

Creating a Broader Impacts Culture

Shakila Merchant, J. L. Weissman, and Effie MacLachlan

Abstract

Minority-serving institutions (MSIs), historically Black colleges and universities, and Tribal colleges and universities play a pivotal role in championing inclusivity and diversity within higher education systems across the nation. As catalysts for social change, they regularly engage in Broader Impacts (BI) work. However, these institutions often face challenges in resource allocation and a dearth of human capital to sustain vital operations, which hinders their capacity building efforts. This article explores how MSIs, exemplified by the City College of the City University of New York (CUNY), can empower faculty, staff, and trainees engaged in BI work to extend their influence beyond their institutions by adopting a community of practice and engagement (COPE) approach. By leveraging collective strengths of knowledge, expertise, and diversity, CUNY's MSI campuses endeavor to foster a transformative ripple effect, shaping a more inclusive and equitable future through research and innovation. Beginning in Spring 2023, the City College of New York, in partnership with the Advancing Research Impact in Society (ARIS) National Science Foundation-funded center, embarked on initiatives to understand the existing BI culture, knowledge, and challenges to enhance BI and research development capacity across the CUNY system. This article discusses the pilot efforts and lessons learned from these endeavors.

Founded in 1857, the City University of New York (CUNY) is one of the oldest and largest public universities in the United States, with 11 senior (baccalaureate degree) colleges, seven community (associate degree) colleges, and seven graduate, honors, and professional schools offering close to 60 doctoral degree programs. These include 16 Hispanic-serving institutions (HSIs), two predominantly Black institutions (PBIs), and 12 Asian American and Native American Pacific Islander-serving institutions (AANAPISIs), with several colleges falling into multiple categories. CUNY enrolls over 225,000 students across the 25 colleges and schools, all within a 12-mile radius in New York City, making CUNY a model public university in a dense urban setting. The City College of New York (CCNY) is the flagship school within the CUNY network. CCNY is the oldest and most comprehensive public higher education institution in New York City, with over 13,000 undergraduate and 2,600 graduate students. CCNY is the founding campus of the CUNY system and has close ties to its community located in the neighborhood of Harlem. CCNY is

one of 42 R2 minority-serving institutions (MSIs) in the country and the only R2 HSI in the State of New York.

Among institutions of higher education, the distinctive mission of MSIs transcends traditional academic boundaries by championing inclusivity and diversity (Gasman & Conrad, 2013; O'Brien & Zudak, 1998). As catalysts for social change, MSIs naturally lend themselves to Broader Impacts (BI) work (Harmon, 2012; Pickering et al., 2020). However, despite filling this vital role, these often underfunded institutions, including CCNY/CUNY, face challenges in resource allocation and human capital development, particularly in building institutional research capacity and creating student training opportunities (Chavella Guerra & Wilson, 2021; Eck, 2023). CCNY and CUNY's community colleges (all MSIs) all serve as social and economic drivers with close ties to community partners across the five boroughs of New York City. Yet CUNY struggles to strengthen its BI culture mostly because of its large and multicampus geographic distribution and its decentralized culture of operations.

This article is included in a special issue focused on the Implementation and Evaluation of the ARIS Broader Impacts Toolkit project, which is designed to advance the understanding of mechanisms and supports needed to develop effective Broader Impacts (BI) statements. The full issue can be found at <https://jces.ua.edu/37/volume/17/issue/2>

CUNY faculty and researchers submit hundreds of research and education focused proposals each year, mostly to the National Science Foundation (NSF), the National Institutes of Health (NIH), the National Oceanic and Atmospheric Administration, and the National Aeronautics and Space Administration, yet many faculty members noted during our workshops and focus groups that success rates are low. In FY 2022 alone, the state of New York received \$571 million in NSF funding for research (\$462 million), education (\$91 million), and business (\$18 million) grants, of which 50% was awarded to Ivy league and R1 institutions such as Cornell, Columbia, and the State University of New York (NSF, 2022). Our initial community survey data (46 participants) revealed (Figure 1) that only 33% of CUNY researchers have received NSF awards and the remaining 67% either have never applied to the NSF (37%) or didn't get funded (30%). Seventy-six percent (76%) of CUNY faculty surveyed agreed that the BI Toolkit would greatly help them successfully submit their future proposals, while 34% were unsure (Figure 2). The key conclusion of the survey was that a majority of the participants would benefit from the BI workshop. Some participants said it was difficult to gauge what NSF reviewers consider transformative research. One respondent stated that BI should be taken away and scientists should just make evident why their research is critical to society and the scientific community.

