



Advancing Research Impact in Society

Welcome to the Toolkit!

The resources and tools on this site are designed to help Researchers and BI Professionals develop projects and partnerships that will satisfy the Broader Impact requirement of National Science Foundation (NSF) proposals, and help you fulfill your interest in communicating your science.

Let's get started: Join us at <https://aris.marine.rutgers.edu/wizard/index.php>

The screenshot shows the ARIS Broader Impacts Toolkit website. At the top, there is a navigation bar with the ARIS logo and the text "ARIS Broader Impacts Toolkit". To the right of the navigation bar are links: "Plan Elements", "Wizard", "My Summary", "Checklist", "Rubric", and "About". Below the navigation bar is a main header area with the title "ARIS Broader Impacts Toolkit" and a brief description: "The resources and tools on this site are designed to help Researchers and BI Professionals develop projects and partnerships that will satisfy the Broader Impact requirement of National Science Foundation (NSF) proposals, and help you fulfill your interest in communicating your science." To the right of the description is an icon of a briefcase. Below the description is a footer line: "This site is brought to you by the Center for Advancing Research Impact in Society (ARIS) and Rutgers University." Below the main header area are four cards, each representing a different tool:

- Guiding Principles**: What does NSF require? Get a high-level overview of societally relevant outcomes and review criteria specified by NSF.
- Planning Checklist**: What elements are needed in a BI project? Use this list to review the key elements of an effective BI project proposal.
- BI Wizard**: How to I develop my BI project proposal? Our wizard will walk you through all of the key steps to building partnerships and and effective project.
- BI Project Rubric**: How to I assess my project's potential? Use this rubric to help you evaluate a Broader Impact project plan.

Our tools address several needs:

- Learning about Broader Impacts (BI Wizard)
- Writing BI plans (Checklist & BI Wizard)
- Reviewing proposals (BI Rubric & tutorial)

Learning about Broader Impacts

Let's use the FAQ QuickStart page as a brief tour of what the Toolkit can do. Let's imagine you are consulting with a researcher and they ask:



Toolkit Quickstart and F.A.Q.

How do I use the tools in the ARIS BI Toolkit?

Learn about the various ways you can use the ARIS Toolkit to help you develop BI plans, review the BI plans of others, and communicate the societal impacts of your research.



What do you mean by societal benefits of my research? How is my research relevant to society?

The BI Wizard offers examples of NSF's 10 areas of investment in BI. Access the BI Wizard program elements page – It provides examples of NSF projects and how they map to the 10 investment areas. See <https://aris.marine.rutgers.edu/wizard/relevance.php>



Is there a guidance document that better explains what NSF means by BI?

Yes, the ARIS Guiding Principles (GP) document provides details on the five questions BI plans should address. It breaks down each of the five criteria NSF reviewers are instructed to use to review the BI portion of a proposal. It includes principles and questions to consider when developing a plan to address the criteria. See the GP

@<https://aris.marine.rutgers.edu/wizard/principles.php>

This document is designed to assist NSF program managers, proposal reviewers, and review panels, in evaluating the BI component of NSF proposals and to assist proposers with developing their broader impacts plans. This document also creates an opportunity for proposers to think critically about how their broader impact activities will incorporate into their research portfolio over time and begin to develop their "impact identity" (Risien, 2018)

The guiding principles and questions



Can the ARIS toolkit provide a basic description of what Broader Impacts are and how to write a BI plan?

The BI Wizard provides support in defining the key elements of an effective BI plan and provides guidance based on the experience of ARIS BI professionals. Use the 4-minute introduction video for more information about the BI Wizard and an introduction to constructing effective BI projects. See:

https://www.youtube.com/watch?v=Lvta88_ZO2k&t=12s



I have no idea how to work with a partner on my BI work. Is there a tool that will help me understand my partnership options?

The partnership section of the Wizard will help provide guidance on identifying appropriate and high-quality partner(s) to accomplish BI goals. Sometimes partners will help you develop and deliver the activity and sometimes your partners are representatives of your target audience who are the intended beneficiary of the BI activity. In addition, sometimes you will work with existing relationships in your university or college, and other times you might seek a new partner (local community organization, non-profit, etc.) to achieve a specific goal or objective.



See <https://aris.marine.rutgers.edu/wizard/partners.php>.



How do I select an audience that will benefit from my research?

