Advance U.S. International Diplomacy Efforts by Expanding Eligibility in the Embassy Science Fellows Program

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Executive Summary: Science has a unique ability to transcend borders in pursuit of common knowledge for the betterment of humanity. To increase technological and innovative progress, international collaboration is necessary and can be leveraged to advance foreign policy relationships. The United States (U.S.) Department of State's (DoS) Embassy Science Fellows Program (ESFP) has a proven track record of advancing international diplomacy interests of the U.S. through scientific collaboration, yet the program is sorely underutilized despite the high demand for qualified science, technology, engineering, and mathematics (STEM) experts by embassies around the world. To address the demand for STEM experts willing to serve DoS interests, we propose broadening ESFP eligibility to non-federal scientists. With this change, the DoS can recruit from a larger pool of experts and increase the probability that embassy needs for science diplomats can be met, augmenting the impact of the ESFP on U.S. diplomacy initiatives.

I. International science diplomacy efforts for the United States

A recent report found that scientific collaboration is an optimal way to achieve international diplomacy goals (American Academy of Arts and Sciences 2020). A notable example of this is the European Organization for Nuclear Research (CERN), whose goal of fostering international collaboration to achieve common scientific goals persisted even amidst the Cold War and saw scientists from the United States (U.S.) and Soviet Union working together. This example has influenced other international scientific collaborations like SESAME in the Middle East and in part inspired Barack Obama's call for increased science and technology cooperation between the U.S. and the rest of the world, specifically with Muslim majority countries (The White House 2009; SESAME, n.d.).

In the wake of this speech urging increased U.S. international science diplomacy efforts, Congress has introduced and failed to enact several bills over the past decade which sought to facilitate science diplomacy efforts (H.R. 4801 2010; H.R. 5916 2012; H.R. 6303 2012; H.R. 1156 2015). Despite a lack of legislation, the U.S. government has several programs that advance science diplomacy goals: the Jefferson Science Fellows (JSF), which appoints senior academic scientists to year-long fellowships to aid the Department of State (DoS); the Science Envoy Program, which appoints scientists as envoys on short tours abroad; and the Embassy Science Fellows Program (ESFP), which matches federal U.S. scientists with embassies around the world seeking scientific expertise on diplomatic initiatives (National Academies, n.d.; U.S. Department of State "U.S. Science Envoy Program," n.d.; U.S. Department of State "Embassy Science Fellows," n.d.). The ESFP is relatively unknown to science, technology, engineering, and mathematics (STEM) experts outside of the U.S. government, but its first public review in its two-decade existence by McLaughlin

and colleagues for the American Association for the Advancement of Science (AAAS) has shed light on its inner workings and opened the door for outside perspective. We choose to focus on the ESFP over other STEM diplomacy programs due to its high demand, breadth of topics, and demonstrated impact on U.S. diplomacy efforts.

The ESFP was first established in 2001 to bolster scientific capacities within the DoS (U.S. Department of State "Embassy Science Fellows," n.d.). U.S. Embassies and Consulates submit proposals to the DoS Office of Science and Technology Cooperation in the Bureau of Oceans and International Environmental and Scientific Affairs (OES/STC) requesting assistance on scientific projects directly related to the DoS policy efforts, such as Climate and Environment, Global Health, and Science, Technology, and Innovation, among others. Once proposals are submitted, prospective fellows from eligible government agencies can apply to up to three proposals with the support of their home agency. Finally, U.S. Embassies and Consulates rank applications and match each with a fellow, who will then obtain the necessary security clearances before starting their 1-3 month project (McLaughlin et al. 2021). Past projects include reducing single-use plastics in Thailand and strengthening scientific collaborations between the U.S. and Switzerland (U.S. Agency for International Development 2022; Feder 2003, 29-30). Fellows have served in 116 countries in a wide variety of disciplines, including projects in public policy, natural resources, agriculture, and medicine. Over 80% of fellows reported benefits to their home agency, such as forging new relationships and expanding the breadth of the U.S. mission, while over 90% of fellows reported advancements to U.S. foreign policy within their host country, including expanding acceptance of U.S. scientific norms and improving U.S. international science and technology capabilities (McLaughlin et al. 2021).

