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Understanding and Meeting the Challenges of Displaced Scientists in the 21st Century

*Michael Martin, Florence Chaverneff, Sloka Iyengar, and Olga Palinkasev Gregorian**

I. Introduction and historical context

Recent years have seen an increase in the number of scientists[1] displaced by persecution or political turmoil. In seeking to maintain their scientific careers, either to rebuild their country's scientific capacity upon their return or to establish themselves in their new countries, these displaced scientists face a range of challenges. An organized response to meet these challenges will benefit their host countries while preserving scientific capacity for their home countries.

The situation is not unprecedented. Large numbers of scientists, including Albert Einstein, fled Europe in the 1930s and 1940s. Einstein's departure from Germany in 1932 was in response to rising nationalism, prior to Hitler assuming power in 1933.[2] In addition to Einstein's Jewish heritage, his personal politics and scientific reputation made him a target of nationalist politics. Einstein's internationalism, including his dissent from the German scientific community's

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** Biographies available at the end.*

support of the German effort in World War I, were well known.[3] His foundational discoveries in modern physics made him a target of the attacks on modernity by National Socialism and prominent members of the German scientific community.[4] Einstein's prominence meant that when he left Germany, he was able to choose among positions in England, France, Spain, and the United States,[5] and did not face professional or personal uncertainty.

Less prominent scientists who fled Europe in the 1930s relied on organized relief efforts. In Europe, the Academic Assistance Council of England and the Association Universelle pour les Exilés Allemands took on the role of finding academic and other positions for those fleeing Germany.[6] The most prominent effort in the United States was the Institute of International Education's (IIE) Emergency Committee in Aid of Displaced Foreign Scholars.[7] These efforts existed alongside broader efforts, such as the work of the American Friends Service Committee, which assisted victims of Nazi persecution of all professions.[8]

IIE's Emergency Committee was formed in 1933 and advised over 600 scholars. This included 243 researchers in fields then classified as "natural sciences," now grouped together with engineering and medicine under the term STEM, and another 181 in the social sciences.[9] In many cases, the Committee was only able to advise scholars. However, in approximately half of the cases, the Committee worked with outside funding sources and universities to arrange placement in academic institutions in spite of the challenges of finding employment during the Great Depression.[10] Those placed by the Emergency Committee included James Franck, the 1925 Nobel laureate in Physics, who resigned from his position at the University of Göttingen in protest of anti-Semitic laws;[11] the apolitical mathematician Kurt Gödel;[12] and two future Nobel laureates, Felix Bloch[13] and Max Delbrück.[14]

The majority of scholars were supported by the Committee for less than two years, and then moved into unsubsidized positions. Host institutions included Ivy League schools; public institutions ranging from two-year colleges to research institutions; colleges and universities with Jewish, Catholic, and Protestant affiliations; and at least one institution now classified as a historically Black college.[15] Formal reports from host institutions and accounts from the displaced scholars themselves show that the scholars faced many challenges in their new institutions. These included academic cultures that were often less research oriented than their previous institutions, language challenges, and social adjustment to the often rural locations of the universities.[16] In some cases, the challenges were insurmountable, and several scholars were dismissed.[17] In most cases, scholars adjusted successfully and often earned reputations for instructional excellence.[18] A representative

account of a scholar's performance by a university administrator captures the full range of these challenges:

> Other problems arose from her own distrust of her use of English, although never inadequate; her lack of acquaintance with the life, attitudes, and problems of American girls; her concern for the destruction and disintegration of her own country with the recurring consideration of whether she could be more useful there. She faced all of this with understanding and has made marked progress in establishing herself in her work…. she has been decidedly effective in the education of most of her students and is devoted to any work she undertakes.[19]

The experiences of scholars with whom the IIE advised but did not financially support, but still reached the United States, were mixed. Those with scientific backgrounds were often able to find positions in industrial research or with government agencies.[20] Other scholars took whatever positions they could find, including as secretaries or summer camp and sports instructors, factory workers, and even day laborers.[21] When the Committee finished operations in 1947, the consensus was that it had been a success; through direct or indirect support, hundreds of academics had both avoided imprisonment and possible death under Nazi rule and successfully applied their skills in their new country. However, the Committee had received appeals from more than 6,000 displaced scholars in Europe, meaning that the 613 with whom it regularly corresponded, and the 340 whom it supported, represented only a fraction of those seeking help.[22]

II. Persecution and displacement of scientists in the 21st century

Scientists are driven to migrate due to their belonging to larger groups, such as urban communities, minorities, or university faculty that are attacked in armed conflict or politically repressed. Scientists are also subject to individual political repression due to their status or actions as scientists.

