



# **OVERVIEW OF NSF & FUNDING OPPORTUNITIES IN GEOSPACE**

**SHIKHA RAIZADA**

**PO, AERONOMY**



# Overview

- ❖ NSF Missions and Priorities
  - ❖ Where is Aeronomy within NSF
- ❖ Navigating NSF
- ❖ Proposal Preparation
- ❖ The Merit Review Process
- ❖ Opportunities in Aeronomy/AGS + NSF
- ❖ Staying Informed



Promote the  
progress of  
science

## **NSF MISSION**

Advance the  
national health,  
prosperity and  
welfare

Secure  
the national  
defense



# NSF'S 3 MAJOR PRIORITIES



## STRENGTHENING ESTABLISHED NSF

With investments that expand  
the frontiers of knowledge  
and technology.



## INSPIRING THE MISSING MILLIONS

Using interventions and capacity  
building that enhance and  
broaden participation.



## ACCELERATING TECHNOLOGY AND INNOVATION

Through innovative, **cross-cutting  
partnerships** and programs.





# NSF STRUCTURE

Directorate for  
**Biological Sciences (BIO)**

Directorate for  
**Geosciences  
(GEO)**

Directorate for  
**Engineering (ENG)**

Directorate for  
**Social, Behavioral & Economic  
Sciences (SBE)**

Directorate for  
**Computer & Information  
Science & Engineering (CISE)**

Directorate for  
**STEM Education (EDU)**

Directorate for  
**Mathematical & Physical  
Sciences (MPS)**

Directorate for  
**Technology, Innovation and  
Partnerships (TIP)**

## GEO's mission:

**To fund the development of knowledge and technological innovations to:**

- **Understand and adapt to the changes in our earth, ocean, and atmosphere,**
- **Accelerate the societal benefits of our investments, and**
- **Train a diverse and inclusive geosciences workforce.**



# NSF STRUCTURE

Directorate for  
Biological Sciences (BIO)

Directorate for  
Geosciences  
(GEO)

Directorate for  
Engineering (ENG)

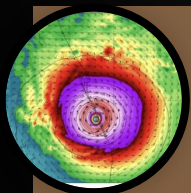
Directorate for  
Social, Behavioral & Economic  
Sciences (SBE)



Earth Sciences (EAR)



Ocean Sciences (OCE)



Atmospheric and Geospace  
Sciences (AGS)



Polar Programs (OPP)