One of the most important things to consider is the needs of the audience you are engaging. Understanding the audiences' needs and motivations for working with you will not only make a more compelling case (rationale) for funding your BI project, it will make for a positive connection and experience when funded. The video reviews some of the characteristics of target audiences and how you might think about the contact time and audience size when choosing a project. See:

<https://aris.marine.rutgers.edu/wizard/audiences.php>



I would like to strengthen the rationale for my BI choices. Are there suggested references I can include to ground my BI statement in scholarship?

To assist researchers and project proposal writers develop effective Broader Impact projects, we have compiled a number of relevant references to assist you in your planning. These literature connections align with general [Target Audiences](#). See: <https://aris.marine.rutgers.edu/wizard/references.php>.

Literature Connections for BI Projects with Government/Policy Makers

References for rationale or as background to prepare to work with these audiences.

1. Hetherington ED and Phillips AA (2020). A Scientist's Guide for Engaging in Policy in the United States. *Front. Mar. Sci.* 7:409. <https://doi.org/10.3389/fmars.2020.00409>

While interest in science policy among researchers has substantially increased in recent decades, traditional academic and research careers rarely provide formal training or exposure to the inner workings of government, public policy, or communicating scientific findings to broad audiences. This guide offers 10 practical steps for scientists who want to engage in science policy efforts, with a focus on state and federal policy in the United States.

2. Wells, W.G. (2011). *Working with Congress: A practical guide for scientists and engineers*. (3rd ed.) Washington, DC: AAAS. https://www.aaas.org/sites/default/files/AAAS_Working_with_Congress.pdf

Working with Congress: A Scientist's Guide to Policy, produced by the AAAS Office of Government Relations, provides detailed information on congressional procedures and history. Now in its third edition, the guide emphasizes practical advice on developing and maintaining constructive relationships with lawmakers, their staff members, and other science policy advisers in Washington, D.C.



I have no idea how much I should budget for my BI work. Is there a tool that can help me?

In this section of the Wizard, you will find three examples of commonly conceived BI activities. These items are meant to be examples to help provide perspective on budgeting for Broader Impacts. See: <https://aris.marine.rutgers.edu/wizard/cost.php>


Let's Play a Game: Higher/Lower

We will offer three examples of commonly conceived BI activities.

Each slide will state the BI activity and a price for the activity.

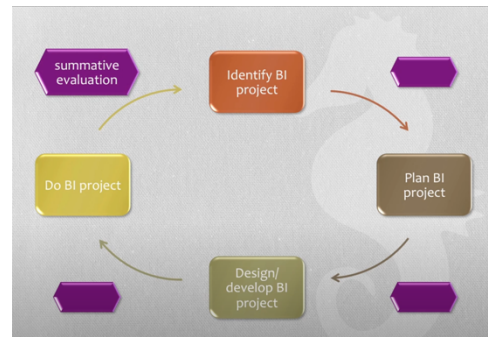
We will ask if you think the actual cost of the activity is higher or lower.

When you're ready, advance to the next slide!




I need a way to share the impact of my BI project but I have no idea where to start.

A truly successful BI project engages people outside your field to understand the relevance of your research. BI activities are an excellent mechanism to not only engage the public, but also to demonstrate accountability with public funds. In this section of the Wizard, you can find evaluation resources that help tell the story of the impact of your BI project. See <https://aris.marine.rutgers.edu/wizard/evaluation.php>



Writing BI plans



I am ready to start writing my BI plan but need a little help getting started. Do you have a tool to help me draft an outline?

The BI Wizard will walk you through the development of an outline for your plan in five steps. The information is saved in your browser but not on our server to protect your IP. See <https://aris.marine.rutgers.edu/wizard/wizard.php>.

Broader Impacts Wizard


Home Plan Elements Wizard Summary Checklist About

Broader Impacts Wizard

The Broader Impacts Wizard will help you develop a broader impacts plan that will satisfy the National Science Foundation (NSF) Broader Impact requirements and fulfill your interest in communicating your science.

The quick and easy process will help frame discussions with your BI partner(s) to produce an outline of important points to include in your NSF proposal.

Note, as you go through the Wizard, there are questions you can answer to save your thoughts. This data is only saved locally in your web browser and is not shared with our server. When you are done, you can copy all your work from the summary page. This will give you the notes you need to continue your work on the Broader Impact elements of your proposal.




I have a draft plan ready. Is there an easy way to check to see if I hit all the major points in my BI plan?