The question then becomes: Can MSIs engage their communities of researchers and administrators to create a BI culture and community of practice? To address this question, we first looked into the challenges the

university community faces when seeking to create a community of practice and engagement (COPE). Most CUNY MSIs do not have strong research development and sponsored programs administrative teams that are able to provide much-needed guidance, internal reviews, and dedicated support to proposers. Many MSIs also lack trained BI professionals in their sponsored research offices. A culture of last-minute proposal submission gives pre-award administrators little or no time to review the proposals, including the BI plans, which may also be a contributing factor to failure in writing successful proposals. Bruce MacFadden (2019) has noted that a last-minute rush that puts the sponsored research team in crisis mode when developing proposal elements and BI plans results in NSF proposals that are not well organized and, by extension, not competitive. Many universities now have strict internal submission timeline policies that require a window of at least 48 hours before the final submission deadline. Our preliminary focus groups and survey analysis revealed that more than 90% of CUNY administrators and researchers who participated in our workshops agreed that there is a need for a community of BI professionals within CUNY who will serve as a knowledge hub for all proposers seeking guidance and support. This group of BI professionals would create a peer-based community of learning and engagement. To address these needs, we decided to embark upon the creation of a community of practice focused on building BI knowledge and capacity.

Building new shared organizational structures, such as a community of practice, from scratch with no budget is difficult. An

Figure 1. Success of NSF Proposal Funding

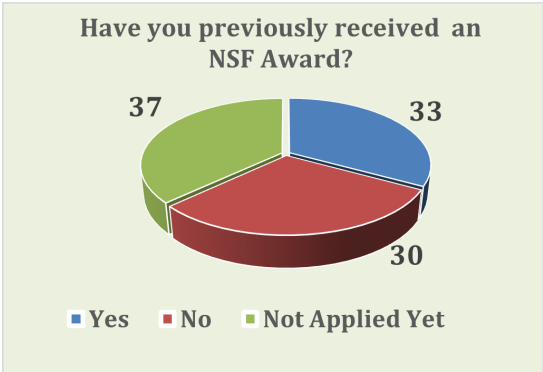
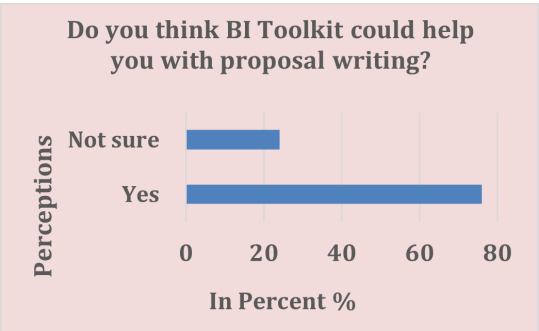


Figure 2. CUNY Perceptions About BI Toolkit



effective first step is to look around for existing building blocks and practices. This also helps to avoid creating unnecessary redundancies or reinventing the wheel. A search across the CUNY network revealed two existing programs that could serve as cornerstones for the effort.

Funding Fridays (CUNY)

The Funding Fridays research development webinar series was launched in 2020 in response to the sense of disruption and disconnectedness that faculty and research staff experienced during the COVID-19 pandemic shutdown. This webinar series was a collaborative research development effort led by the CUNY Office of Research, the CUNY Office of Library Services, and the CUNY Research Foundation Office of Award Pre-Proposal Support (RF-APPS). The monthly hour-long webinars focused on a variety of topics including grant prospecting strategies and resources, public and open access mandates from funders, federal agency and foundation funding priorities and opportunities, and writing the NSF BI statement. Because the Office of Research has a university-wide reach, these webinars regularly drew an audience of 70 to 100 researchers and staff. The CUNY RF-APPS independently conducts a Brown Bag Research Webinar Series that provides guidance to faculty on identifying funding opportunities and writing competitive proposals; these webinars also focus on special topics such as developing the NSF BI section. The Funding Fridays webinar series ran from 2020 to 2022; however, RF-APPS continues to conduct its Brown Bag series. These university-wide offices are eager to collaborate with and contribute to the BI framework initiative.