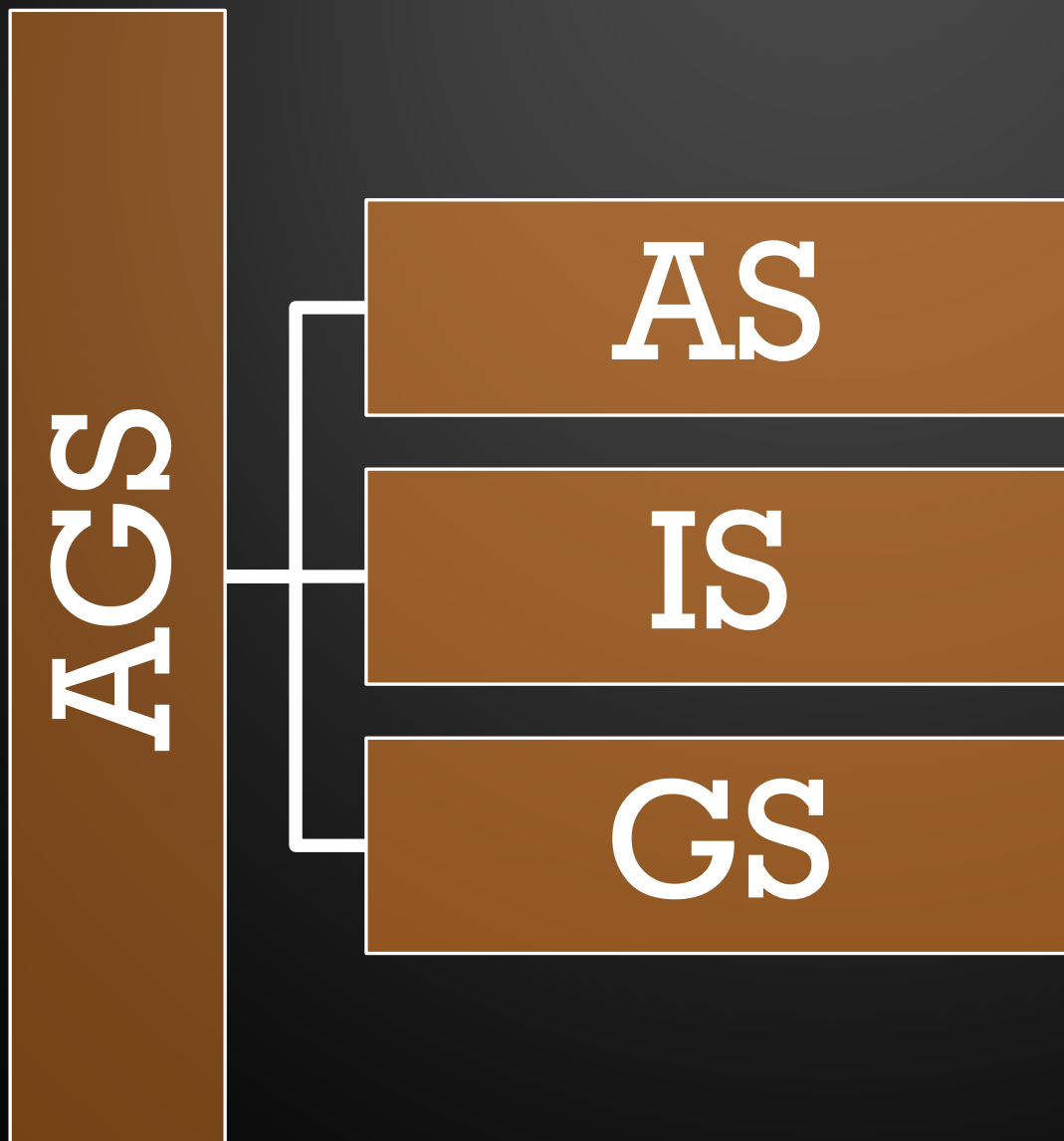


Research, Innovation,  
Synergies, and Education  
(RISE)

Directorate for  
Technology, Innovation and  
Partnerships (TIP)



# ATMOSPHERE AND GEOSPACE SCIENCES (AGS)





# DIVISION OF ATMOSPHERIC AND GEOSPACE SCIENCES



**Anne Johansen**  
Division Director



**David Verardo**  
Acting  
Deputy Division  
Director

Infrastructure  
Cluster

Geospace  
Cluster

Atmosphere  
Cluster



**Roman  
Makarevich**  
Geospace Facilities  
(IC, liaison with GC)



**Shikha Raizada**  
Aeronomy



**Chia-Lin Huang**  
Magnetospheric  
Physics



**Mangala Sharma**  
Space Weather,  
Geospace Cluster Coordinator (Detail to NASA HQ HPD)



**Tai-Yin Huang**  
Data Infrastructure



**Lisa Winter**  
Solar-Terrestrial

**+ TBD**  
Program Director





# NSF GEOSPACE FOCUS AREAS

**Division of  
Atmospheric and  
Geospace  
Sciences (AGS)**

**Magnetospheric  
Physics**

**Solar-Terrestrial**

**Geospace  
Cluster  
(GC)**

**Aeronomy**

**Space Weather  
Research**

**Geospace  
Facilities  
(Infrastructure  
Cluster)**

**AERONOMY**

- ❖ Focuses on mesosphere, thermosphere and ionosphere
- ❖ Coupling from stratosphere to this global system and magnetosphere.
- ❖ Plasma physics of the coupled magnetosphere-ionosphere interactions, irregularities etc.
  - ❖ High power radio-wave modifications

***Accepts proposals  
throughout the year***



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## Innovation Anywhere, Opportunity Everywhere

NSF is an independent federal agency that supports science and engineering in all 50 states and U.S. territories.

What we do



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### Explore NSF discoveries

From 3D printing to black holes, NSF transforms the world with science and engineering.



### Our focus areas

We focus on accelerating new technologies and big ideas — from biology to technology.



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## Areas We Fund

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## Additional Resources

[Explore Our Impacts](#)[Search Funded Projects \(Awards\)](#)[NSF by the Numbers](#)[Our Directorates & Offices](#)

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Science  
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Where to Start

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For Postdoctoral Fellows

For Graduate Students

For Undergraduates

For Entrepreneurs

Explore Funding

Search All Opportunities

By Directorate

By Upcoming Due Date

NSF-wide Initiatives

Search Funded Projects (Awards)

How to Apply

Preparing Your Proposal

Submitting Your Proposal

How We Make Funding Decisions

Proposal & Award Policies & Procedures Guide (PAPPG)

Additional Resources

Research.gov

Grants.gov

Baam.nsf.gov

Our Directorates & Offices

science and engineering in all 50 states and U.S. territories.