According to the United Nations High Commissioner for Refugees (UNHCR), as of 2018, there were 20.4 million people who fell under UNHCR's definition of refugee, and another 3.5 million asylum seekers.[23] These included 6.7 million people displaced from Syria, 2.7 million displaced from Afghanistan, and 1.1 million displaced from Myanmar. These statistics do not include the estimated 3.4 million people displaced from Venezuela or the more recent displacement from Yemen. The urban areas that host universities and scientific research institutions

have been particularly affected by these crises. For instance, more than half of Aleppo's pre-war population of almost 3 million people was displaced by the Syrian Civil War.[24]

Scientists are also threatened when their home institutions are attacked. In the wave of political suppression that followed the failed coup in Turkey in 2016, at least 6,000 of the country's 150,000 academics were removed from their positions, either when their universities were shut down, or when they were individually suspected of a lack of loyalty to the government.[25] China's suppression of Uighur intellectuals includes not only writers, musicians, and scholars focusing on Uighur culture, but scientists, engineers, and economists as well.[26] The case of Tashpolat Tiyip, a Uighur geographer with an international scientific reputation and the former president of Xinjiang University, has attracted the most attention. Professor Tiyip disappeared in 2017, and reports indicate that he is currently imprisoned under a suspended death sentence.[27]

Scientists may be subjected to persecution for their actions as scientists. This includes both refusal to participate in activities that go against their conscience, and participation in scientific work or science-based activism that is perceived by authorities as a political threat. Omid Kokabee, an Iranian laser physicist, was pursuing his second doctorate at the University of Texas when he returned to Iran to visit family in 2011. As a result of refusing to work with the Iranian's military research programs, Dr. Kokabee was tried unsuccessfully for espionage, and then tried and convicted of illegal communication with foreign governments and of illegal earnings as part of his academic research.[28] Dr. Kokabee spent five years in prison before being paroled.[29] Dr. Khaled al-Assad, a Syrian archeologist, spent large portions of his career studying and advocating for the protection of the Palmyra archeological site. He chose not to leave the area during Syria's civil war and was captured and executed by ISIS in 2015. It is widely believed that he was executed for refusing to apply his knowledge to assist in the ISIS-led looting of Palmyra.[30]

Scientists in environmental studies are often targeted when governments suppress environmental research and activism. Authorities may redefine the collection of environmental data for conservation efforts as espionage. In Iran, members of a team collecting data for the Persian Wildlife Heritage Foundation's study of the Asiatic cheetah were jailed. Dr. Kavous Seyed Emami died under suspicious circumstances in jail, while the other eight members of the team received prison sentences ranging from four to ten years.[31] In Russia, collaboration with the ecological group Environmental Watch on North Caucasus documenting the environmental consequences of infrastructure development for the Sochi Olympics led to the geologist Yevgeny Vitishko being sentenced to three years in prison, and

the zoologist Suren Gazaryan being forced into exile.[32] In some cases, collaboration with international conservation groups has been criminalized: more than half of all countries, including many nominally democratic countries, have adopted legal restrictions on the activities of foreign non-governmental organizations, flows of foreign funding to locally operating non-governmental organizations, or both.[33] These attacks target not only professional researchers, but also self-trained "citizen scientists," indigenous rights activists, and others incorporating scientific knowledge into their advocacy. As an example, Sudanese engineer Mohammad Abubakr left after being arrested for the fifteenth time for his efforts as a citizen scientist to document ecological destruction in his home country.[34]

New patterns of political repression of scientists and other medical professionals emerged as COVID-19 became a global health and political crisis. In multiple democratic countries, public health scientists have been subjected to public threats from both citizens and elected officials.[35] Authoritarian governments have targeted three groups: medical professionals sharing information about the extent of COVID-19 in their country, medical professionals pointing out deficiencies in governmental responses, and researchers whose conclusions differed from those of prominent political figures. The targeting of medical professionals who attempted to notify others of the spread of COVID-19 dates to the beginning of the pandemic, when Li Wenliang was warned by police to cease discussing COVID-19 with other physicians.[36] This targeting is not unique to China; Human Rights Watch reported that laws against spreading malicious rumors were used in Turkmenistan to silence doctors discussing COVID-19,[37] while multiple Nicaraguan medical professionals were fired for criticizing the government's claim that COVID-19 was under control.[38] In Burundi and Russia, medical professionals discussing shortages of personal protective equipment (PPE) have also been targeted.[39]

The most complex COVID-19–related case of political repression reported to date is that of Dr. Marcus Lacerda, a Brazilian medical researcher whose peer-reviewed study of the effects of chloroquine on COVID-19 patients showed that it increased, not decreased, mortality.[40] These results were seen as a direct contradiction of Brazilian President Bolsanaro's promotion of the drug. Seizing on the fact that the dosages used in the study were at the high end, but not extreme high end of those given in such studies, Dr. Lacerda became the target of a social media campaign, then death threats, and finally a politically motivated criminal investigation accusing him of deliberately endangering patient health as part of a campaign against Bolsonaro.[41]

These examples illustrate the global scope of the challenges that scientists are facing. The range of nationalities and circumstances of scientists affected, and in many cases displaced, by political persecution suggests they will face an even broader range of issues than their predecessors in the 1930s and 1940s.

