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International Research Collaborations: Scientists Speak about Leveraging Science for Diplomacy

Lisa M. Frehill and Katie Seely-Gant

SCIENCE has long connected researchers across boundaries—geographic and otherwise—through a shared search for answers. From the appointment of a foreign secretary of the Royal Society of London in 1723, to the U.S.-Japan Committee on Scientific Cooperation set up by President John F. Kennedy and Prime Minister Hayato Ikeda in 1961, to the continued collaborations that support the International Space Station, science has often been deployed for diplomacy.^{1, 2, 3, 4} The globalization of the scientific enterprise makes it increasingly common for scientists to engage in international collaborations, and the potential for these researchers to engage, often unintentionally, in science diplomacy expands accordingly.⁵ How can these collaborations be leveraged, more intentionally, for science diplomacy? While science collaborations hold forth promise as a lever for diplomacy, to what extent do scientists involved in international collaborations envision their work within the framework of science diplomacy?

Here we explore how scientists involved in international collaborations can more consciously engage in science diplomacy. We draw on interviews with thirty-four U.S.-based scientists, focusing on their international work and various related issues. While science diplomacy was not one of the original interview topics, the

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questions nonetheless elicited responses related to diplomacy themes, thereby providing insight into how scientists may act as agents for diplomacy through their international collaborations.

“Science diplomacy” is broadly defined as cooperation among countries or regions to solve complex problems through scientific research. The Royal Society and the American Association for the Advancement of Science (AAAS, publisher of *Science & Diplomacy*) note three types of science diplomacy: science in diplomacy, science for diplomacy, and diplomacy for science.⁶ International scientific collaborations hold forth promise for science diplomacy. For example, collaborative partnerships are a key pillar of the Obama administration’s Science Envoy program, which sends prominent U.S. scientists abroad for research collaborations.⁷ When AAAS President Geraldine Richmond took the podium at the 2016 AAAS Annual Meeting in February to speak about her experience as a science envoy, she highlighted the importance of international science collaborations as a way to enhance positive cross-national relationships.⁸ Additionally, the Partnerships for International Research and Education, funded by the U.S. National Science Foundation (NSF), seeks to support U.S.-based scientists in strengthening such collaborations and leveraging international expertise, facilities, and field research sites, and the United States Agency for International Development’s Partnerships for Enhanced Engagement in Research initiative seeks to do the same for scientists in the developing world.⁹

Inspired by Richmond’s comments, we revisited a set of interviews with U.S.-based scientists regarding their international collaborations. These interviews did not originally seek to address science diplomacy. As such, the interviews represent a somewhat “naturalistic” or unobtrusive approach to gleaning insights about scientists’ views related to science *for* diplomacy. The new analysis of these interviews sheds light on how scientists and engineers may view themselves or their work as furthering diplomatic goals or as a means to encourage and strengthen diplomatic ties with collaborating countries even though “diplomacy” was not an explicit interview topic.

The interviews were initially conducted as part of a larger study in 2009 and 2010 that explored how universities and agencies, including the NSF and international funding agencies, could facilitate international science collaborations with an emphasis on gender issues. The primary goal was to provide guidance to universities, the NSF, and international organizations on strategies to help close the gender gap in international scientific collaborations.^{10, 11, 12} Semi-structured interviews were held with thirty-four award recipients¹³ whose project descriptions referenced an international dimension. Fifteen respondents brought up issues related to science diplomacy.

Several important themes related to diplomacy emerged naturalistically in these interviews. Four of the scientists deployed the language of diplomacy, while seven others emphasized a need to counter negative opinions about Americans during

their experiences abroad. Development goals at both societal and individual levels were described by nine scientists. Finally, we discuss how asymmetrical relationships appear to be an underlying aspect of scientists' descriptions of their international collaborations.

All thirty-four interviewees emphasized their focus on producing high-quality science. However, it is significant that interviewees commonly raised the above topics or deployed traditionally diplomatic language, as this indicates broader thinking by scientists who engage in international collaborations. It signifies an awareness that one does not travel to an international institution simply to conduct an experiment and leave (what has come to be termed "parachute science"), but rather as a representative of the larger U.S. science enterprise. Therefore it follows that one might engage with scientific collaborators in a more diplomatic and non-exploitive way.