What we do

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**Find & apply for funding**

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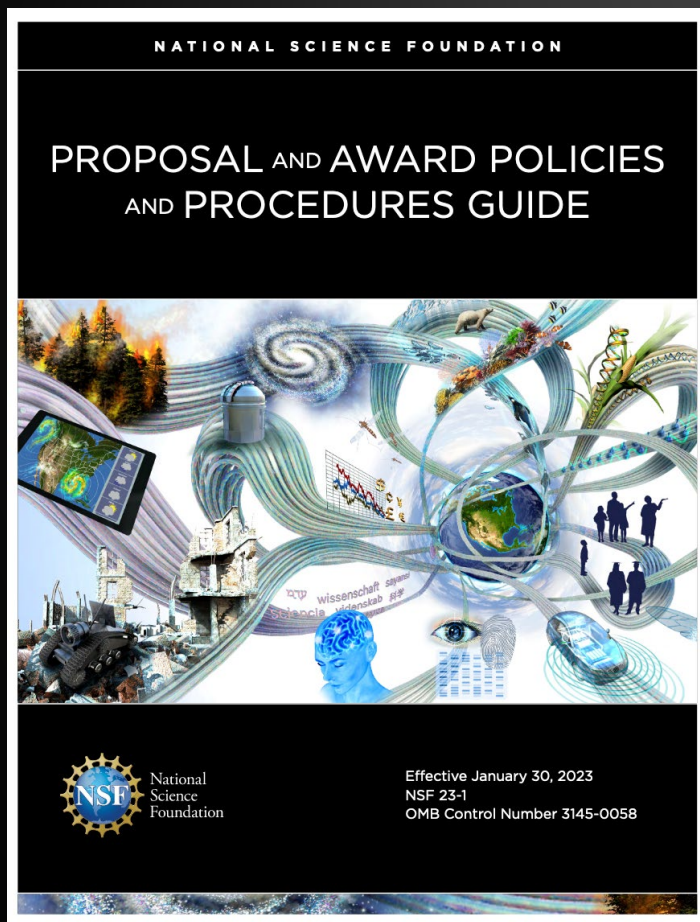


www.nsf.gov





## ESSENTIAL DOCUMENTS - PAPPG



- Provides guidance for preparation and submission of proposals to NSF
  - Who can submit proposals?
  - What is allowed in the budget?
  - Format + required documents
- Describes process – and criteria – by which proposals will be reviewed
- Outlines reasons why a proposal may be returned without review

**NSF 23-1**



# ESSENTIAL DOCUMENTS - SOLICITATION

## **Coupling, Energetics, and Dynamics of Atmospheric Regions (CEDAR)**

### **PROGRAM SOLICITATION**

NSF 22-575

### **REPLACES DOCUMENT(S):**

NSF 18-544



National Science Foundation

Directorate for Geosciences  
Division of Atmospheric and Geospace Sciences

#### **Full Proposal Target Date(s):**

May 20, 2022

May 05, 2023

First Friday in May, Annually Thereafter

### **IMPORTANT INFORMATION AND REVISION NOTES**

#### **Important Information**

Innovating and migrating proposal preparation and submission capabilities from FastLane to Research.gov is part of the ongoing NSF information technology modernization efforts, as described in [Important Notice No. 147](#). In support of these efforts, research proposals submitted in response to this program solicitation must be prepared and submitted via Research.gov or via Grants.gov, and may not be prepared or submitted via FastLane.

Any proposal submitted in response to this solicitation should be submitted in accordance with the revised *NSF Proposal & Award Policies & Procedures Guide* (PAPPG) ([NSF 22-1](#)), which is effective for proposals submitted, or due, on or after October 4, 2021.

### **SUMMARY OF PROGRAM REQUIREMENTS**

#### **General Information**

##### **Program Title:**

Coupling, Energetics, and Dynamics of Atmospheric Regions (CEDAR)

##### **Synopsis of Program:**

The Coupling, Energetics, and Dynamics of Atmospheric Regions (CEDAR) program is a broad-based research program with the goal of understanding the behavior of atmospheric regions from the middle atmosphere upward through the thermosphere and ionosphere into the exosphere in terms of coupling, energetics, chemistry, and dynamics on regional and global scales. These processes are related to the sources of perturbations that propagate upward from the lower atmosphere as well as to solar radiation and particle inputs from above. The activities within this program include observations from ground-based and space-based platforms, theory, and modeling.