III. Challenges faced by displaced scientists

Forcibly displaced individuals, including scientists face a range of challenges in continuing and rebuilding their careers. These issues are qualitatively and quantitatively different from the challenges surrounding cultural integration that scientists that have not been forcefully displaced and choose to immigrate for professional advancement face. The issues faced by the group that is forcibly displaced can be scientific, academic, legal, cultural, and/or personal/psychological in nature. The lack of concerted effort to recognize and support displaced scientists further complicates matters.[42] For all individuals that move from their country to another, the host community may perceive them as more of a burden to society than an asset, adding another obstacle to the individual's professional and personal integration. Below, we highlight some of the challenges faced by displaced scientists and contextualize them within issues faced by all displaced people.

Challenges unique to displaced scientists

Many challenges unique to displaced academics center around the difficulty in resuming research in their host countries.[43] A displaced scientist may no longer be able to access samples, data, and/or records necessary to continue their work. If the displaced scientist switches to new research topics that are more relevant to his or her host country, then other challenges may arise. In many cases, scientists have very different scientific tools and research priorities than those in their eventual host countries.[44] There are also general academic challenges that affect the success of displaced scholars' careers in their host countries. These range from a lack of networks of peers and mentors in host countries to an unfamiliarity with norms in publishing and sources of funding. In addition, scientists in war-torn countries may have lost several years of the ability to conduct research and stay abreast of latest findings. The COVID-19 pandemic put institutions of higher education across the world under extreme financial strain,[45] potentially exacerbating these issues.

Challenges affecting all displaced people with increased impact on scientists

Another set of challenges affect all displaced individuals, but impact scientists in different and specific ways. Country-specific restrictions on travel and immigration limit placement opportunities and prevent scientists from attending conferences. The impact of restrictions of international air travel during the COVID-19 pandemic particularly affected refugees who could not be resettled, including displaced scientists, many of whom were approved to pursue educational fellowships overseas.

Lack of recognition of professional credentials is a challenge that affects many displaced professionals. Additionally, scientists may find that their publications are not included in scientific and citation databases and may have to start afresh.

The COVID-19 crisis has exacerbated the stresses caused by a limited number of permanent faculty positions,[46] forcing many scientists to re-evaluate their career goals or consider positions outside academia.[47] Many academic scientists are unfamiliar with navigating the non-academic professional landscape, and these difficulties are likely compounded among those who have been displaced forcefully. Displaced scientists interested in non-academic positions may be both be unaware of their transferable skills and alternative career paths and unfamiliar with the process of transitioning to such positions.

Challenges common among displaced individuals, regardless of profession

Individuals fleeing persecution are more susceptible to human rights violations, sexual abuse, poor healthcare, and mental health issues due to the stress associated with forced migration.[48] A lack of certainty and control of their lives, aggravated feelings of powerlessness and meaninglessness, disruption of key social networks, and feelings of isolation have been observed in refugee populations.[49] Refugees also face mental health issues and psychological trauma caused by violence endured or witnessed, the stress of prolonged displacement, challenges related to separation from families, "survivor guilt," the trauma of relocation, language barriers, and other issues associated with social and cultural integration into the local communities of their host countries.[50] Refugees may also experience cultural bereavement, defined as the "grief experience of the uprooted person—or group—resulting from loss of social structures, cultural values and self-identity."[51] Personal and professional uncertainties may exacerbate these issues. Even when mental health support is available, displaced individuals may not be aware or accepting of such opportunities. Displaced individuals may face hostility and discrimination associated with their race, ethnicity, religion, or immigration status in their host

countries.[52] They may also have a lack of knowledge of, or access to, immigration lawyers. Financial uncertainties, lost livelihoods, and difficulties in accessing affordable healthcare are compounding issues.

Displaced scientists face immense challenges in rebuilding their personal and professional lives in a host country. With the numbers of forcibly displaced people at a record high, the displacement of scientists is a diplomatic issue that needs concerted efforts from multiple stakeholders as described below.

IV. The scientific and diplomatic value of an organized response

Providing aid to displaced scientists serves two aspirations of science diplomacy, as it allows the preservation of scientific capacity and supports the human rights of individual scientists. Both of these contribute to a "right to science."