Deploying the Language of Diplomacy

A couple of the interviewees were cognizant of personnel at consulates and embassies who were involved with promoting trade and cultural exchange. Interviewees recommended these embassy personnel to the interviewers as sources of information to assist with scientific exchanges and collaborations. In other cases, in the course of their interviews, interviewees deployed terminology typically associated with diplomacy. When asked about possible disparate treatment due to their own ethnic background or gender, three interviewees with extensive international experience referenced a need to be a "citizen of the world." This phrase has come to be used to indicate adoption of a global rather than national identity, to signify a sense of being comfortable in any country. On a related note, another scientist indicated that her university had established a database of faculty who had international experience and referred to these faculty members as "ambassadors" who could provide guidance to other faculty traveling to the same countries.

The use of diplomatic language in a conceptualization of science for diplomacy was reflected in the comments of another interviewee, who had experience in China and several other Asian countries. This respondent was asked whether the NSF should provide support for international collaborations. She emphasized the importance of strategic reasons in saying, "I'm not sure they [researchers] should have funding just for international because it's international unless there's some strategic reason for the U.S. to want to make closer scientific ties with a particular country." The interviewee's emphasis on strategic reasons as justifying public expenditures explicitly acknowledges the diplomatic goals of international collaborations from a U.S. perspective, while complementing the diplomatic language of viewing scientists as "ambassadors" and "citizens of the world." This suggests institutions may want to deploy the language of diplomacy

to prepare researchers with international collaborations to be mindful of science for diplomacy. Furthermore, institutions need to recognize the conceptualization of identity in terms of researchers' attachment to the United States in order for researchers to be conscious of their role as representatives of the United States versus the global identity implied by the term "citizen of the world."

Counteracting the 'Ugly American' Image

Seven of the interviewees discussed the potential issues associated with U.S. cultural norms that may be viewed negatively in other countries, similar to the image that was portrayed in the 1958 political novel *The Ugly American*. This novel, consisting of a series of vignettes about various Americans in international settings, contrasts the imperialist methods attributed to government officials with the important role that could be played by more ordinary U.S. citizens engaging personally with local populations in the interests of development and diplomacy.¹⁴ Despite some of its negative connotations, the book famously won favor with then Senator John F. Kennedy, who sent a copy to his fellow senators and later, as president, established the Peace Corps as a means to deploy more Americans to serve in developing countries in a constructive rather than exploitative way.

We further explored such tacit diplomacy by considering the extent to which researchers were aware of having biases or being perceived as an outsider among their scientific collaborators or within their collaborating country or region.¹⁵ More recently, with efforts associated with combating the Ebola and Zika viruses, concerns about "parachute science" have again moved to the fore.

Another line of questioning that elicited diplomacy-themed responses involved interviewees being asked what advice they might provide to others engaging in international collaborations. Seven interviewees discussed how negative stereotypes of Americans might be countered using the advice they suggested. For example, a researcher who was originally from Ethiopia and now had collaborators in both Ethiopia and South Africa suggested

[P]eople have to be willing to go there and learn as well. So, if people want to go there, like to boss around or tell people that they know more, then they'll get in trouble. So that means it has to be a two-sided process and they have to be humble and be able to learn from the experience of the other side. And don't go like a Messiah; just go as someone who is seeking.

This researcher's comments emphasize the need to be culturally sensitive and to understand that learning in an international context is bidirectional. This was a common theme among the interviewees. Several referred to the need "to educate yourself about the culture of the place you are trying to interact with." Finally,

another interviewee more directly addressed how international collaborations were especially important to U.S. graduate students, asserting that, in the United States,

[W]e are pretty isolated culturally. Every corner of the world you go there is an American presence. But the American presence doesn't mean American learning, American understanding of local cultures. So we could use a lot more of that.

This statement reflects recognition of the prevalence of U.S. influence abroad but indicates that cultural understanding is still important. An important lesson for researchers is that culture is deeper than the superficial familiarity of seeing a Starbucks and a McDonald's on every corner.