The number of proposals submitted by embassies has exploded since the ESFP was founded in 2001, with over 100 submitted each year since 2016. Despite this high demand, these positions are difficult to fill, and the overall match rate averages less than 50% each year (Figure 1). Part of this may be due to logistical constraints—the home agency of the scientist is expected to pay many of the up-front costs involved in the program, including travel, salary, and benefits, while the embassy covers in-country costs like housing and office space. Additionally, it may be difficult for prospective Fellows to pause their domestic work in order to commit to short-term embassy projects. Another issue may be lack of publicity. Despite the availability of the ESFP to all federal STEM officers, only a handful of agencies consistently send Fellows to participate, with five agencies together—the U.S. Environmental Protection Agency, National Science Foundation, U.S. Department of Agriculture, National Institutes of Health, and National Oceanic and Atmospheric Administration—accounting for 73.8% of accepted proposals in the first eighteen years of the program's operation. The McLaughlin Report categorized proposals submitted from 2011 to 2018 and found that the low match rate was not unique to any one category but rather reflected a program-wide shortcoming. Even the category of proposals with the highest match rate, science and innovation, only matched at a rate of 54.2% (McLaughlin et al. 2021).

In this memorandum, we discuss three options for the DoS and the ESF Program Coordinator to expand the impact of U.S. science diplomacy efforts by leveraging the existing ESFP infrastructure: 1) support codification of the ESFP to publicize the opportunity, 2) directly fund the ESFP, and 3) open the ESFP to a larger pool of applicants.

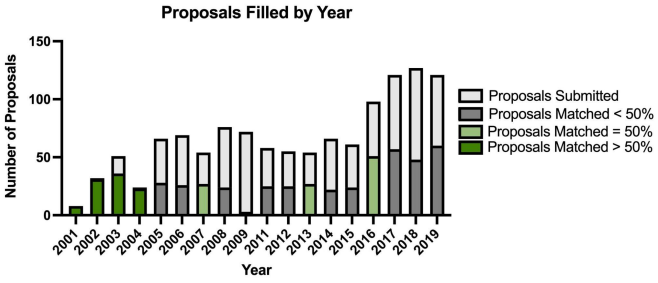

Figure 1: As the number of proposals increased from the advent of the ESFP, the DoS has consistently struggled to fill more than half of them (years with at least half of proposals funded in green) and averages a match rate of less than 50% annually. Figure adapted from McLaughlin et al. 2021, Figure 1.

II. Policy options

i. Option 1: Endorse creation of a body responsible for overseeing international science and technology interests of the U.S. and codification of the Embassy Science Fellows Program.

The ESFP is currently run by the DoS but does not have the benefit that lasting permanence within U.S. diplomacy efforts could provide, such as permanent and sustainable funding and increased visibility. A previous attempt to codify the ESFP through congressional authorization failed nearly a decade ago despite bipartisan support and endorsement by the U.S. Civilian Research Development Foundation (H.R. 6303 2012). A companion bill attempting to establish a body to identify and coordinate international science and technology cooperation that would oversee the ESFP also failed (H.R. 5916 2012). Ultimately, efforts to pass the bills fizzled amidst budget cuts, congressional gridlock, and the departure of bill co-sponsor Russ Carnahan (Maughan 2012). Renewed bipartisan efforts to establish a permanent body to oversee international science and technology cooperation passed the house but failed to pass the senate several years later (H.R. 1156 2015). Despite the overall success of the ESFP and its availability to a wide variety of government agencies, Fellow participation is biased by home agencies (McLaughlin et al. 2021), which could suggest biased recruitment, lack of institutional knowledge, or even opposition of home agencies because of domestic project stallings or financial considerations. Further, very little administrative information on the ESFP is publicly available on the main webpage, which may influence the lack of ESFP awareness among potential applicants (U.S. Department of State "Embassy Science Fellows," n.d.).