Grants 101 Boot Camp for Early Career Faculty (CUNY)

Faculty researchers at CUNY are introduced to NSF BI expectations through the Advanced Science Research Center's annual Grants 101 and NSF CAREER boot camps. The Grants 101 boot camps started in 2019, and the CAREER boot camps began in 2017. The interdisciplinary Grants 101 boot camps are open to researchers across CUNY and cover grant proposal development broadly. Though the primary focus is NSF funding opportunities, NIH and other federal-level funding mechanisms are addressed. The NSF CAREER boot camps are exclusively focused on the NSF Faculty Early Career Development Program and are open

to CUNY assistant professors who meet NSF's CAREER eligibility criteria. These boot camps run for 20 to 22 weeks and are also interdisciplinary. The boot camps include both informational slide presentations and in-depth discussions of weekly assignments and proposal drafts during intensive weekly meetings. BI is one topic covered in the Grants 101 boot camps, but it is discussed in more depth in the CAREER boot camps, often in concert with the investigators' education plans that are integral to an NSF CAREER proposal. During these BI discussions, principal investigators from various CUNY colleges including CCNY, gain a deep understanding of the NSF's goals and expectations and explore their unique educational interests in order to develop compelling BI outreach and engagement activities. These boot camps have helped over 120 CUNY faculty develop impactful BI activities that have increased access to and opportunities for students and community partners to participate in STEM initiatives. To date, 18 CAREER boot camp participants have received CAREER awards, and numerous faculty members have received other NSF awards.

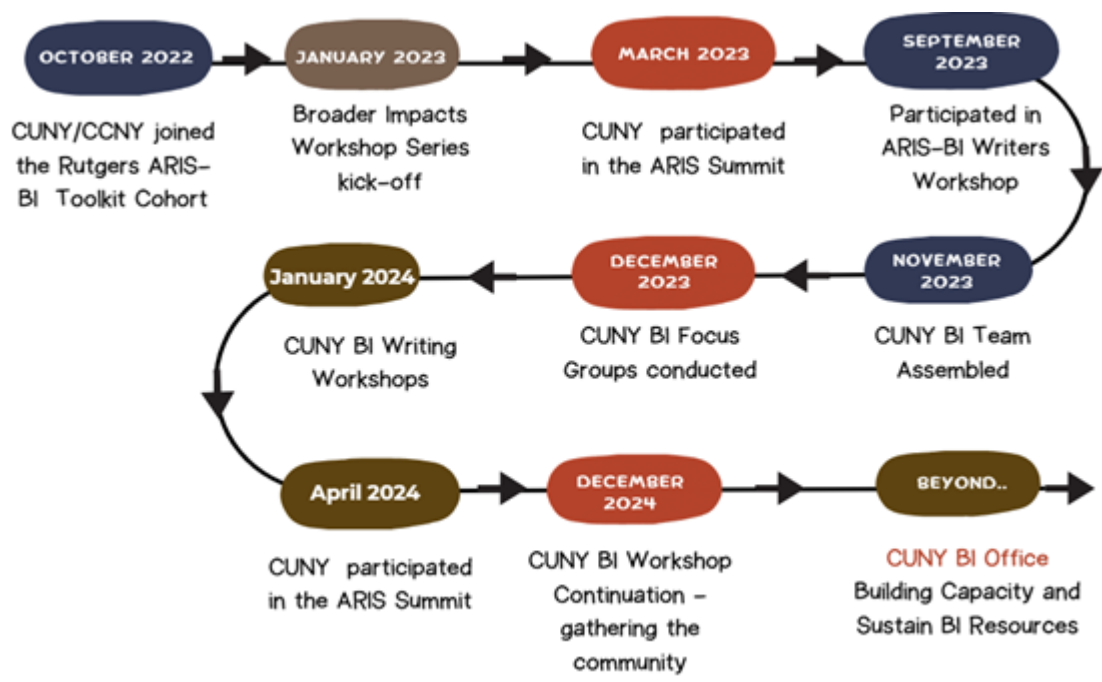
Early Career Writing Club (CCNY)

Starting in Fall 2023, the CCNY Office of Research began offering a biweekly writing club for pre-tenured faculty. This group meets regularly to pitch ideas, receive peer feedback, and receive training in effective grantmaking from the Office of Research staff. This group is well attended, with 16 participating pre-tenured faculty, most in their first or second year at CCNY. This initiative is in its early stages, and the team that designed and conducted these clubs is no longer at CCNY. However, CCNY administration is recruiting a new team at the Office of Research with the hope to revive all practices that support the early career faculty members.

