PIs in planning and enacting impactful BPC activities.



The National Science Foundation's Directorate for Computer & Information Science & Engineering (CISE), led by Assistant Director Margaret Martonosi, generously supports this portal. [Read more about BPCnet here.](#)

The BPCnet Resource Portal is an initiative by the **Computing Research Association** with support from the **National Science Foundation's (NSF) Directorate for Computer and Information Science and Engineering (CISE)**. CISE is committed to broadening participation in computing (BPC).

FAQs should be more actionable (to target audience)

- What can I do
 - to make the world a better place in terms of diversity?
- What can I do
 - to increase the chances that my proposal will be funded?



BPC PLANS ▾ BPC PLAN CONSULTANCY SUBMIT YOUR PLAN RESOURCES ▾
NEWS & EVENTS ▾ STATISTICS

Frequently Asked Questions (FAQs)

The following Frequently Asked Questions (FAQs) page includes questions and responses from the [official FAQ](#) for CISE Broadening Participation in Computing (BPC) PILOT, as well as additional FAQs found exclusively on BPCnet.org. All FAQs, regardless of the source, are organized by section below.

BPCnet.org provides additional information to official NSF FAQ responses throughout this page. Additional clarification provided by BPCnet.org to official NSF FAQs are indicated with *italicized text*.

FAQ sections:

- [CISE and BPC](#)
- [Project BPC Plans](#)
- [Connected Project BPC Plans](#)
- [Standalone Project BPC Plans](#)
- [Departmental BPC Plans](#)
- [Institutional Considerations](#)
- [Submitting to NSF](#)

CISE and BPC

1. What is BPC? +

2. Which groups qualify as "underrepresented" in computing and closely-related disciplines? +

3. Why did CISE initiate the BPC effort and why is it expanding? +



Panelist Review Example

Suppose a summary of the proposed BPC Plan is: This BPC Plan aims to address the underrepresentation of women in the Computer Engineering and Computer Science undergraduate degree programs at {university}. The plan includes efforts to retain women by introducing socially relevant projects (related to the proposed research) into undergraduate courses. Efforts to introduce the proposed research to K12 students in outreach activities through existing {university} STEM programs are also described.

Panelist Feedback on BPC Plan

Context: NO

The BPC plan identifies the local need to increase the representation of women in CE and CS programs but lacks description of clear and measurable goals.

Intended Population: NO

The plan describes an existing partnership with a local school; however, there is no demographic information about the students.

Strategy: YES

PIs will integrate examples into undergraduate courses and lead the K12 outreach. The role of the PIs in the BPC plan is clear.

Preparation: YES

The plan mentioned that the PIs have participated in working groups on diversity and inclusion and have participated in women in computing/engineering events at national research conferences.

Measurement: NO

No measurement or dissemination plan is mentioned.



Panel Summary Example

Summary Feedback on BPC Plan

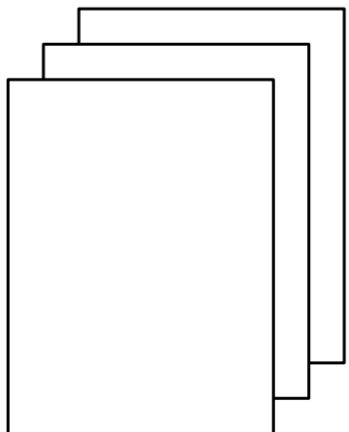
The PIs provide an excellent strategy for BPC and are prepared to do the work.

The BPC plan is **not meaningful** though, as critical information is missing, specifically: clear and measurable goals, demographic information on the participating students, and a measurement plan.

The PIs are encouraged to use BPCnet.org resources (e.g., consultants available) to improve their plan.



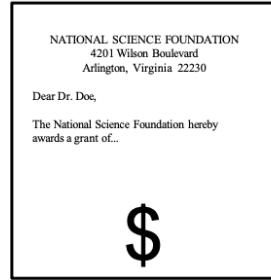
What the PI receives



verbatim text of your
reviews



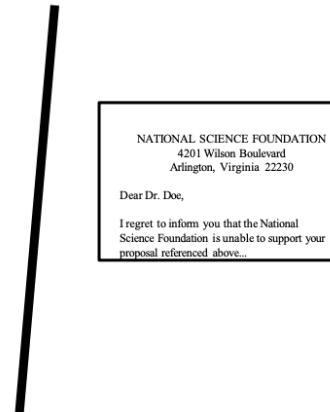
verbatim panel
summary



NATIONAL SCIENCE FOUNDATION
4201 Wilson Boulevard
Arlington, Virginia 22230

Dear Dr. Doe,

The National Science Foundation hereby
awards a grant of...