To rectify potential lack of institutional knowledge and reaffirm its support for the ESFP, we propose that the DoS issue a statement supporting future attempts to create a permanent international science and technology cooperation body and congressionally authorize the ESFP, thus providing it with both legitimacy and publicity.

Advantages

A statement of support for a congressional bill that authorized the creation of a permanent body to coordinate international U.S. science and diplomacy efforts and codify the ESFP would require no direct action by or cost to the DoS. The endorsement of such a bill by the DoS could shed light on its utility and broaden its appeal, bolstered by the data of the McLaughlin report and an additional decade of successful Fellow placement, which may increase the likelihood of it passing through both the House and the Senate. Establishment of a permanent body to oversee U.S. science and technology diplomacy would both streamline the ESFP and provide permanent resources dedicated to improving the publicization, coordination, and optimization of the ESFP. Including the ESFP in a Congressional bill would further solidify its place as a tool for international U.S. science diplomacy.

Disadvantages

The DoS does not have the authority to write or pass such a bill by itself, and would need the support of at least one, but likely many, Congressional representatives. The Congressional Budget Office estimated that annual maintenance of a permanent body would require approximately $3 million (Congressional Budget Office 2015), and it is unclear how much of this budget could be allocated to the ESFP specifically, whose administration would fall under the duties of the created body, or if additional funding would be sought. Further, endorsement of legislation alone may not directly correlate with increasing federal STEM officers' knowledge of the ESFP nor encourage wider federal agency participation. The benefits of this option may only be reaped if a bill is ultimately authored and passed.

ii. Option 2: Provide direct funding to Embassy Science Fellows' home agencies to support Fellow involvement.

Home agencies may be hesitant to incur the financial burden of sponsoring their employees' participation in the ESFP. The DoS could subsidize the cost to home agencies by providing supplemental funding in support of participating Fellows without Congressional creation of a permanent body to oversee international science and technology efforts. In 2021, the U.S. DoS spent 63.6% of its allotted $79.6 billion budget, with ~$60 million allotted to the OES/STC (USAspending.gov 2021). The DoS could obligate a grant specifically for funding the ESFP. A previous bill suggested allotting $3 million for an oversight committee for the ESFP (Congressional Budget Office 2015), which would be 0.0036% of the DoS budget (USAspending.gov 2021).

We propose that the DoS creates a new grant specifically for ESFP participants and their home agencies.

Advantages

Financial support for Fellows could encourage broader participation in the ESFP. Increased participation from a larger variety of home agencies could increase both overall match rate and the ability of the ESFP to accommodate a wide array of proposal categories.

Disadvantages

Providing funding to Fellows would place a financial strain on the DoS before matching takes place by requiring that DoS resources be used to evaluate grant applications in addition to the ESFP application. Further, funding may not be the only barrier to federal employee involvement. Home agencies may have other hesitations that limit their support for employee involvement in the ESFP, including domestic project stalling.

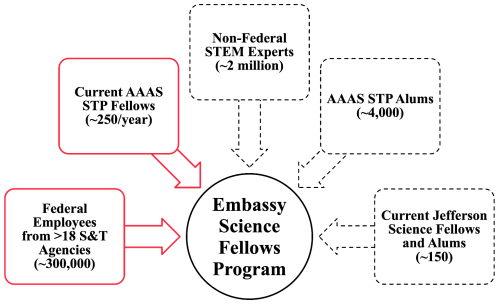

Figure 2: Expanding the ESFP to non-federal STEM experts can help meet U.S. embassy needs for international science diplomacy support. Current eligibility for the ESFP in red, proposed eligibility for the ESFP in dashed lines (data adapted from National Academies, n.d.; American Association for the Advancement of Science, n.d.; National Science Foundation 2016).

iii. Option 3: Expand eligibility for the Embassy Science Fellows Program to non-federal scientists.