Efforts to Create a BI Community of Practice and Engagement (COPE)

Starting in Spring 2023, in partnership with the Advancing Research Impact in Society (ARIS) NSF-funded center, CCNY joined forces with other CUNY colleges to build BI capacity alongside parallel efforts to build overall research development capacity across the university. In this article we discuss our experience piloting these efforts. A core challenge of this work was a lack of familiarity with the BI training available at the different colleges, making the ARIS-BI Toolkit

Figure 3. CUNY BI Efforts Timeline



a particularly important tool for introducing faculty, staff, and trainees to this space (Rutgers University, 2023).

Figure 3 indicates the CUNY BI efforts initiated in 2022 to merge and enhance CUNY’s collective strengths into a BI community of practice and engagement.

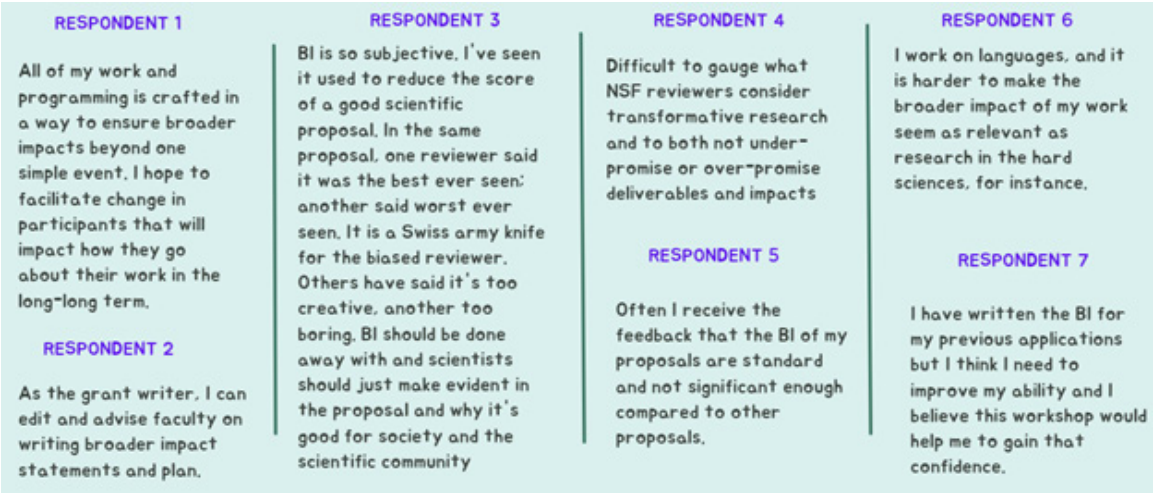
CUNY BI Workshops

The inaugural CUNY BI workshop was held virtually on May 4, 2023. Facilitators from the ARIS NSF center helped lead the workshop and introduced BI to the CUNY community. Prior to the workshop, a pre-program survey that was approved by the CCNY IRB office was sent to the registered participants. Thirty CUNY members signed up for the workshop, including faculty and administrators, but only eight attended the training and six faculty completed the survey.

Survey results and discussions during the event emphasized the need to engage in more conversations relevant to BI activities and support CUNY faculty and staff in writing and securing funded proposals. Figure 4 indicates CUNY community perspectives about the NSF BI criterion.

