

# BROADER IMPACTS:

ADVANCING RESEARCH  
IMPACT IN SOCIETY



ORED SEMINAR SERIES

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# What do we mean by Broader Impacts?

“Broader Impacts” is a term most recognizable by the academic and research community as an element of review criteria established by the National Science Foundation.

In today’s broader research funding landscape, this term has come to define a project's ability to leverage broad and diverse resources to affect change or create non-academic benefits to a specific audience or sector of society.

Today, we’ll review:

- Quick history and evolution of “Broader Impacts”
- Some types of Impact
- Tips for demonstrating impact in your proposal
- Your “Broader Impacts” identity
- Additional resources to support impact planning, demonstration, and evaluation

*If the concept of impact has relevance only because of an NSF instruction, then the potential for success of your proposal is diminished.*

Portions of today's presentation are made available through [ARIS \(Advancing Research Impact in Society\)](#) through support from the National Science Foundation under grants OIA-1810732 and MCB-1408736.



# NSF Merit Review Criteria

*“...to promote the progress of science; to advance the national health, prosperity, and welfare; to secure the national defense; and for other purposes.” – NSF Mission*

1. **Intellectual Merit** – the potential to advance scientific knowledge (creative, original, potentially transformative)
2. **Broader Impact(s)** – the potential to benefit society and contribution to the achievement of specific, desired societal outcomes.

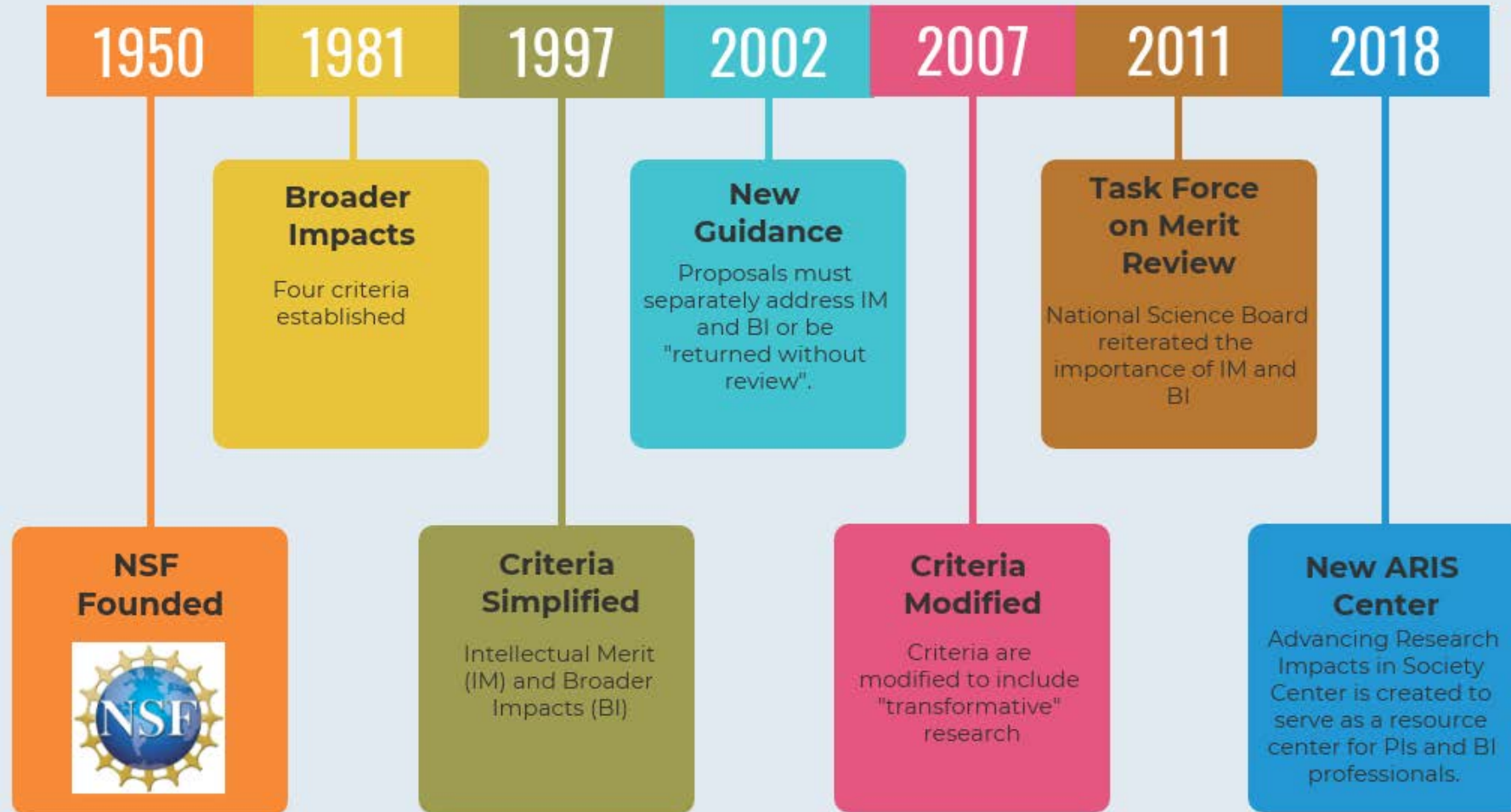
NSF wants to know, “what is the potential for the proposed activity to:

- a. advance knowledge and understanding within its own field or across different fields (**Intellectual Merit**); and
- b. benefit society or advance desired\* societal outcomes (**Broader Impacts**)?”

*\*These desired outcomes are what you have to establish (are they aligned with the funder’s desired outcomes?), justify, and demonstrate may be achieved through your project.*

# TIMELINE

History of Broader Impacts at the National Science Foundation



# Broader Impacts: Just the NSF? For now...





## Separating Intellectual Merit from Broader Impacts

IM asks what are the original contributions of the proposed work to the area of study.

- A common critique is that PIs are too vague as to originality, creativity, and potentially transformative nature of the work they propose.
- How would this work potentially change the direction of or challenge conventional wisdom in the field?
- What new knowledge or contribution does the proposed work bring to the discipline's body of knowledge?
- IM may be narrow...and that is OK! IM is NOT about novelty or experience of the investigator, e.g., "I bring a strong mathematics background to this predominantly engineering research team," or "Not having to teach would allow for more progress toward this goal."

Broader Impacts is where you will describe any potential the proposed research and accompanying activities have to produce impact beyond the discipline.

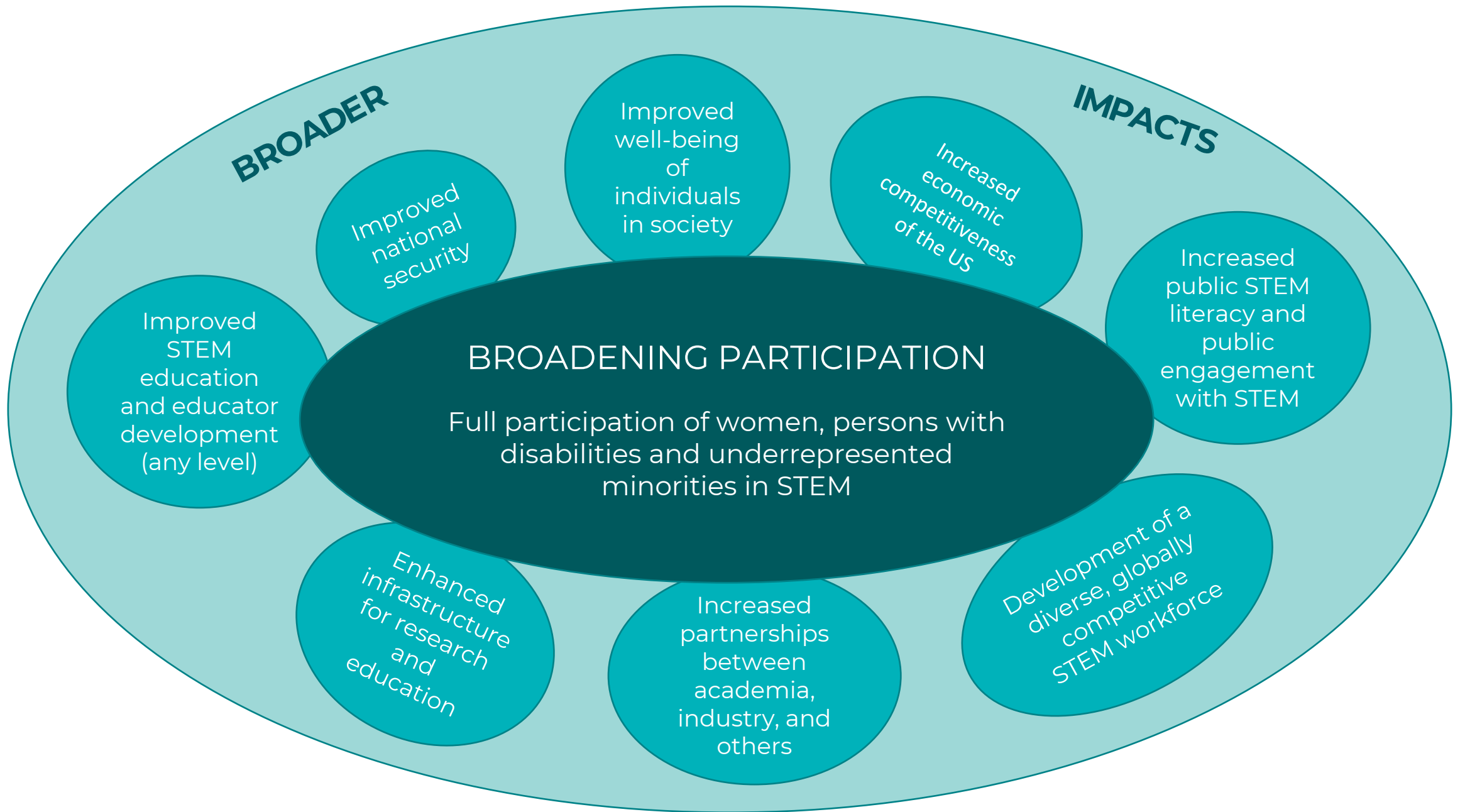
# NSF's Broader Impacts Criteria

For NSF proposals, your Broader Impacts activities and performance measures are those elements which target and/or engage a specific audience or beneficiary and:

- Potential to advance discovery and understanding while promoting teaching, training, and learning;
- Potential to actively promote broadening participation\* and engagement among underrepresented groups;
- Enhance infrastructure for research and education, such as facilities, instrumentation, networks and partnerships;
- Ensure broad dissemination of the results of the work funded to enhance scientific and technical understanding.

\**“Broadening Participation”* and *“Broader Impacts”* are NOT the same thing!





# Why does broad participation matter?

- We need the best and brightest in STEM. If we're not drawing from the ENTIRE population, we're potentially missing out on a lot of great minds
- We need to have all voices at the table to ensure we're asking the questions that affect everyone
- To ensure equity with respect to funding decisions
- It's the right thing to do!