##### **Consultant Program Officer(s):**

- Deadline / Target Date
- Synopsis (do you belong?)
- Program Directors (who to ask questions)
- Eligibility (are you/your institution allowed in this program?)
- Budget limitations
- Do you need a Pre-Proposal or Letter of Intent?
- How much money do they have, how many awards do they expect?



# ESSENTIAL DOCUMENTS – SOLICITATION PAGE

**Coupling, Energetics, and Dynamics of Atmospheric Regions (CEDAR)**

[View guidelines NSF 22-575](#)

[View image credit](#)

[Print](#)

[Home](#) / [Funding at NSF](#) / [Funding Search](#) / Coupling, Energetics, and Dynamics of Atmospheric Regions (CEDAR)

**Important information for proposers**  
All proposals must be submitted in accordance with the requirements specified in this funding opportunity and in the NSF [Proposal & Award Policies & Procedures Guide \(PAPPG\)](#) that is in effect...

Supports research that combines theory, modeling and observations from ground-based and space-based platforms to study changes in the atmosphere over short and long time scales.

**Upcoming due dates**

Full proposal
2024
May 3 2024 - Target date
First Friday in May, Annually Thereafter

**Synopsis**

The Coupling, Energetics, and Dynamics of Atmospheric Regions (CEDAR) program is a broad-based research program with the goal of understanding the behavior of atmospheric regions from the

**Program contacts**

Shikha Raizada	<a href="mailto:sraizada@nsf.gov">sraizada@nsf.gov</a>	(703) 292-8963	GEO/AGS
Tai-Yin Huang	<a href="mailto:thuang@nsf.gov">thuang@nsf.gov</a>	(703) 292-8519	GEO/AGS

**Additional program resources**

[Browse projects funded by this program](#)

[Map of recent awards made through this program](#)

**Awards made through this program**

[Read the solicitation NSF 22-575](#)

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**Important information for proposers**  
Proposals may only be submitted by certain types of PIs. Please see solicitation for details.

**Limit on number of proposals per PI or Co-PI**  
2- Only two research proposals per investigator, either as a PI, co-PI, or in a subaward, are allowed per target date in the CEDAR Program.

**Review full program guidelines and learn how to submit a proposal in the latest solicitation.**



# NSF GEOSPACE RELEVANT FUNDING OPPORTUNITIES

**NSF 22-575:  
Coupling,  
Energetics,  
and Dynamics  
of  
Atmospheric  
Regions**

**1st Friday  
in May**

**NSF 22-537:  
Geospace  
Environment  
Modeling**

**Sep 30**

**NSF 22-570:  
Solar,  
Heliospheric,  
and  
INterplanetary  
Environment**

**Oct 7**

**NSF 23-577:  
Faculty  
Development  
in geoSpace  
Sciences**

**Mar 3, 2025**





# CAREER TRAJECTORY PROPOSALS



Graduate  
Research  
Fellowships (GRFP)



Postdoctoral  
Fellowships



CAREER Awards



Mid-Career  
Advancement  
Awards



# EARLY CAREER FUNDING OPPORTUNITIES

- **Undergraduate Students:** REU program
- **Graduate Students:** NSF GRFP (due in the Fall)
  - 5-year fellowship
  - 3 years of financial support
    - \$ 37 K annual stipend & \$16 K education allowance



## NSF Graduate Research Fellowship Program (GRFP)

View guidelines

NSF 23-605

Contact: GRF Operations Center

[info@nsfgrfp.org](mailto:info@nsfgrfp.org)

(866) 673-4737





# EARLY CAREER FUNDING OPPORTUNITIES (CONTD.)

## Atmospheric and Geospace Sciences Postdoctoral Research Fellowships (AGS- PRF)

View guidelines

NSF 22-639

- **Postdoctoral Fellows: AGS PRF**

- Within 2 years of PhD
- Choose US host institution
- Select a mentor
- Two-year Fellowship
  - Year 1 ~ \$100k
  - Year 2 ~ 102 K
- No deadline, apply anytime!



Recent PRFs in Geospace: Jimmy Juno, Rachael Filwett, Ben Boe, Emily Lichko, Sarah Conley



NOT SURE WHERE YOUR IDEAS FIT?

Do you have questions?

Write a one-pager!