The second CUNY BI workshop was conducted virtually in two parts on January 8 and 19, 2024. Leaders from both ARIS and the CCNY Office of Research facilitated the workshops. Expanded efforts were made to recruit university-wide by contacting college-based sponsored research offices and requesting that they promote the training to their faculty. Fifty-two participants from more than 10 CUNY campuses (out of 100 registrants) attended the 3-hour workshop on January 8, which covered core topics in BI work and introduced participants to the ARIS BI Toolkit. Participants were then asked to submit a draft BI statement using the BI Toolkit resources. On January 19, 12 participants engaged in a peer editing activity using the rubric provided by the ARIS Toolkit, an exercise that aimed to familiarize participants with NSF BI review criteria (see Appendix A for our lesson plan). The participants seemed very engaged and made connections across CUNY campuses. Some of the participants were doctoral students/early career professionals and found the workshop valuable at this stage of their professional careers as future scientists, researchers, and/or faculty members. The workshop helped build a collaborative

Figure 4. CUNY Community Perspectives About NSF BI Criterion



environment among faculty members from different campuses. Participants discussed the potential for collaborative funding opportunities, which attests to the overall success of this project in creating a community of practice across the CUNY system.

CUNY BI Focus Groups

In December 2023, we held focus groups with staff from various college-based offices of sponsored research and with CUNY faculty. We uncovered a broad range of perspectives. While some faculty and staff had a great deal of BI expertise and in some cases had used the BI Toolkit, others lacked any knowledge of BI concepts and practices (Figures 5 and 6). All of the attendees agreed that more support in writing effective BI statements would be broadly beneficial across the university, but many noted limited institutional resources (e.g., experienced staff to lead training) and faculty time constraints as key challenges.

Challenges and Vision for the Future

Our conversations with faculty, staff, and trainees across the CUNY system revealed a core paradox of BI work at resource-limited public MSIs. Our campuses are well positioned to engage in highly impactful work by the very nature of CUNY’s founding mission—to bring the academy to the people through affordable education for all. Yet, individuals within our system are prevented from reaching the full potential of this vision because of resource scarcity. This scarcity is felt

at many levels, from a lack of time due to high teaching loads to a lack of practical support at institutions with no dedicated research or proposal development staff.

We found that the ARIS BI Toolkit could be used interactively as an effective teaching tool (see Appendix A), and the existence of a high-quality BI tool lowered the burden on sponsored research staff by developing useful workshops and training modules for researchers. Resources like this are essential to the success of research capacity building at resource-limited institutions because they ensure that effective training can be held at institutions where pre-existing BI expertise does not exist. Many CUNY colleges do not have dedicated research development staff, and faculty from those colleges noted how much they benefited from our focused workshops. Expanded BI expertise and training within the CUNY system would magnify faculty’s ability to write successful proposals and thus increase overall research and training capacity.

Where do we go from here? In the context of limited resources, we advocate for fostering interdependence and collaboration as the solution for growing and sustaining BI-related knowledge and resources, given that not every college possesses the necessary expertise and personnel capacity to establish a robust BI framework and research development infrastructure. We anticipate that by establishing a collective, university-wide effort, CUNY will ensure that these vital resources are accessible