# Why Do Broader Impacts Matter?

## Beyond NSF: How does your research impact society?

Scientists and engineers funded by the U.S. National Science Foundation are accountable to taxpayers for conducting research, and collectively moving their research beyond the lab to impact the public good, thereby benefitting the economy, society and discovery itself. This is why demonstrating “Impact” is a focus and often requirement of many federal and other funders.

### The “Impact Chain”



# Some Examples of Impact

## Social & Cultural Impacts

Improved quality of life  
Improved personal/public/national safety & security  
Reduced poverty  
Improved education, literacy, opportunity, health, access to social services  
Improved cultural health, societal participation  
Decreased marginalization  
Improved models for decision-making & risk management

## Environmental Impacts

Improved quality of air, water, land, soil, species, ecosystems, environmental management & stewardship, sustainability  
Renewable, sustainable, safe energy  
Increased agricultural productivity & safe food supply  
Speed of recovery from environmental problems  
Mitigation of risk to environment

## Economic Impacts

GDP growth  
Increased employment, jobs, and exports  
New technologies, products, patents, licenses, companies, jobs  
Increased industry competitiveness & market leadership  
Increased productivity, income & revenue  
Production efficiency & cost reduction  
Private sector investment

## Health Impacts\*

Reduction of disease & mortality rates  
Improved clinical outcomes  
Reduction of healthcare costs  
Treatment efficacy  
Improved patient satisfaction, quality of life  
Improved surgical techniques, treatments, therapies  
Increased preventative therapies

## **IMPACT suggests a long-term change.**

**IMPACT is achieved through ACTIVITIES and is demonstrated by OUTCOMES,  
which must be MEASURABLE**

**Examples of Impact Outcomes include, but are not limited to:**

- full participation of women, persons with disabilities, and underrepresented minorities in (STEM)\*;
- improved STEM education and educator development at any level;
- increased public scientific literacy and public engagement with science and technology;
- improved well-being of individuals in a sub-segment of society;
- development of a diverse, globally competitive STEM workforce;
- increased partnerships between academia, industry, and others;
- enhanced national security;
- increased economic competitiveness of the United States; and
- enhanced infrastructure for research and education.