The ESFP consistently lacks qualified applicants to fulfill embassy needs for STEM experts, highlighting a significant recruitment shortcoming. The McLaughlin Report suggested expanding eligibility for the ESFP to Jefferson Science and AAAS Science and Technology Policy (STP) fellows and alums who have previous experience working within the DoS (though current AAAS STP fellows are eligible while still employed by the federal government). This would immediately increase the eligible pool of applicants by thousands and continue to increase the pool by approximately 270 people each year, but this expansion alone may not suffice (Figure 2). The Netherlands version of the ESFP opens applications to all scientists with a Ph.D. (Dutch Research Council (NWO), n.d), a move that would drastically increase the U.S. ESFP pool more than sixfold and likely encompass a wider range of disciplines than found in government STEM personnel alone. Instead of requiring a statement of home agency support, non-federal applicants could apply directly to a sponsoring federal government agency that would agree to fund the applicant for the term of their mission. The existing infrastructure and proven track record of the ESFP in advancing international science diplomacy goals can be leveraged and expanded by increasing the match rate between embassies seeking expertise and STEM experts seeking diplomacy opportunities.

We propose that the DoS expand eligibility of prospective ESFP participants to all non-federal scientists with targeted recruitment of current and previous Jefferson Science and AAAS STP fellows.

Advantages

It is likely that scientists who have already expressed interests in policymaking and international diplomacy through participation in AAAS STP and JSF fellowships would also be interested in serving in the ESFP. Recruitment from additional groups of scientists with policymaking and DoS experience would ensure minimal onboarding and could help improve the low match rate of the ESFP. Expansion of the ESFP even further to all non-federal scientists may also help mitigate the low match rate, connecting scientists in more niche subject areas with embassies that could use their expertise. Expansion of the ESFP to non-federal scientists would further publicize opportunities for science diplomacy and allay potential federal agency concerns of domestic project stalling by outsourcing international projects to non-federal experts with the bandwidth to address embassy needs. The DoS has already successfully trained non-federal scientists for diplomatic missions through the Science Envoy program. Further, the DoS need not assume the burden for funding by expanding the application to non-federal employees; rather, that burden would be placed on the applicant to either find a sponsoring federal agency whose mission was aligned with that of the embassy proposal or an

embassy that would agree to fund the applicant entirely in exchange for their assistance. The ESFP may also carry with it some acclaim, which could motivate employers or academic institutions to support their employees' short-term commitments to serve the diplomatic interests of the DoS. Ultimately, increasing the ESFP applicant pool would offer more expertise to match embassy needs, increase career opportunities for those interested in science diplomacy, and increase the ability of the U.S to achieve global DoS diplomacy goals.

Disadvantages

This option would require further allocation of federal resources to accommodate an increase in submitted proposals and a more involved onboarding process for non-federal employees unfamiliar with federal diplomacy work. By expanding ESFP eligibility without guaranteeing funding, many highly qualified applicants may not be matched due to lack of permanent financial resources or federal agency willingness to sponsor a non-federal employee in the short term. Additionally, widening the pool to non-federal scientists would not guarantee employer support—non-federal scientists would likely still need permission from their employer or academic institution in order to participate in the ESFP.

III. Policy recommendation

To rectify the most immediate need of increasing match rate between embassies and STEM experts, we recommend implementation of Option 3, expansion of ESFP eligibility to non-federal scientists. The ESFP increases international collaboration through science diplomacy but is not being utilized to its fullest potential. By making ESFP opportunities available to qualified STEM experts outside of the federal government, the U.S. can build upon its previous scientific successes while gaining access to international scientific resources and fostering relationships with other nations. As the ESFP's reach continues to grow, so may its impact, paving the way for the U.S. to be a leader in and example of successful science diplomacy.

References

American Academy of Arts and Sciences. 2020. America and the International Future of Science. Cambridge, Mass.: American Academy of Arts and Sciences.

