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## **Broader Impacts and Participation: Do's and Don'ts**

Cristo Leon

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New Jersey Institute  
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# Broader Impacts and Participation: Do's and Don'ts

September 12, 2017

Talk by:

Cristo Leon

Director of Research College of Science and Liberal Arts  
Office of Research, New Jersey Institute of Technology.

*Why serving others will  
help serve your self?*

Currently, Cristo is the Director of Research, CSLA at NJIT where he Manages the logistics of the College of Science and Liberal Arts research and planning programs. Assist the CSLA Dean, faculty and staff on research-related planning documents, research activities and proposal budget preparation. Help the Office of Research and Development and other entities within NJIT monitor and assist in ensuring compliance with federal, state and other governmental and NJIT regulations. Serve as staff liaison for the CSLA Dean's Office with the Office of Research and Development and with the New Jersey Innovation Institute.



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Affiliated with the Air Force Reserve Officer Training Corps detachment based at NJIT, the Aerospace Studies Department has substantial scholarship opportunities available to students preparing for a career as a U.S. Air Force officer after graduation.



**Biological Sciences**

Federated with Rutgers University-Newark, the Department of Biological Sciences offers undergraduate and graduate programs spanning the study of individual neurons to global ecosystems.



**Chemistry & Environmental Science**

The Department of Chemistry and Environmental Science addresses scientific and social challenges through undergraduate and graduate programs in chemistry, biochemistry, pharmaceutical chemistry, and environmental science and policy.



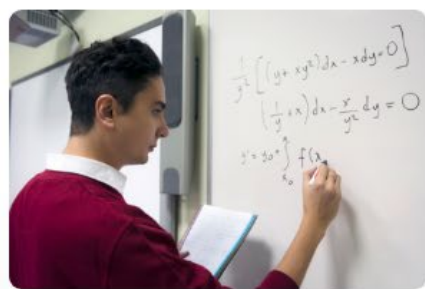
**History**

The Department of History, federated with Rutgers University-Newark, offers the unique advantages of historical study at NJIT, including undergraduate and graduate specialization in the history of technology and health and medicine.



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Educational and research opportunities in the



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Global Facilitator, Coach & Trainer at Tecnológico de Monterrey



Associate Director of e-Learning at Ocean County College



Social Media | Digital Marketing | Online Advertising at CLDM



Digital Mentor at Northern Ocean Habitat for Humanity



Executive Development & Outreach Coordinator at Tecnológico de Monterrey



Social Media Manager at Tecnológico de Monterrey



Instructional Designer & Trainer at Secretaría de Educación Pública



Director of Innovation, Instructional Design & Trainer at Universidad Veracruzana



Resident Director Xalapa, Veracruz, México at International Studies Abroad

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Resident Director Xalapa, Veracruz, México at International Studies Abroad



Productor y Promotor Cultural. ORTEUV, at Universidad Veracruzana



Actor y Coreógrafo, TISEV, at Secretaría de Educación Pública

*How does an Actor get  
to be a Director of  
Research?*

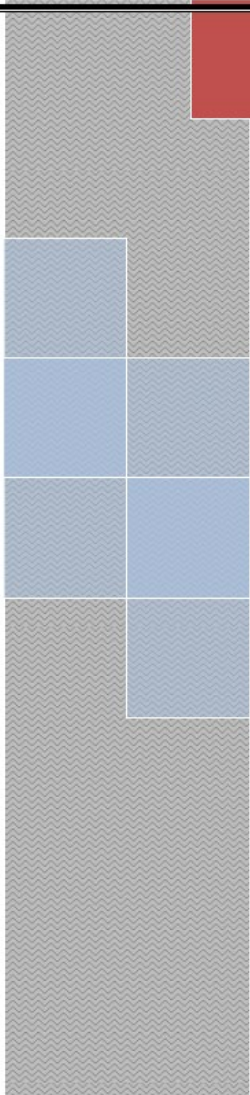
# *Storytelling*



# *Today's Story: Broader Impacts*



NSF. (2015). *Perspectives on Broader Impacts* (1st ed.). USA.  
Retrieved from  
[https://www.nsf.gov/od/oia/publications/Broader\\_Impacts.pdf](https://www.nsf.gov/od/oia/publications/Broader_Impacts.pdf)