*\*These are NSF-specific, but remember, impact applies to ALL types of efforts to bring about a change – includes arts, humanities, education, health, workforce, social sciences, etc.*

# Why do Broader Impacts matter?

- Accountability is a good thing
- Forces researchers to think more deeply about the relevance and implications of their work
- Reinforces/strengthens communication skills
- Engages and excites next generation of scientists and engineers
- Increases diversity in STEM



# Demonstrating Broader Impact in Your Proposal

Broader Impacts may be achieved through the research itself, through activities that are directly related to specific research projects, or through activities that are supported by, but are complementary to, the project.

**Impact activities typically include:**

- Impact Planning (identifying, analyzing, mapping, prioritizing types and audience)
- Education and outreach initiatives (format unique to audience and type of research)
- Partnerships and stakeholder engagement/co-creation (consider all types of collaborators, partners, beneficiaries and their possible role)
- Infrastructure access and support (both tangible and alignment with institutional/investigator capacity)
- Knowledge mobilization (includes dissemination, translation, transfer, exchange)
- Impact tracking and evaluation (evidence base for metrics, activities for follow up/measurement)

## **Broader Impacts: Example Activities:**

### Advance discovery while promoting teaching and learning...

- developing research-based educational materials or contribute to databases useful in teaching (ex: digital libraries, resource materials for teachers, community activities)
- Piloting new methodologies and activities with students; curriculum design involving team- or project-based learning
- Partnering with researchers and educators to develop effective means of incorporating research into learning and education (MSU's on teams in education research, curriculum and instruction, or workforce development, for example)
- Encouraging student participation at meetings and activities of professional societies

### Broaden participation of underrepresented groups....

- Partner with established programs at MSU (ACCESS, TRIO, funded BP programs, affinity/professional orgs.etc.)
- Make campus visits and presentations at institutions that serve underrepresented groups
- Establish research & education partnerships and collaborations with faculty and students at community colleges, HBCUs, PUIs, MSIs, and EPSCoR institutions
- REUs, RETs, student exchanges, "citizen science" and experiential learning and research activities
- Mentor early-career scientists from underrepresented groups in growth areas (not just the discipline, but the work of academia including proposal preparation, technology transfer, navigating life as new faculty, etc.)

## **Broader Impacts: Ways to.....**

### Benefit society...

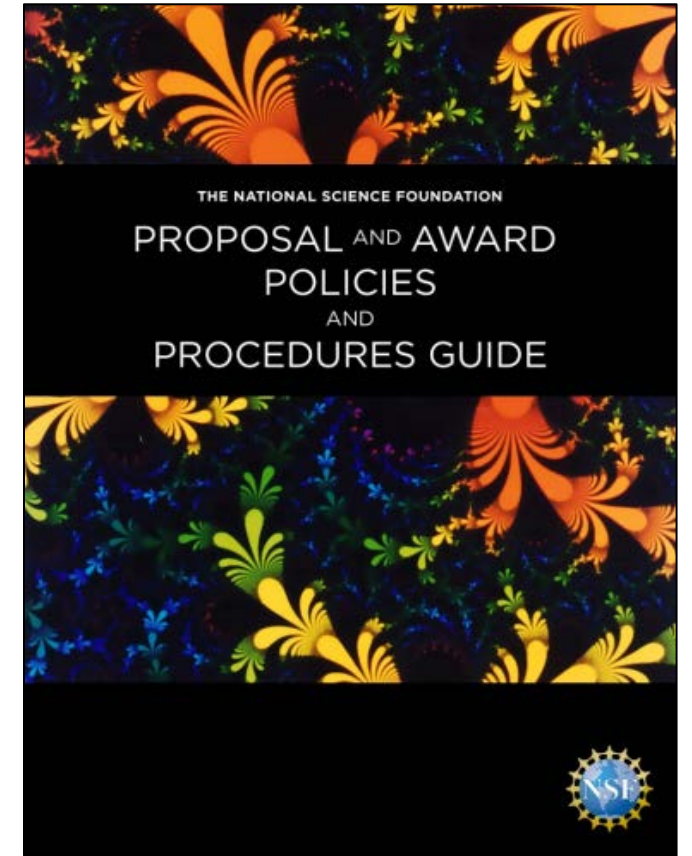
- Build on other efforts of your professional and academic organizations –leverage their impact
- Demonstrate a linkage between discovery and societal benefit through impact planning exploration
- Partner with academic scientists, staff, at federal agencies and with private sector to integrate research into broader programs and activities of NATIONAL interest (NGOs, “think tanks,” etc.)
- Analyze, interpret, and synthesize research and education results in formats understandable and useful for non-scientific audiences/ knowledge translation