Figure 5. CUNY Faculty/Researchers Focus Group

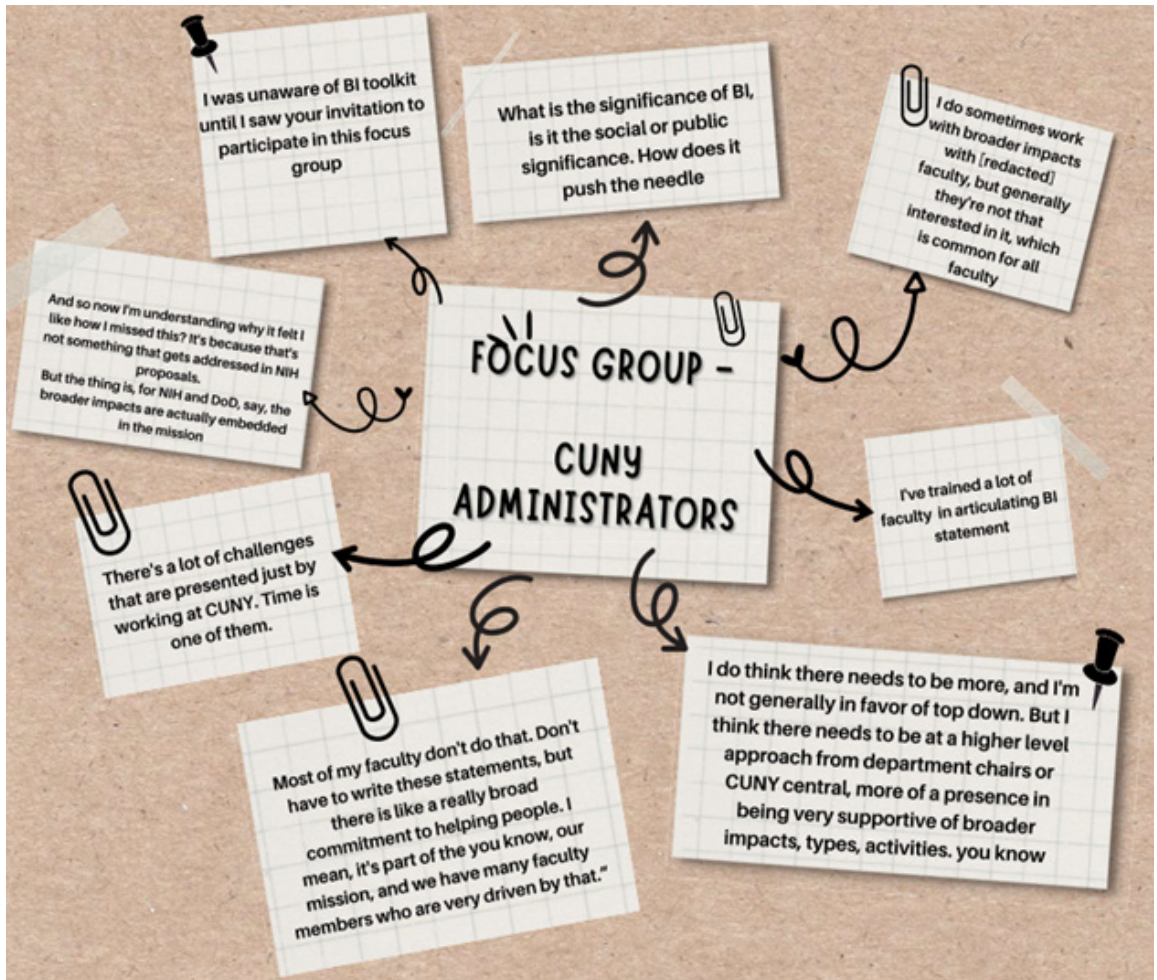


to all faculty, administrators, and researchers at large. Our objective is to harness this collective expertise by continuing to engage faculty and research administrators and by building on centralized research development initiatives efforts. Through these collaborative efforts, we aim to construct a university-wide community of practice, recognizing that the synergy of the whole far surpasses the individual contributions of its parts.

Utilizing a community of practice was an interesting model/approach for the CUNY community because it helps the community realize the value of collaboration and engagement rather than operating in competitive college-based silos. The 2030 Strategic Roadmap titled *CUNY Lifting New York* (CUNY, 2023) focuses on six main goals, including college differentiation and

university integration. Figure 7 illustrates how the BI footprint within CUNY can be increased, improved, and sustained. To sustain the proposed COPE framework, the CUNY BI team will expand its reach by coordinating with centralized research development efforts to integrate BI work and community into university-wide discussions about research impact. The CUNY BI team will continue to organize BI workshops and disseminate resources such as the BI Toolkit to both general audiences of faculty and staff and researchers working in large interdisciplinary research networks. The team will also apply for institutional grants to continue to support this endeavor. This COPE model aligns with CCNY's (2014) and CUNY's strategic plan of student-driven training and learning through research innovation—so CUNY continues to serve as the economic engine of the city and the region.