Contact the  
Program  
Directors!\*

\*Program Officer = Program Director = Program Manager





Cover Page

Project Summary – 1 page

# PARTS OF A PROPOSAL

Project Description – 15 pages\*

Bio-sketch

Current & Pending Support

Budget

COVER SHEET FOR PROPOSAL TO THE NATIONAL SCIENCE FOUNDATION					
PROGRAM ANNOUNCEMENT/SOLICITATION NO./CLOSING DATE: If not in response to a program announcement/solicitation enter NSF 14-1					FOR NSF USE ONLY
NSF 22-560					NSF PROPOSAL NUMBER
FOR CONSIDERATION BY NSF ORGANIZATION UNIT(S) (Indicate the most specific unit known, i.e., program, division, etc.)					2324596
EAR - PETROLOGY AND GEOCHEMISTRY					
DATE RECEIVED	NUMBER OF COPIES	DIVISION ASSIGNED	FUND CODE	DUNS# (Data Universal Numbering System)	FILE LOCATION
02/30/2023	3	06030000 EAR	1573	173851965	03/19/2019 2:46pm S
EMPLOYER IDENTIFICATION NUMBER (EIN) OR TAXPAYER IDENTIFICATION NUMBER (TIN)		SHOW PREVIOUS AWARD NO. IF THIS IS <input type="checkbox"/> A RENEWAL <input type="checkbox"/> AN ACCOMPLISHMENT-BASED RENEWAL		IS THIS PROPOSAL BEING SUBMITTED TO ANOTHER FEDERAL AGENCY? YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> IF YES, LIST ACRONYM(S)	
NAME OF ORGANIZATION TO WHICH AWARD SHOULD BE MADE Jefferson Manor University			ADDRESS OF AWARD ORGANIZATION, INCLUDING 9 DIGIT ZIP CODE Jefferson Manor University 1 Lucille Lane Sudden Valley, CA 22303		
AWARDEE ORGANIZATION CODE (IF KNOWN)					
NAME OF PRIMARY PLACE OF PERF Jefferson Manor University 1 Lucille Lane Sudden Valley, CA 22303			ADDRESS OF PRIMARY PLACE OF PERF, INCLUDING 9 DIGIT ZIP CODE		
IS AWARD ORGANIZATION (Check All That Apply) (See GPG II.C For Definitions)		<input type="checkbox"/> SMALL BUSINESS <input type="checkbox"/> FOR-PROFIT ORGANIZATION		<input type="checkbox"/> MINORITY BUSINESS <input type="checkbox"/> WOMAN-OWNED BUSINESS <input type="checkbox"/> IF THIS IS A PRELIMINARY PROPOSAL THEN CHECK HERE	
TITLE OF PROPOSED PROJECT Musa acuminata and perpetual longevity: a study of whether there is always money in the banana stand					
REQUESTED AMOUNT \$ \$563,098		PROPOSED DURATION (1-60 MONTHS) 36 months		REQUESTED STARTING DATE 09/31/2023	
SHOW RELATED PRELIMINARY PROPOSAL NO. IF APPLICABLE					
THIS PROPOSAL INCLUDES ANY OF THE ITEMS LISTED BELOW <input checked="" type="checkbox"/> BEGINNING INVESTIGATOR (GPG I.G.2) <input type="checkbox"/> DISCLOSURE OF LOBBYING ACTIVITIES (GPG II.C.1.e) <input type="checkbox"/> PROPRIETARY & PRIVILEGED INFORMATION (GPG I.D, II.C.1.d) <input type="checkbox"/> HISTORIC PLACES (GPG II.C.2.j) <input type="checkbox"/> VERTEBRATE ANIMALS (GPG II.D.6) IACUC App. Date _____ PHS Animal Welfare Assurance Number _____ <input checked="" type="checkbox"/> FUNDING MECHANISM Research - other than RAPID or EAGER					
<input type="checkbox"/> HUMAN SUBJECTS (GPG II.D.7) Human Subjects Assurance Number _____ Exemption Subsection _____ or IRB App. Date _____ <input type="checkbox"/> INTERNATIONAL ACTIVITIES: COUNTRY/COUNTRIES INVOLVED (GPG II.C.2.j) _____ <input checked="" type="checkbox"/> COLLABORATIVE STATUS Not a collaborative proposal					
PI/PD DEPARTMENT Geological Sciences		PI/PD POSTAL ADDRESS			
PI/PD FAX NUMBER					
NAMES (TYPED)	High Degree	Yr of Degree	Telephone Number	Email Address	
PI/PD NAME Megan Fogarty	DPhil			popover@jmu.edu	
CO-PI/PD Laura Bollier	PhD			lojobo@jmu.edu	
CO-PI/PD					
CO-PI/PD					
CO-PI/PD					