NATIONAL SCIENCE FOUNDATION
4201 Wilson Boulevard
Arlington, Virginia 22230

Dear Dr. Doe,

I regret to inform you that the National
Science Foundation is unable to support your
proposal referenced above...

award or declination letter
and context information

- Do not include identifying information about yourself or other panelists
- Keep comments constructive, informative, non-inflammatory, and non-discriminatory
- Avoid saying “I am not an expert..”; identify the aspects of a proposal that you can comment on
- Give concrete suggestions (e.g. references)



NSF Policy of Harassment

- As the primary funding agency of fundamental science and engineering research in the U.S., NSF is committed to promoting safe, productive research and education environments for current and future scientists and engineers, including at NSF headquarters and other locations where the Foundation conducts its business. Panel reviewers are an integral part of the Foundation's commitment to identifying and funding science, technology, engineering, and math proposals of the highest quality. NSF is committed to fostering an atmosphere of frank, open, and respectful communication in the proposal review process so that all reviewers can participate fully and expects all review panel participants to comport themselves in a responsible and accountable manner while employed by NSF as panel reviewers. Individuals serving as panel reviewers are Special Government Employees and as such fall under NSF's complaint procedures for employees.
- Any reviewer who believes they are being subjected to harassing or threatening behavior during the course of their NSF panel review activities should contact NSF's Office of Diversity and Inclusion at (703) 292-8020 or eeo@nsf.gov."



Conflicts of Interest

- We have done our best to identify and manage COIs but stay vigilant.
 - Statutory COIs disqualify you from the panel
 - Non-statutory (“appearance”) COIs need to be identified and managed.
- **Read and understand the COI rules** on the COI form
- If you discover a new COI, please let moderators know right away.
- A missed COI has the potential to invalidate the entire panel.
- Guiding thought: Have you or could you benefit financially, where “you” can mean you or someone in your immediate family? Are you unable to evaluate the proposal in a fair and unbiased manner?



Conflicts of Interest

Typical relationships that could lead to a conflict:

STATUTORY COI

(financial interest: disqualifying)

- ◆ *your home institution is proposer or subaward on panel*
- ◆ *current, previous (12 months), or seeking employment*
- ◆ *A payment (>\$1,500) in past 12 months including award, honorarium, or travel payment*
- ◆ *officer or governing board*
- ◆ *other financial interest*

APPEARANCE OF CONFLICT

(managed)

- ◆ *co-author of paper or project collaborator (48 months)*
- ◆ *co-edited journal or proceedings (24 months)*
- ◆ *thesis advisor or student (life-long)*
- ◆ *family member is a student*
- ◆ *sr personnel is family member or close friend*

You **must not participate** in the discussion or ranking of any proposal for which you have a conflict.
Please discuss any actual or perceived conflicts with your panel moderator.



Confidentiality

NSF receives proposals in confidence and is responsible for protecting the confidentiality of their contents and their review.

- ◆ Do not copy, quote, or otherwise use material from these proposals.
- ◆ Destroy all copies – paper and electronic – when you have completed your reviews.
- ◆ Do not discuss the results, recommendations, or membership of this panel (including your own participation on this specific panel).

Except for verbatim copies to the Principal Investigator (without names or other identifying information), reviews will not be disclosed to persons outside the Government. NSF considers reviews to be exempt from disclosure under the Freedom of Information Act, but cannot guarantee that it will not be forced to release reviews under the FOIA or other laws.

[← Go to TMLR homepage](#)

The Fundamental Limits of Neural Networks for Interval Certified Robustness

*Matthew B Mirman, Maximilian Baader, Martin Vechev*

02 Jun 2022, 00:41 (modified: 27 Jan 2023, 11:43) Accepted by TMLR Everyone Revisions BibTeX

Abstract: Interval analysis (or interval bound propagation, IBP) is a popular technique for verifying and training provably robust deep neural networks, a fundamental challenge in the area of reliable machine learning. However, despite substantial efforts, progress on addressing this key challenge has stagnated, calling into question whether interval analysis is a viable path forward.

In this paper we present a fundamental result on the limitation of neural networks for interval analyzable robust classification. Our main theorem shows that non-invertible functions can not be built such that interval analysis is precise everywhere. Given this, we derive a paradox: while every dataset can be robustly classified, there are simple datasets that can not be provably robustly classified with interval analysis.

License: Creative Commons Attribution 4.0 International (CC BY 4.0)

Submission Length: Regular submission (no more than 12 pages of main content)

Changes Since Last Submission: 1. Deanonymized version of paper released.

2. All suggestions from f5Ug have been addressed in prior revisions.

Assigned Action Editor: Kuldeep S. Meel

Submission Number: 149

Add: [Public Comment](#)

Filter by reply type... Filter by author... Search keywords... Sort: Newest First

Everyone [x](#) 22 / 22 replies shown

Decision by Action Editors

Decision Action Editors (Kuldeep S. Meel) 27 Jul 2022, 15:32 (modified: 01 Aug 2022, 13:21) Everyone

Recommendation: Accept with minor revision

Comment: The paper received positive feedback from the reviewers and the authors have responded to earlier concerns of the reviewers. The authors are strongly advised to take into account detailed feedback from Reviewer f5Ug for preparing the final version.

All reviewers view the paper positively and therefore, the paper can be accepted with minor revision. Congratulations to authors on a solid work and I look forward to receiving the final version of the paper.

Best,

Add: [Public Comment](#)

Thanks!

Official Comment Authors 11 Aug 2022, 07:14 Everyone

Comment:

We thanks the reviewers and action editors for the helpful feedback! We've uploaded a camera ready version that has taken into account all feedback.

Best, Authors