### Disseminate to enhance scientific and technological understanding...

- Integrate research with education activities to communicate a broader context
- Partner with museums, nature/science centers and the like, to develop exhibits in STEM, etc.; host events
- Present research and education results in formats useful to policy makers and in their environments
- Translate research into complementary fields via conference presentations across disciplines and among beneficiary populations

# WHERE DOES BI APPEAR IN MY NSF PROPOSAL?

- Project Summary & Abstract
- Project Description: “Broader Impacts of the Proposed Work”
- Special Information and Supplementary Documentation
- Postdoc Mentoring Plan
- Data Management Plan
- Letters of Collaboration
- Biosketch
- Budget & Justification
- Annual Report



NSF PROGRAM  
OFFICER:

“The BEST broader  
impacts plans are  
seamlessly  
integrated into the  
research”



## In NSF and other proposals, BI may be integrated throughout a proposal by...

- Setting specific IMPACT goals and objectives
- Statistics and references (justification and baseline for impact performance indicators)
- Using the “chain” concept
- Proactive language (“will” not “should” or “might”)
- Specificity - provide detail about proposed activities (support with collaborator commitment if possible)
- Direct v. indirect impacts
- Timeframes and deliverables
- Clearly defined roles of researchers, partners, and collaborators (and students/other education beneficiaries)
- Describe institutional support (of applicant and stakeholders)
- Bios and C&P by demonstrating established relationship, where applicable
- Budget by demonstrating devoted resources



# Broader Impacts Resources

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## BI Resources At/Near MSU

- Office of Research Development (our website has resources, and we can find others!)
- Center for Community Engaged Learning
- MS Cooperative Extension; 4H; FFA
- MSU's Centers and Institutes
- Undergraduate Research Office – REUs, MARC, etc.
- Evaluation: SSRC; RCU; NSPARC
- Office of Institutional Diversity and Inclusion; disability resource center
- Local museums, science/technology centers, zoos, aquaria, nature centers, etc.
- Local schools, after-school programs; STEM summer camps
- Office of Student Affairs/Student Activities (MVC)
- Greater Starkville Development Partnership
- Local Science Cafés; Farmers Markets; County Fairs
- Local senior centers, scouting groups, homeschool cooperatives
- Regional industries and workforce development partners

# About ARIS



The National Alliance for Broader Impacts (NABI) was formed in 2014, with the awarding of a National Science Foundation (NSF) Research Coordination Network (RCN) grant (MCB #1408736).

The goal of NABI was to create a community of practice that fosters the development of sustainable and scalable institutional capacity and engagement in broader impacts activity.



- Identification and curation of promising models, practices, and evaluation methods for the Broader Impact (BI) community;
- Expanded engagement in and support of the development of high-quality BI activities by educating current and future faculty and researchers on effective BI practices;
- Development of the human resources necessary for sustained growth and increased diversity of the BI community; and
- Promotion of cross-institutional collaboration on and dissemination of BI programs, practices, models, materials, and resources.



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Finding Funding

Proposal Preparation

Programs

Request Assistance

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# Your Broader Impacts Identity