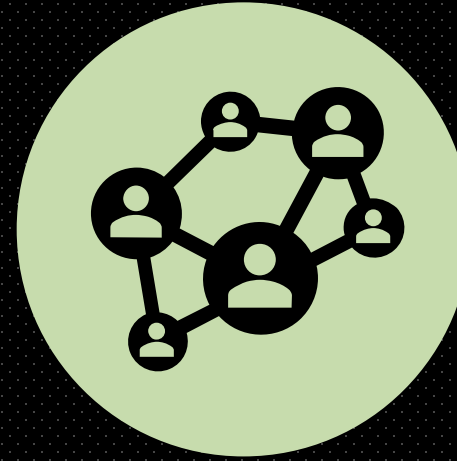


# NSF Merit Review criteria



## Intellectual Merit

the potential to **advance knowledge**



## Broader impacts

the potential to **benefit society**

**Both review criteria must be addressed *explicitly* in  
the Project Summary & the Project Description**



# NSF Merit Review criteria

IM

BI



Will the work advance knowledge, and benefit society?



Is the work creative? original? even potentially transformative?



Is the work plan well reasoned? Will the team know if they're successful?



Is the team well qualified to do what they propose?



Do they have the resources, or collaborators, required to be successful?



## **BROADER IMPACTS: BENEFITTING SOCIETY**

**Teaching, training,  
and learning  
(undergrads + grad  
students)**

**Broaden participation  
of underrepresented  
groups**

**Build or enhance  
partnerships  
(internationally, or  
with other agencies)**

**Broad dissemination  
to enhance scientific  
+ technological  
understanding**

**Enhance  
infrastructure (labs,  
equipment, + work  
in developing  
countries)**

**Local impacts  
(policies @ state +  
local level)**





## BROADER IMPACTS: BENEFITTING SOCIETY

Teaching, training,  
and learning

Broaden participation

Build or enhance  
partnerships

(u

or  
es)

**It is better to do 1 or 2 well than to try covering them all**

**Not every PI or institution is well suited for the same BI**

**BI should be integrated and meaningful, not tacked on**

Br  
to

+ technological  
understanding

in developing  
countries)

local level)

+



## PROPOSAL WRITING GUIDELINES

- Proposals writing instructions: NSF proposal & Award Policies and procedure Guide (PAPPG)
  - Version: **NSF 24-1**
  - **<https://new.nsf.gov/policies/pappg/24-1>**

Be a reviewer or panelist



## LAY OUT A CLEAR WORK PLAN, TIMELINE, AND ROLE FOR EACH PARTICIPANT

### Weak Work Plan:

PIs Howe and Fogarty will go into the field with the graduate and undergraduate students in year 1 to collect samples, and will complete the proposed analyses by year 2.

- draw out a timeline, with tasks
- explain how each analysis or model connects to your hypotheses
- clarify the specific role of each PI + student
- show that the work is feasible within your timeline



## BUILD A REALISTIC BUDGET

- We know science costs money. Be accurate, be reasonable
- Find out what size grants are the norm for the program to which you are applying and get into that range (find out on the NSF website!)
- Know what the funder will pay for and will not pay for...read the PAPPG and solicitation/program guidelines (equipment? travel? collaborators?)
- Use the “Budget Justification” pages to explain your costs
- Ask for money to support your Broader Impacts







## CRAFT A SOLID DATA MANAGEMENT PLAN

Goal: Provide the public with access to research results and data

- Policies vary by Division so know the guidance!
  - Full data sets, derived data products (e.g., model results, output, and workflows), software, and physical collections must be made publicly accessible within two (2) years of final collection

### Common Weaknesses:

- “Data available upon request from PI” or “Data on lab / university server”
- “Data will be made available at time of publication”
- “Data will be published using private storage (e.g., Dropbox or Google Drive)”



## Some Best Practices

- ❖ Clearly readable Maps, figures, legend, captions
- ❖ Lay out a clear work plan, timeline, and role for each participant
- ❖ Realistic and well-justified budget
- ❖ Request funds for Broader Impact activities
- ❖ Get feedback from a person in addition to your SRO.

## COMMON PROPOSAL MISTAKES

- ❖ Work is too close to what has been done before (an incremental advance)
- ❖ Project has too large a scope or is too narrowly focused to be exciting
- ❖ Proposed plan will not actually address address the stated goals of the project



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