# Framework for Evaluating Impacts of Broadening Participation Projects

Report from a National Science Foundation  
Workshop

The National Science Foundation

The Directorate for Education and Human Resources

The Division of Research on Learning in Formal and Informal Settings (DRL)

Fitzgerald Bramwell, Patricia B. Campbell, Beatriz Chu Clewell, Darnella Davis, Norman Fortenberry, Antonio García, ... Adam Stol. (2009). *Framework for Evaluating Impacts of Broadening Participation Projects* (1st ed.). USA: National Science Foundation.

Retrieved from [https://www.nsf.gov/od/broadeningparticipation/framework-evaluating-impacts-broadening-participation-projects\\_1101.pdf](https://www.nsf.gov/od/broadeningparticipation/framework-evaluating-impacts-broadening-participation-projects_1101.pdf)

# Broader Participation in the Scientific Enterprise: NSF Perspectives and Actions

Bernice Anderson

March 7, 2017



Creating Strong Broader Impacts for NSF Proposals: Role of Evaluation & Broader Participation

54 views

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James Lipuma

Published on Mar 13, 2017

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This panel was hosted by NJIT on March 7 2017 as part of the Center for Leadership, Education, and Assessment Research (CLEAR) mission of supporting effective education. The full agenda

James Lipuma. (2017). *Creating Strong Broader Impacts for NSF Proposals: Role of Evaluation & Broader Participation*. NJIT, Newark, NJ, USA. Retrieved from <https://www.youtube.com/watch?v=7rUa9WiBIIA&feature=youtu.be>



*Your story grows each  
day as you progress*

*What story do you want  
to have?*

*How does your story  
connect with everyone  
else?*

*Altruism, civic  
engagement and  
volunteerism*



*Have a method, paths  
are many, do your  
research!*

*Don't be surprised!*

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*Don't wait until your  
dissertation to find  
your passion*

# *NSF Review Criteria*

Each year, the National Science Foundation (NSF) receives about 50,000 proposals for funding. Because there are far more meritorious proposals than NSF is able to fund, the foundation distinguishes among those proposals through a merit review process that incorporates two criteria: Intellectual Merit and Broader Impacts

*Intellectual merit: the  
potential to advance  
knowledge.*

# *Broader Impacts?*



*Broader impacts: the potential to benefit society and contribute to the achievement of specific, desired societal outcomes.*

*Broader impacts: the  
potential to benefit  
society.*

*Broader impacts: the potential to contribute to the achievement of specific, desired societal outcomes.*

*How can I benefit  
society?*

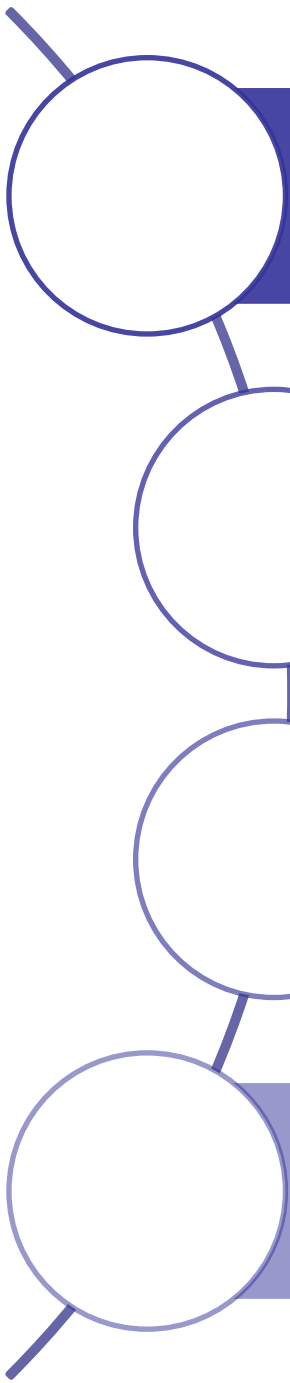
*How can my research  
contribute to society?*

NSF's mission is to fund innovative science, and so the foundation does not want to be prescriptive about what qualifies as “broader impacts.” The foundation states that “NSF projects, in the aggregate, should contribute more broadly to achieving societal goals.