# Starting Point..

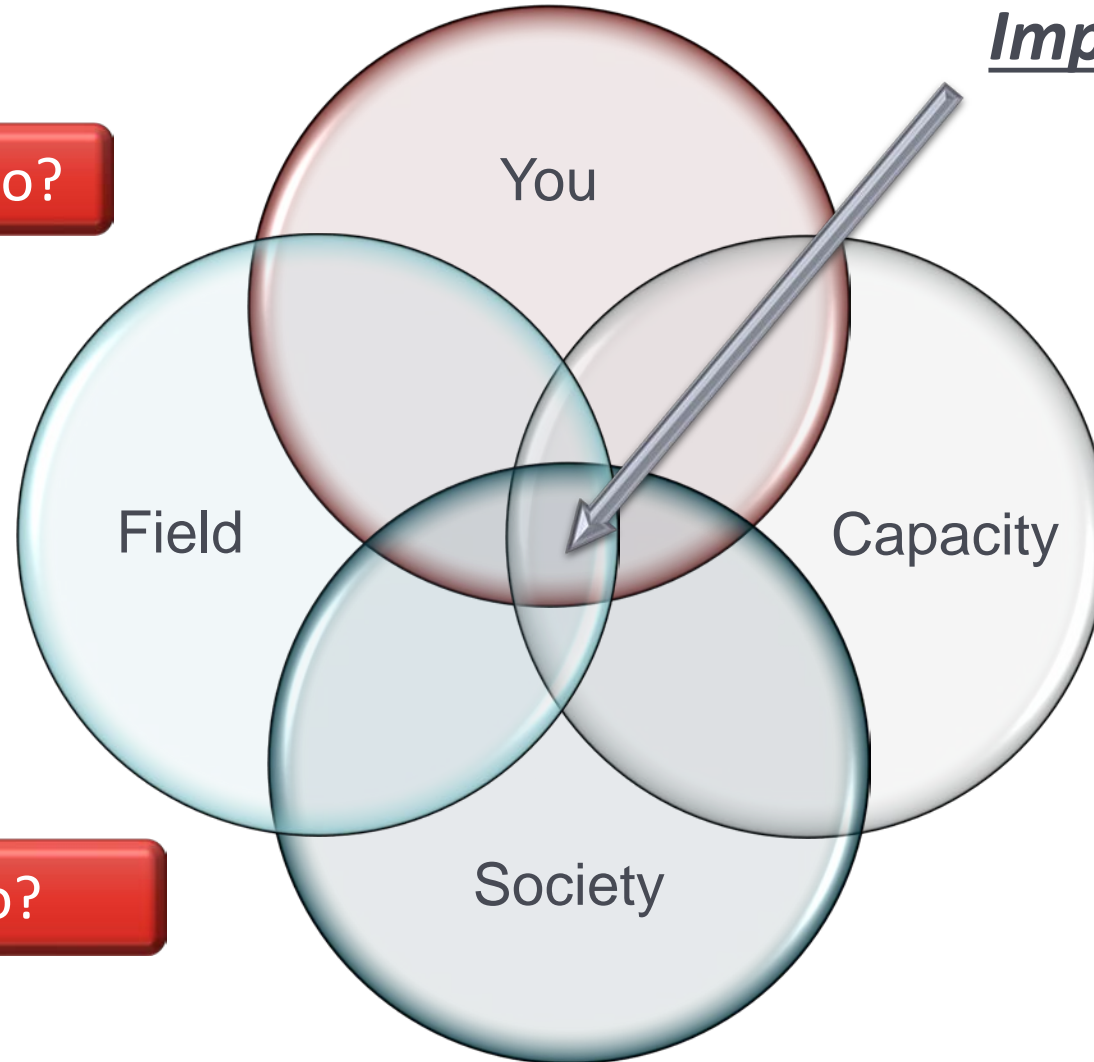
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- Everyone who does research has a *RESEARCH IDENTITY*
- This is your footprint, your unique identity in the research landscape based on your individual contributions to your field
- It shapes the choices you make, the collaborations you seek out, the grants you target, the journals in which you seek to publish, etc.
- It is dynamic
- It is (or will someday be) your research legacy
- Whether consciously, or not, you spend a lot of time thinking about your *RESEARCH IDENTITY*

# Building your BI Identity

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What would I LOVE to do?



What CAN I Do?

What SHOULD I do?