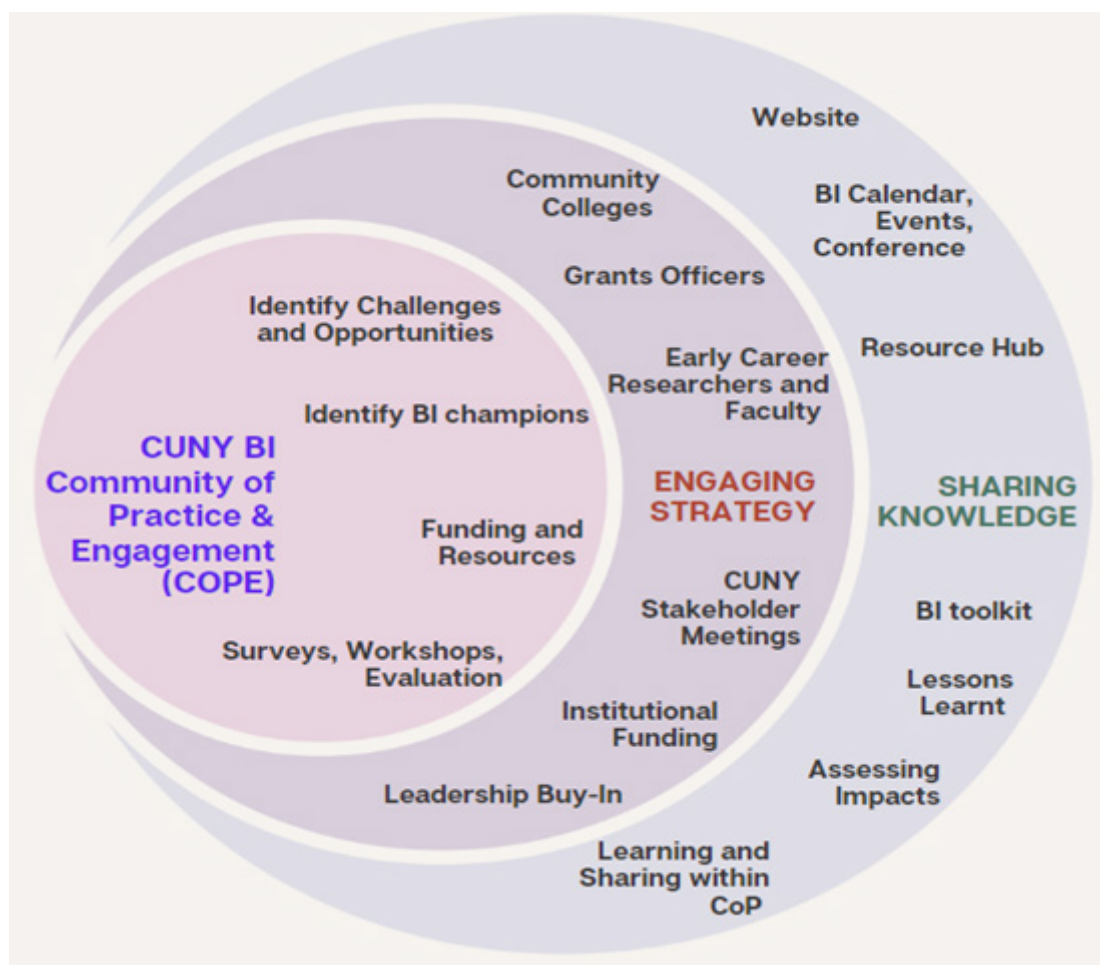
Figure 6. CUNY Administrators Focus Group



References

- Chavela Guerra, R.C., & Wilson, C. (2021). *From lack of time to stigma: Barriers facing faculty at minority-serving institutions pursuing federally funded research* [Paper presentation]. 2021 ASEE Virtual Annual Conference Content Access, Virtual Conference. <https://doi.org/10.18260/1-2--37209>.
- City College of New York. (2014). *Strategic plan*. <https://www.ccnycuny.edu/strategicplanning>
- City University of New York. (2023). *Lifting NY strategic roadmap*. <https://www.cuny.edu/about/chancellor/strategic-roadmap/goal-1/>
- Eck, K. (2023). *Feasibility and early results of providing research development consulting services to historically Black colleges and universities (HBCUs): Year 1 of the NORDP Consultants Pilot Project*. National Organization of Research Development Professionals. https://nordp.memberclicks.net/assets/NORD/Eck_Feasibility%20and%20Early%20Results_FINAL.pdf
- Gasman, M., & Conrad, C.F. (2013). *Minority serving institutions: Educating all students*. Penn Graduate School of Education Center for MSIs. <https://www.unlv.edu/sites/default/files/24/Diversity-MSIs-EducatingAllStudents.pdf>
- Harmon, N. (2012, January). *The role of minority-serving institutions in national college completion goals*. Institute for Higher Education Policy. <https://www.ihep.org/publication/the-role-of-minority-serving-institutions-in-national-college-completion-goals/>
- MacFadden, B.J. (2019). *Broader impacts of science on society*. Cambridge University Press. <https://doi.org/10.1017/9781108377577>
- National Science Foundation. (2022). *New York*. https://www.nsf.gov/news/factsheets/newyork_factsheet.pdf
- O'Brien, E.M., & Zudak, C. (1998). Minority-serving institutions: An overview. *New Directions for Higher Education*, 1998(102), 5–15. <https://doi.org/10.1002/he.10201>