Use our BI Checklist to see if you included all the major components of a great BI project in your proposal.

Broader Impacts Plan Checklist

This checklist was developed from the [NABI Guiding Principles document](#) as a quick assessment to help you gauge the completeness of your BI Plan.

You can use this checklist to check off the items you have addressed in your plan. Then, review the items you have not addressed, and consider adding text to your proposal to address them.

<p>1) Does the BI project address one/more of the target outcomes for BI activities outlined by NSF (check all that apply)?</p> <ul style="list-style-type: none"> <input type="checkbox"/> Full participation of women, persons with disabilities, and underrepresented minorities in STEM <input type="checkbox"/> Improved STEM education and educator development at any level <input type="checkbox"/> Increased public scientific literacy and public engagement with science and technology <input type="checkbox"/> Improved well-being of individuals in society <input type="checkbox"/> Development of a diverse, globally competitive STEM workforce <input type="checkbox"/> Increased partnerships between academia, industry, and others <input type="checkbox"/> Improved national security <input type="checkbox"/> Increased economic competitiveness of the United States <input type="checkbox"/> Enhanced infrastructure for research and education 	<p>2) What is the potential for the proposed activity to benefit society and contribute to achievement of specific desired societal outcomes?</p> <p>Participants/Audience</p> <ul style="list-style-type: none"> <input type="checkbox"/> Is the audience defined? <input type="checkbox"/> Are the needs of the audience described? <input type="checkbox"/> Is the size of the audience (# engaged participants) articulated? <p>BI Project Benefits to Society</p> <ul style="list-style-type: none"> <input type="checkbox"/> Does the project address a societal need? <input type="checkbox"/> Are the benefits to the participant/audience described? <input type="checkbox"/> Is the length of engagement with the participant/audience described and adequate? <input type="checkbox"/> Is there a mechanism described for reaching the participant/audience?
<p>3) To what extent do the proposed activities suggest and explore creative, original, or potentially transformative concepts?</p> <p>Potential to be Transformative</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Does the proposed BI project utilize evidence-based principles, practices, and methods (and if so, to what degree)? <input type="checkbox"/> Does the project transform knowledge of the PI's science for the benefit of a target participant/audience? <input type="checkbox"/> Is the project scalable? Relate to regional or national scale efforts? 	<p>4) Is the plan for carrying out the proposed activities well-reasoned, well organized, and based on a sound rationale? Does the plan incorporate a mechanism to assess success?</p> <p>BI Project Description</p> <ul style="list-style-type: none"> <input type="checkbox"/> Are the goals and objectives of the BI project clearly defined? <input type="checkbox"/> Is the justification for the BI project clearly articulated? <input type="checkbox"/> Is there a plan in place to measure the BI project outcomes? <input type="checkbox"/> Does the BI project description cite the relevant literature on how people learn science?

You can use this checklist to check off the items you have addressed in your plan. Click on the checkbox to turn on/off items in the checklist.


Then, review the items you have not addressed, and consider adding text to your proposal to address them.

Demonstration of BI Wizard


- Not a wizard so much as it is an interactive notebook
- There are two parts – Plan Elements + Wizard Steps
- Designed to be a note collector to support plan/proposal writing and outlining

1. Go to “Pulling it all together” like a researcher who just wants to get started!


Let's get started!
Start anywhere in the cycle to develop a strong BI plan.




Who will I engage?
Finding Partners and Determining your Target Audience
Determine who you want to reach with your BI efforts and how you can have a positive impact.




How much will this cost?
Developing your Budget
Brainstorm the resources will you need to achieve your objectives and develop a viable budget



How is my research relevant to society?
Explore a range of BI options supported and encouraged by NSF



How will I know if my BI project is successful?
Explore evaluation strategies for your BI project



Pulling it all together
Use our interactive worksheet to draft an outline for your BI plan

Ready to start writing?

Per the NSF... a well-written BI section should include activities that are clearly described, have a well-justified rationale, demonstrate creativity or originality OR have a basis in established approaches.



The proposer should have:

- a well-organized strategy for accomplishment of clearly stated goals; establish the qualifications of those responsible for the activities; and demonstrate sufficient resource for support
- a plan should be in place to document/assess results

In preparing a BI description, consider the following components:

- The rationale for working with this audience. Why is it important? Is there literature or precedence for this work?
- How will the BI plan generate benefits to those involved? What are the expected results from engagement? Make sure to mention the duration of audience engagement and the expected number of people impacted.
- How the BI plan connect back to the research proposed and your research interests?