These broader impacts may be accomplished 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.”



*Broader Impacts are not  
one thing*



Your proposal can/may have different types of BI and may put more or less emphasis on this component

Scale can be different as well

Intellectual merit and broader impact are both important, and the interplay between them is not static

Broader Impacts is not Broader Participation

*Keep in mind:  
The right thing, at the  
right time in the right  
place*

*Figure out what your  
strengths are and  
leverage them*

Mentioning items that faculty typically do as part of their jobs is not usually a strong broader impact, nor is lip service

### Not usually strong

- Create a new course that is not particularly unusual
- Write a book
- Advise a student
- Give lip service to broadening participation
- Develop an algorithm or technique that “could be used to cure cancer”

### On the other hand you could

- Create a new course that brings in new partners that your department has not worked with before
- Expand an on-line resource that is used by researchers across the nation
- Start a student seminar with a solid plan to recruit from nearby schools
- Describe specific steps to translate your algorithm to be applicable in a real-life setting

*Broader participation?*

# *The CEOSE Recommendation*



The CEOSE (Committee on Equal Opportunities in Science and Engineering) report requested that NSF launch a **bold new initiative** for broadening participation (BP) with the goal of eventually having the participation of scientists and engineers in Science, Technology, Engineering, and Math (STEM) fields mirror **the population** of the Nation.

The CEOSE (Committee on Equal Opportunities in Science and Engineering) report requested that NSF launch a **bold new initiative** for broadening participation (BP) with the goal of eventually having the participation of scientists and engineers in Science, Technology, Engineering, and Math (STEM) fields mirror **the population** of the Nation.

# *Institutional and systemic change*

*Scalable nation-wide*

*Integration of current  
research results on BP  
and education*

# *Innovative, longitudinal analysis*

# *Adoption of defined benchmarks*



*Support for translation,  
replication, and  
expansion of what  
works*

*Coordination of  
research centers and  
projects across levels of  
schooling, from pre-K to  
20+*

*Direct financial support  
to individuals (Students,  
postdoctoral fellows,  
etc...)*

# *Interagency and private sector partnerships*

*Long-term commitment  
to impact STEM  
employment, education  
and research*

# NSF BROADENING PARTICIPATION OPTIONS

Level of Investment by Level of Boldness (Size and Novelty of Effort) versus Potential Impact

		POTENTIAL IMPACT		
		LOW	MEDIUM	HIGH
↑	BOLDNESS			
	FY16 High	<ul style="list-style-type: none"> <li>Call for Community Design Projects in response to the 2011-2012 CEOSE recommendation</li> <li>Provide funding for BP infrastructure that PIs could "plug in" to for meaningful BP Broader Impacts</li> </ul>	<ul style="list-style-type: none"> <li>Call for BP Institutes/Centers conducting BP research and increasing the number of UR scientists and engineers</li> <li>Call for Partnerships/Centers that can translate BP research into scalable programs for widespread dissemination<sup>1</sup></li> </ul>	<ul style="list-style-type: none"> <li>Call for large-scale BP partnerships that cover research, implementation and scaling across preK-20+, focusing on institutional and systemic outcomes<sup>2</sup></li> </ul>
FY15 Medium	<ul style="list-style-type: none"> <li>Increase the availability of BP Supplements via DCLs from directorates</li> <li>Make available BP data by subfields</li> <li>Encourage PIs/faculty to participate in diversity meetings</li> <li>Form a Rotator Corps for BP</li> <li>Expand Science: Becoming the Messenger Workshop to have a BP focus</li> </ul>	<ul style="list-style-type: none"> <li>Support additional replication of successful implementations<sup>3</sup> or additional partnering with model BP programs<sup>4</sup></li> <li>Leverage efforts like REU, I-Cubed (I<sup>2</sup>), PULSE, etc.</li> <li>Make supplemental funding available to <u>all</u> NSF research centers for BP goals (contingent on strong existing efforts)</li> <li>Engage STEM Diversity Organizations and have an NSF BP presence at their national meetings</li> </ul>	<ul style="list-style-type: none"> <li>Increase in number of Emphasis and other programs reaching the 50% threshold<sup>5</sup></li> <li>Offer support for mid- and large-scale BP theoretical studies with potential for large scale implementation</li> <li>Identify strategic goals for BP for NSF that address all directorates.</li> <li>Increase the prominence of BP language in the merit review criteria and in Annual and Final reporting</li> </ul>	