Scientific Collaboration as a Development Lever

When considering international research collaborations as leveraging science for diplomacy, nine interviewees suggested scientific collaborations could encourage further development of the scientific enterprise and infrastructure. While development of human resources occurs in all collaborative relationships, scientists' comments about development were often elicited when there were observable asymmetries between the collaborating organizations, such that the collaboration becomes a means to supplement scientific capabilities on either side of the relationship, creating a more robust and effective partnership. In other words, these U.S.-based scientists were conscious—in an unprimed interview setting—of the salience of “development” issues (in the traditional international sense of the term) when they discussed working in less developed nations.¹⁶

It is important to note, though, that asymmetries can be difficult to disentangle because of the complex, multiple status hierarchies associated with international collaborations. At the national level, we might observe that some nations have highly developed science enterprises, with large and stable public expenditures over a long history in contrast to other nations where the science enterprise is in the process of growth and institutionalization. At the institutional level, researchers can be located at highly resourced, research-intensive institutions at which doctoral-level education of scientists and engineers is a central mission, or at colleges and universities that have fewer resources or where teaching, whether undergraduate education or master's level, is more central to the institutional mission. Finally, at the individual level, the position of the collaborative partners in the science career hierarchy—for example, a full professor or senior research scientist versus a junior scientist or assistant professor—represents a third status hierarchy that affects the conceptualization of “asymmetry” within any given collaboration situation.¹⁷

As such, “development” has a broad meaning within the context of international collaborations. It can refer to international development that may occur when researchers from highly resourced nations collaborate with those from less-resourced nations. But it can also refer to the complementary nature of collaborations as a means to advance infrastructure and capabilities at collaborating organizations, as well as to the individual-level process by which students and faculty on both sides of the collaboration attain and improve skills, including technical skills and cultural competence, to aid in forming their identities as international scientists.¹⁸

A common example of international collaborations as development levers, as seen in the interview data, involves the exchange of students, either within a structured exchange program or as research assistants for collaborating principal investigators. A constant stream of student exchanges can also help to sustain international collaborations, particularly those funded by organizations such as the NSF, that emphasize, and in some cases require, student involvement in international programs. While almost all of the thirty-four original interviewees discussed student exchanges, our analysis here focuses on those who also included themes related to diplomacy.

For example, for some principal investigators, student involvement was cited as a moral obligation:

I like to involve the [local people] because we go over there, we collect wonderful data, we build our careers on the work that we do in [foreign country] so it only seems right to provide some additional opportunity to the people there.

In this example, the principal investigator arranged for local students from the collaborator’s country to enroll for a semester at the investigator’s home institution in the United States, giving the students an opportunity to build their résumé and network with professors and advisors in preparation for graduate school or future employment. Other principal investigators reported similar student exchanges, while some engaged in faculty exchange, serving as visiting professors, hosting their scientific collaborators as visiting faculty to their home institution in the United States, and even serving on thesis committees at collaborating institutions. This type of true collaboration reflects a desire to avoid being a parachute scientist.

In international collaborations, the development theme can also relate to human resources development, usually expressed by interviewees as science research skills development beyond the knowledge generation associated with student exchanges. One interviewee described how his students learned how to adapt and improvise after their visit to labs in developing countries:

They [my students] are used to coming to me and saying, "I need such and such." And I buy it for them. Whereas over there if you need such and such, well, you have to build it or you have to somehow find a way around it. And this is a part of scientific culture that's almost completely missing here and they discover it there and they come back saying, "Wow! You can actually do a whole lot more than you think you can."

The ingenuity that is driven by scarcity of resources is a skill that students from a highly resourced lab environment often do not learn; but their work in lower-resourced environments gives them the opportunity to develop this key aspect of innovation. Interviewees also noted that many collaborators from developing countries were interested primarily in applied research, as opposed to the basic research to which many of these NSF-funded U.S.-based researchers were more accustomed. In some cases, the collaboration was specifically initiated to transition existing technologies to be low-cost, practical, and scalable in the developing country. Such a shift requires scientists to think more broadly about the implications and applications of their research, and also to possibly seek more diverse funding sources beyond the NSF to sponsor international collaborations.

In other cases, principal investigators reported that their scientific collaborators simply lacked the resources to spend on basic research, framing attention to basic research as a luxury or privilege. Because of thin budgets and overextended staff, researchers in developing countries did not have the extra time and resources to divert from their organizations' critical, practical missions. One interviewee working with an earth science research group gave the following example:

They provide us a place to stay, they provide us logistical support, they provide us with equipment. . . . But actually trying to get someone to work with on a research project has been very difficult. . . . They're sort of a [natural disaster monitoring group]. And they would be doing research on top of that if they had time and if they had money. But they don't have time and they certainly don't have the money. So they spend all their time running from one fire to another.