American Association for the Advancement of Science. "Alumni of S&T Policy Fellowships." n.d. Accessed April 4, 2022. https://www.aaas.org/programs/science-technology-policy-fellowships/alumni.

Bureau of Educational and Cultural Affairs. "Organizational Funding." n.d. Accessed April 4, 2022. https://eca.state.gov/organizational-funding.

CERN. 2022. "What We Do." About. Accessed June 13 2022. https://home.cern/about/what-we-do.

Congressional Budget Office. "Congressional Budget Office Cost Estimate: H.R. 1156 International Science and Technology Cooperation Act of 2015." March 12, 2015. https://www.cbo.gov/sites/default/files/114th-congress-2015-2016/costestimate/hr115600.pdf.

Donahue, Michelle. 2022. "Short Terms, Long Gains: Embassy Science Fellows Build Bridges Abroad." *The American Association for the Advancement of Science*, January 27, 2022.

Dutch Research Council (NWO). n.d. "Embassy Science Fellows." Accessed July 18, 2022. https://www.nwo.nl/en/calls/embassy-science-fellows.

Feder, Toni. 2003. "Government Scientists Do Stints in Embassies." *Physics Today* 56, no. 7 (July 2003): 29–30. https://doi.org/10.1063/1.1603069.

Global Science Program for Security, Competitiveness, and Diplomacy Act of 2010. H.R. 4801, 111th Cong. (2010).

Global Science Program for Security, Competitiveness, and Diplomacy Act of 2012, H.R. 6303, 112th Cong. (2012).

International Science and Technology Cooperation Act of 2012, H.R. 5916, 112th Cong. (2012).

International Science and Technology Cooperation Act of 2015. H.R. 1156, 114th Cong. (2015).

Maughan, Heather. "US Science Diplomacy Bills Stuck in Congress." *Sci Dev Net.* September 19, 2012. https://www.scidev.net/global/news/us-science-diplomacy-bills-stuck-in-congress/.

McLaughlin, Jacqueline, Gad Perry, Kevin Manuel, Kelly Soluri, and Andrew Hebbeler. 2021. "The U.S. Embassy Science Fellows Program: Implementation and Impacts," 19.

Mutual Education and Cultural Exchange Act of 1961, Pub.L. 87-256, 75 Stat. 527 (1961).

The National Academies of Sciences, Engineering, and Medicine. "About Jefferson Fellows." n.d. Accessed April 1, 2022. https://sites.nationalacademies.org/PGA/Jefferson/PGA_046613.

National Science Foundation. 2016. "Report – Science & Engineering Indicators 2016." Accessed April 1, 2022. https://www.nsf.gov/statistics/2016/nsb20161/#/report/chapter-3/s-e-workers-in-the-economy/employer-size.

SESAME Synchrotron-light for Experimental Science and Applications in the Middle East. "What Is SESAME". About Us. n.d. Accessed June 13, 2022. https://www.sesame.org.jo/about-us/what-is-sesame.

U.S. Agency for International Development. 2022. "Science and Technology Fellowships." Accessed March 17, 2022. https://www.usaid.gov/research/fellowships.

USAspending.gov. 2021. "Department of State (DOS)". https://www.usaspending.gov/agency/department-of-state?fy=2021.

U.S. Department of State, Office of Science and Technology Cooperation. "U.S. Science Envoy Program." n.d. Accessed April 4, 2022. https://www.state.gov/programs-office-of-science-and-technology-cooperation/u-s-science-envoy-program/#:~:text=Science%20Envoys%20meet%20government%20and,education%20and%20diversity%2C%20and%20energy.

U.S. Department of State, Office of Science and Technology Cooperation. "Embassy Science Fellows Program." n.d. Accessed April 4, 2022. https://www.state.gov/programs-office-of-science-and-technology-cooperation/embassy-science-fellows-program/.

The White House. 2009. "The President's Speech In Cairo: A New Beginning." The White House | President Barack Obama. June 2009. https://obamawhitehouse.archives.gov/issues/foreign-policy/presidents-speech-cairo-a-new-beginning.

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