On the next few pages, you can use interactive wizard to draft your plan.

Note, this information is only saved locally in your web browser and is not shared with our server. When you are done, you can copy all your work from the [summary](#) page. This will give you the notes you need to continue your work on the Broader Impact elements of your actual proposal.

[Get Started](#)

This site was developed with the support of the National Science Foundation under Grant No. OCE-0730719, with continued support from OIA-1810732 and OIA-2140950. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the authors and do not necessarily reflect the views of the National Science Foundation.

Note, information is only saved locally in your web browser and is not shared with our server. You can only work on one BI project at a time, currently. Hope to add reset button. When you are done, you can copy all your work from the [summary](#) page. This will give you the notes you need to continue your work on the BI elements of your actual proposal. This guidance is not university or funding agency specific (though focus is NSF). Note that even different directorates and RFPs at NSF differ.

Step 1 – Relevance: Start with the end goal first (Backwards Design).

Step 1 - What do you want to do?

The first step in planning a viable Broader Impact project, is to figure out how the goals of your research will be useful to potential audiences. For more guidance on this, please review [How is my research relevant to society?](#)

Examples

Take away message...
More bacteria are helpful than harmful.

The takeaway message of my BI plan is...
cccc

My science is relevant to this audience because...
Members of my audience often believe that all bacteria are the same everywhere and are harmful. They do not fully understand species diversity, what influences this diversity, and the important roles bacteria play in the ocean environment. Without these microorganisms, carbon would be trapped in dead organisms and carbon and other nutrients would not be available to support life on Earth.

My science is relevant to this audience because...
cccc

[Previous Step](#) [Next Step](#)

This page allows you to articulate what is important about your research and how it might be relevant to the audience you have selected.

Step 2 – Who will you engage?

Step 2 - Who will you engage?

The next step in planning your Broader Impact project is to determine the most appropriate Target Audience with whom you wish to work. In addition, you should identify the Partners with whom you will work to reach your Target Audience and/or develop appropriate resources and materials (e.g., lesson plans, videos, etc.) to support your efforts.

Target Audience
[Need help identifying an appropriate target audience? Check out our Audiences page.](#)

Who is your target audience? (be specific)

What needs are you meeting for this audience?

Partners
[Need help finding a partner? Check out our Partners page.](#)

Who is (and) your partner(s)?
| _____

How will they support your BI plan?

How can this work support greater access or engagement with your research?

Which of these key NSF areas of BI engagement will you select?

- Full participation of women, persons with disabilities and underrepresented minorities in STEM
- Increased STEM education and educator development at any level
- Increased public STEM literacy and public engagement with STEM
- Improved well-being of individuals in society
- Development of a diverse, globally competitive STEM workforce
- Increased partnerships between academia, industry, and others
- Improved national security
- Increased economic competitiveness of the United States
- Enhanced infrastructure for research and education including facilities, instrumentation, networks and partnerships.

As a reminder, here are some of your earlier notes...
How we will collaborate:
We will partner with _____

You can click on audience link to select audience type and then go back to Summary to see literature link.

Step 3: How will you do it?

Wizard Steps: @ Partners / @ Audiences / @ Cost / @ Relevance / @ Evaluation / @ Step 1 What / @ Step 2 Who / @ Step 3 How / @ Step 4 Finish

Step 3 - How will you do it?

Finally, you need to figure out how you will accomplish your project, which includes identifying the resources you need, budgeting for them, and making sure your project is successful by having an appropriate evaluation plan or partner.

One way to make sure your project is successful, and that you meet your BI plan objectives, is to make your project SMART. When you set SMART goals, you can bring structure and tractability to your goals and objectives.



SMART Goals

Below are the five facets of SMART goals. Click on each for more info.



Adapted from *Designing Education Projects: A Comprehensive Approach to Needs Assessment, Project Planning and Implementation, and Evaluation*, Second Edition, NOAA (2009).

← Previous Step

Next Step →

What resources will you need to do it?

What is the rationale for doing it this way? What literature is there to support your approach?

Who will you collaborate with to perform the evaluation?

Need help crafting a budget? Check out our [budgeting page](#).