Figure 7. CUNY BI COPE Roadmap



Pickering, C.K., Vaningen-Dunn, C., Grierson, A., & Gallegos, A.T. (2020, June). *Achieving broader impacts in STEM at 2-year Hispanic serving institutions* [Paper presentation]. 2020 ASEE Virtual Annual Conference Content Access, Virtual Online. <https://doi.org/10.18260/1-2--34087>

Rutgers University. (2023). *ARIS broader impacts toolkit*. <https://aris.marine.rutgers.edu/>

About the Authors

All authors are affiliated with The City College of New York. Shakila Merchant is the director of the High School Initiative in Remote Sensing of the Earth Systems Engineering and Sciences (HIRES) program through the the City University of New York Remote Sensing Earth System (CUNY CREST) Institute. J.L. Weissman is the director of proposal development in the Office of Research. Effie MacLachlan is the director of grants and research programs in the Office of Research.

Appendix A: BI Peer Editing Lesson Plan

Pre-Workshop Broader Impacts Writing Prompt

Please provide a draft broader impacts statement no longer than 5 pages for peer review. You should also include some context for what the overall research question/direction of the project is at the start (e.g., a short project abstract). It is OK if your statement is still very rough. A bullet-point style outline is acceptable.

We strongly recommend using the BI Wizard (https://aris.marine.rutgers.edu/wizard/step0_intro.php) to draft your outline and then downloading a PDF of the summary report using the “print” feature and handing that in.

Peer Editing Workshop Plan and Handout

BI Panel Review Guidelines

We will be peer reviewing each other's draft BI statements in groups of four as mock NSF panels. Each group member will be reviewed by the remaining members, and panelists will be asked to come to a consensus on a rating to provide each statement in each review criterion/subcriterion. We ask that each panel also leave a short narrative assessment of the panel's thoughts as well as any criterion-specific comments they may have.

Group Norms

Before beginning your discussion, set some group guidelines for discussion. Here are some suggestions:

- Be kind.
- Be respectful.
- Silence and space during a conversation is OK—give people the time they need to think, organize their thoughts, and respond.
- Step up, step back.
 - If you are taking up a lot of space in a conversation, pull back and see what others think.
 - If you are hanging back in a conversation, challenge yourself to share your thoughts.
- Focus on building up rather than breaking down. Be Constructive!
 - Think of solutions rather than simply heaping on critique.
 - Be aware some panel members may be at different career stages.
- Listen to critique.
 - Your peers took valuable time to give you feedback. Listen to them even if you disagree. If they didn't understand something, perhaps it was not explained clearly.

Review Protocol (20–30 minutes each statement)

1. Group members whose proposal is being reviewed are asked to sit silently while the panel reviews their proposal—no clarification is permitted at this stage. If the reviewee wishes, they may leave the room during this period.
2. One group member volunteers to lead/coordinate/facilitate the panel discussion (rotate this responsibility for each BI statement reviewed). This individual will record the panel's scores and comments in the provided Excel worksheet.
3. The panel compiles individual ratings of sections by reviewers for each criterion in the provided Excel worksheet.
4. Panelists discuss any differences in scoring and settle on a panel score to record in the Excel worksheet. Any comments that come up should be recorded in the space for comments.
5. The panel will collaboratively draft a narrative description of the strengths and weaknesses of the statement. This does not have to be long and can be bullet points.
6. Repeat the process with each group member.