In this latter example, great care needs to be exercised to avoid the potential for such a researcher to be viewed as a parachute scientist. This provides an additional lesson for U.S. institutions. With asymmetries at the national and institutional levels, U.S. institutions need to help develop capabilities or research for the collaborating organization, as a means of engaging in science for diplomacy with developing countries. This theme is consistent with the goals of the Partnerships for Enhanced Engagement in Research program, which intentionally seeks asymmetrical collaborations in order to build scientific capacity and resources

in less-developed countries. The Pew Research Center's annual Global Attitudes Survey in 2015 found that there are widely differing views of the United States across countries but that U.S. science and technological advances are quite often admired.¹⁹ International science collaborations, therefore, represent one potential mechanism by which U.S. scientists and engineers might continue to enhance positive views of the United States to advance U.S. diplomatic goals and increases in soft power.

Lessons Learned

What lessons do we learn from these examples? How can international science collaborations be more intentionally leveraged for science diplomacy? Two-thirds of the scientists who raised diplomacy themes discussed in this article participated in collaborations that featured an asymmetrical relationship with respect to science resources. It is possible that discussing resource asymmetry while asking scientists to reflect about their collaborative experiences made diplomacy conceptually relevant to them. However, self-selection plays an important role in the collaborative process. That is, not all scientists are suited to working in lower-resourced environments—such individuals might actually reinforce negative stereotypes. Agencies might incentivize more scientists to participate in collaborations with particular nations as a lever for development. However, they need to be cognizant of the diplomatic elements of the collaboration and take care to ensure that the U.S. scientists who are involved are provided appropriate information so that the science is a lever and not another exploitative process.²⁰

Additionally, it is the responsibility of institutions and scientists themselves to make sure they are prepared to be “science diplomats” and not “ugly Americans.” The gap between international programs offices at colleges and universities, as well as scientists and engineers who engage in international collaborations, needs to be bridged.^{21, 22} The National Association of Foreign Student Advisers (now called NAFSA: Association of International Educators) and the Institute of International Education are often aligned with professionals at colleges and universities who work in international programs offices that largely serve student needs associated with study abroad, visas, graduate admissions, and the like. Anecdotal evidence from discussions with professionals from international programs offices, science faculty, and NSF program officers with international experience suggests that such international programs professionals are often unaware of the specific needs of scientists in international collaborations. Such offices, therefore, represent an important, yet underutilized, resource that might provide concrete tools to leverage science for diplomacy at the institutional and individual levels.

Another question revolves around how science diplomacy outcomes can be assessed in international science collaborations. The student involvement in these efforts provides one way to capture such impacts. Assessing students' attainment of

global competency and scientific growth may be one means of understanding these outcomes. Additionally, it is important to develop mechanisms of learning about the experiences of the international collaborators. Many studies of international collaboration, including the study presented in this article, fail to capture opinions of the international collaborators; such insights would be critical in informing U.S. programmatic efforts to leverage science for diplomacy.

International science collaborations hold forth much promise with respect to science for diplomacy. By leapfrogging the traditional bureaucratic hurdles faced by diplomats and the U.S. Department of State, science facilitates entrée into development contexts.²³ To achieve this promise, however, scientists, institutions, and funding agencies need to more explicitly connect with resources readily available from international programs offices and the diplomatic community to ensure conscious attention to the endemic biases in asymmetries. Data from the interviews indicate that scientists associate their international collaborations with the goals of diplomacy, although in a more informal and unintentional way. More direct messaging and education by funding agencies and other scientific institutions could help collaborating scientists engage more intentionally in science for diplomacy. **SD**

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13. Most interviewees were from physical science fields (38 percent), with 23 percent from engineering and 18 percent from the earth, atmospheric, geophysical, and ocean sciences fields. Respondents in the life/medical, mathematics and computer sciences, and the social sciences together accounted for 18 percent of interviewees. Half of the interviewees were women; one-fifth were African American, Asian American, or Latino; and 28 percent reported holding at least one non-U.S. degree (bachelor's, master's, or doctorate). Most were senior faculty, with two-thirds indicating a rank of full professor and 15 percent reporting associate professor.
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