Need help figuring out how you can evaluate your project to make sure it is successful? Check out the page [How will I know if my BI project is successful?](#)

In this section, you will write about how you will accomplish your project, which includes identifying the resources you need, budgeting for them, and making sure your project is successful by having an appropriate evaluation plan or partner. Use the SMART too to make sure your objectives are Specific, Measurable, Action-based, Relevant, and Time-bound.

Step 4 & 5: How will you know you have done it? Summary Page!

In this step, you are encouraged to re-read your BI Plan and ask yourself these important questions:

- Does the BI project address one/more of the target outcomes for BI activities outlined by NSF?
- What is the potential for the proposed activity to benefit society and contribute to achievement of specific desired societal outcomes?
- To what extent do the proposed activities suggest and explore creative, original, or potentially transformative concepts?
- Is the plan for carrying out the proposed activities well-reasoned, well organized, and based on a sound rationale?
- Does the plan incorporate a mechanism to assess success?
- How well qualified is the individual, team, or institution to conduct the proposed activities?

Wizard Steps: @ Partners / @ Audiences / @ Cost / @ Relevance / @ Evaluation / @ Step 1 What / @ Step 2 Who / @ Step 3 How / @ Step 4 Finish

Step 4 - How will you know you've done it?

Congratulations! You made it through the BI Wizard. Now it is time to start writing your BI Plan proposal.



What should I do next?

Now that you have gone through the wizard and collected your notes, you're ready to start writing your broader impact project plan into your proposal.

Here are your next steps:

1. Review the key questions below, and the details for each on the [Checklist](#) page to make sure you will think through all of the key elements of an effective BI plan.
2. Grab all of your notes from this Wizard from the [Summary](#) page.
3. Write your plan into your proposal, and work with your partners to finalize your plans.
4. Come back and use the [Checklist](#) to make sure you've included all of the appropriate elements.
5. Submit your proposal!

Things to think about next...

1. What do you think that your audience will be able to do/achieve, etc. as a result of this activity?
2. What, if any, products will come out of this activity?
3. What are the long-term outcomes of this activity? How will it impact your audience in the future?

BI Plan Key Questions

Take a moment to re-read your BI Plan and ask yourself these important questions:

1. Does the BI project address one/more of the target outcomes for BI activities outlined by NSF?
2. What is the potential for the proposed activity to benefit society and contribute to achievement of specific desired societal outcomes?
3. To what extent do the proposed activities suggest and explore creative, original, or potentially transformative concepts?
4. Is the plan for carrying out the proposed activities well-reasoned, well organized, and based on a sound rationale? Does the plan incorporate a mechanism to assess success?
5. How well qualified is the individual, team, or institution to conduct the proposed activities?

Good Luck!

← Previous Step

Summary →

Reviewing proposals



I have been asked to be a red team reviewer at my university for a large scale proposal to NSF. Do you have a tool that will help me provide substantive review of the BI?

Access our BI Rubric to benchmark and review your proposal. If you are not familiar with BI, use the Guiding Principles document to get familiar with the questions.

Broader Impacts Plan Rubric

This rubric is designed to help you evaluate a BI plan.



The rubric can be used in two ways:

- Reviewers participating in the review process can use the rubric to assess the rigor and quality of a proposed BI plan. Please review NSF's Proposal Awards Policies & Procedures Guide (PAPPG) for specific solicitation guidelines. Panelists should use this rubric in combination with their own experience and judgment.
- Grant writers can use this rubric as guidance for writing a BI statement. We encourage grant writers to explore their own career goals and objectives and carefully consider the research impacts they would like to achieve.

You can practice using the rubric with a case study example in our [BI Rubric Tutorial](#).



I have been asked to be a reviewer on an NSF panel. Do you have a tool that will help me provide substantive review of the BI?

Use the BI rubric tutorial to help learn how to apply the rubric in preparation for a panel review.

ARIS BI Rubric Tutorial

Are you curious about how the ARIS Toolkit can help you plan, review and improve Broader Impact projects? On this page we will walk through a case study to introduce you to the resources available in the toolkit.



First, we will review an *example* Broader Impact project proposal.



Then we will walk through the BI Rubric, giving you a chance to rate the case study on each criteria.



Finally, after selecting an option, you can compare your rating with those of the ARIS team. For each criteria, we will explain our rating, and provide links to additional information and guidance in the ARIS Toolkit.

Click [begin](#) to start reading the BI case study.