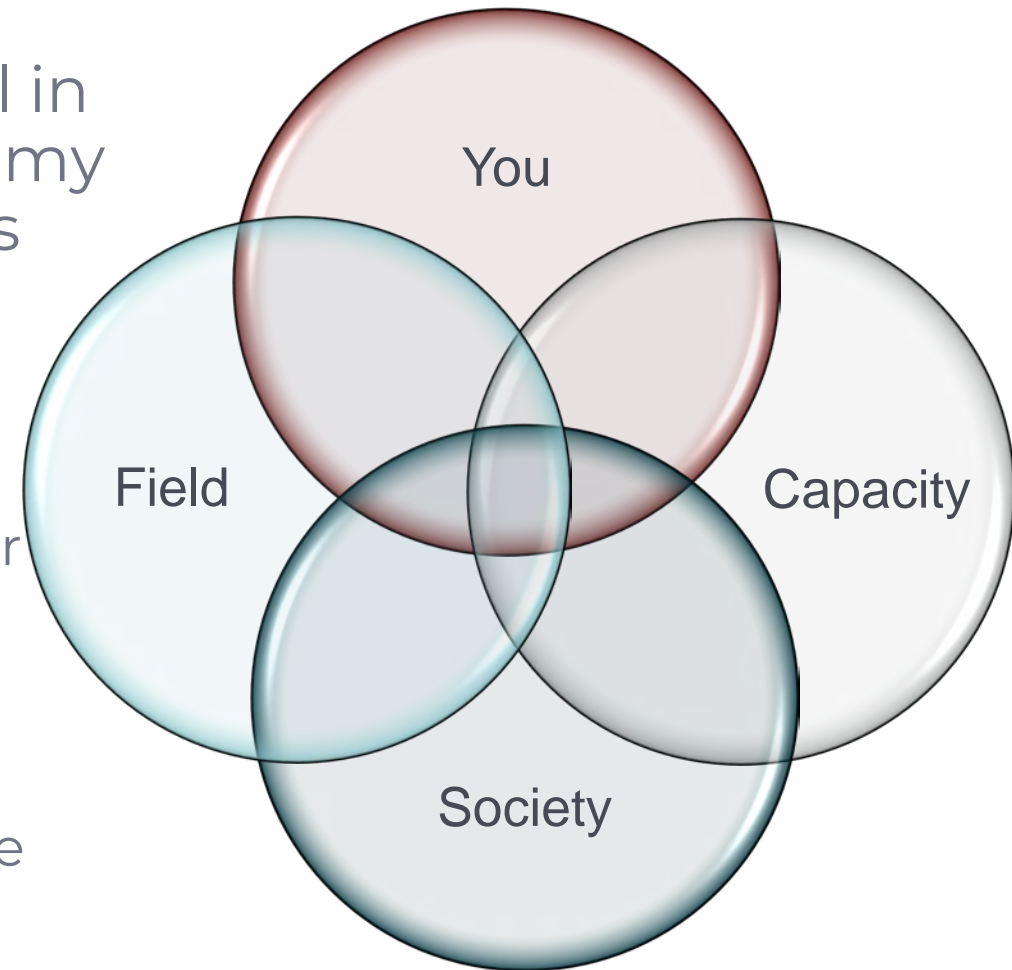


# Building your BI Identity – What is *your* identity?

Craft a 3-4 sentence “Impact Identity and Goals” statement

You can frame it as follows: If I am successful in my BI efforts over the next 10 year, what will my biosketch say about the impact my work has had on society? Address questions such as:

- Who are you, what impact can your work have?
- What change do you want to see as a result of your work and why?
- Who is (are) your audience(s) or beneficiaries?
- What are your preferred media/processes to realize desired impacts?



**Remember: This is not a contract...it's a potential roadmap!**

# Creating a BI Plan

## **The **Broader Impacts Wizard** provides prompts and questions to help with the design of your BI plans and activities.**

- 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

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Just as you prepare your “research plan” you should consider the same questions for your BI plan:

- What do you want to do (impact outcome goal)?
- Why do you want to do it?
- What is your activity?
- What audience(s) will it serve?
- Will it serve people underrepresented in STEM?
- What need(s) or niche(s) does it fill?
- How will you do it?
- What resources will you need to do it?
- Who will do it? Who will help?
- How will you know you’ve done it?
- What is the timeline?

## Broader Impacts Statements for the Reviewers

- The proposed activity benefits society at-large (or a segment thereof) by.....
- Societal benefits of the proposed activities include.....(education, infrastructure, well-being, etc.)
- Evidence of the need for this intervention among this sector/audience/sector is....
- (insert underrepresented population targeted, ex: women) are empowered through.....
- Expected outcomes of the proposed work will enable (insert underrepresented population targeted) to.....
- Locally, research infrastructure is impacted through improvements to.....
- The results of this work reach beyond (local/discipline-specific, etc.) implications to impact.....
- The population(s) of stakeholders most impacted by this work is/are.....
- The project expands the capacity of XXX to reach/impact.....
- While this work will certainly impact the MSU target service area, as evidenced by....., a broader segment of society is impacted due to.....

**We are here  
to help!**  
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