Call for large-scale BP partnerships that cover research, implementation and scaling across preK-20+, focusing on institutional and systemic outcomes

Call for BP Institutes/Centers conducting BP research and increasing the number of UR scientists and engineers

Offer support for mid- and large-scale BP theoretical studies with potential for large scale implementation

Broadening Participation is a high priority for NSF and the Nation, and although the rationale is clear the question remains...how can we think deeply and well about where we want this effort to lead us?  
Melvin Hall 2016



# *NJIT CSLA Research*



Principal investigator Bin Chen, of the New Jersey Institute of Technology, heads a CAREER project: Probing Energy Release in Solar Explosive Events with New Generation Radio Telescopes. (NSF CAREER, 2017)

The PI will also contribute to the development of a new graduate curriculum in solar and space physics under the framework of the multi-institutional Hale Collaborative Graduate Education (COLLAGE) program. The PI will create a course module for the COLLAGE program by integrating his specialties in high-energy solar physics, current research topics, and hands-on teaching/training resources enabled by the SRL. (Chen, 2017)

Chen, B. (2017, January 15). Career: Probing Energy Release In Solar Explosive Events With New Generation Radio Telescopes. *New Jersey Institute of Technology*.

<https://researchwith.njit.edu/en/projects/career-probing-energy-release-in-solar-explosive-events-with-new->



Principal investigator Casey Diekman, of the New Jersey Institute of Technology, heads a CAREER project: Neuronal Data Assimilation Tools and Models for Understanding Circadian Rhythms. (NSF CAREER, 2016)

Graduate, undergraduate, and community college students will be involved in this research and obtain interdisciplinary training. The undergraduate and community college students will form integrated summer research project teams. Community college students will be recruited to enroll in an undergraduate-level mathematical modeling course at the New Jersey Institute of Technology and will receive mentorship on pursuing four-year STEM degree program opportunities. (Diekman, 2016)

Diekman, C. (2016, July 1). Career: Neuronal Data Assimilation Tools And Models For Understanding Circadian Rhythms. *New Jersey Institute of Technology*.  
<https://researchwith.njit.edu/en/projects/career-neuronal-data-assimilation-tools-and-models-for-understand>



Principal investigator Bruce Bukiet, of the New Jersey Institute of Technology, heads a project that will work to increase the number of women pursuing STEM careers. (NSF INCLUDES, 2107)

Focused on countering the notion that boys are naturally better at science and math — a stereotype that silently shapes girls' perceptions of their own abilities in these areas of study. The Leadership and iSTEAM for Females in Elementary School (LiFE) project strives to reverse this trend by finding effective ways to showcase science, technology, engineering and math (STEM) as a collaborative, innovative, people-rich space. NJIT is conducting the project with the Hillside, Morris Plains and Weehawken school districts in New Jersey. (Bukiet, 2018)

Bukiet, B. (2018, April 1). National Science Foundation Includes DDLP: Leadership and ISTEAM For Females in Elementary School (Life): An Integrated Approach to Increase the Number of Women Pursuing Careers in STEM. *New Jersey Institute of Technology*.

<https://researchwith.njit.edu/en/projects/national-science-foundation-includes-ddlp-leadership-and-isteam-f>

*Why serving others will  
help serve your self?*

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- Office of Sponsored Projects. (2017). Writing an Evaluation Plan [Research at Brown University]. Retrieved September 12, 2017, from <https://www.brown.edu/research/conducting-research-brown/preparing-proposal/proposal-development-services/writing-evaluation-plan>

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The logo for NJIT (New Jersey Institute of Technology) features the letters 'NJIT' in a white, serif font. A thick, white, curved line sweeps underneath the letters, starting from the bottom left and ending at the bottom right, creating a dynamic, upward-sloping underline.