Recent waves of displaced scientists—as during the Iraq war—demonstrate that scientists able to continue their careers in exile are eager and able to rebuild the scientific enterprise in their home countries. This indicates that efforts aiming to preserve scientific capacity in such circumstances contribute to science diplomacy. Even if individual scientists do not return, the networks built by "scientific diasporas" can support the rebuilding of a country's scientific capability. From 2007 to 2014, the Iraq Scholar Rescue Project supported nearly 300 Iraqi academics, including scientists, in host institutions throughout the world. Of these scientists, 40% returned to Iraq after the political situation improved, accelerating the rebuilding of Iraq's scientific capacity.[53]

Such efforts also protect the concept of a "right to science." In recent years, organizations such as the American Association for the Advancement of Science (AAAS) and the National Academies of Sciences, Engineering, and Medicine (NASEM) have given attention to the "right to science."[54] This is defined in the 1948 Universal Declaration of Human Rights as the right to "share in scientific advancement and its benefits" and to "the protection of the moral and material interests resulting from any scientific... production of which he is the author."[55] This has historically been understood as a right of national governments. However, over half a century of experience informed by issues such as environmental damage and racial inequalities in health suggest that the right of a society to benefit from science is built upon the freedom of expression and freedom of conscience of individual scientists. A society in which scientists cannot communicate information of societal interest due to political repression does not share in scientific advancement and its benefits.

Therefore, programs that protect the freedom of conscience of individual scientists, including programs that allow them to continue their scientific work in spite of political persecution, protect a national right to science. Programs that maintain the capabilities of scientists who are displaced not because of individual persecution, but because of events such as wars, also protect a right to science. A country can lose its scientific capability if scientists displaced by local or national unrest do not maintain their scientific capabilities and relevance.

As they are equipped to both understand and support the research and professional needs of their displaced peers, the scientific communities in host countries have a responsibility to provide aid. Welcoming, supporting, advising, and mentoring scientists promotes their effective integration into their host country's institutions and sought-after excellence in science.

Effective integration of displaced scientists into existing institutions offers an avenue to increasing diversity at the national and international level. An array of efforts seeks to improve diversity in science in the U.S. and elsewhere in response to underrepresentation of racial and ethnic minorities in STEM fields.[56] Recent studies point to the wide-ranging benefits of increased diversity in science. A 2019 NASEM report noted that the "advancement of the STEM workforce will require […] a marked increase in the cultural diversity of its talent."[57] The authors further note, "diversity in the workplace not only expands the available talent pool, but also increases the range of perspectives and expertise available to solve grand challenges in STEM." Similar benefits were outlined by the authors of the UNESCO Science Report 2030, which noted that effective use of science in public policy required approaches that "foster truly global collaboration embracing the full diversity of scientific voices from around the world."[58]

V. Past successes that highlight current opportunities for action

Several programs currently assist academics who have had to flee their home country. The services they provide may include a fellowship for a fixed period at an academic or research institution, assistance in identifying positions in the host country, relocation assistance and support, mentorship, support in adjusting to different aspects of life in the host country, and training and educational opportunities. These include The New University in Exile Consortium and Harvard Scholars at Risk (U.S.); the Philipp Schwartz Initiative and Academics in Solidarity (Germany); PAUSE (Programme National d'Accueil en Urgence des Scientifiques en Exil (France); CARA (the Council for At-Risk Academics) (UK); EURAXESS and Science for Refugees (EU); and the Global Young Academy, Scholars at Risk,

Coursera for Refugees, The World Academy of Sciences (TWAS), Off-University, the Open Society University Network's Threatened Scholars Integration Initiative, and the Institute of International Education's Scholar Rescue Fund (IIE-SRF; globally).

The IIE-SRF program, where the first three authors of this publication are volunteer advisors, and the fourth is a staff member, is representative of efforts in this area. IIE-SRF was launched in 2002 "to formalize IIE's commitment to protecting the lives, voices, and ideas of scholars around the globe." Through this program, the organization provides one- to three-year fellowships to threatened and displaced academics, placing them at one of over 430 institutions across 50 countries. The financial award, which typically comprises US$25,000 for a one-year fellowship appointment, is typically matched by the host institution. In the program's nearly 20-year history, more than 915 scholars across a range of academic disciplines, including over 500 in STEM fields, have benefited from IIE-SRF support. IIE-SRF is supported by governments, foundations, private organizations, and individual supporters.

After IIE-SRF support ends some scholars are unable to return to their home countries for several years beyond the fellowship or permanently. In such situations, they must remain productive beyond the term of their fellowship, by continuing to conduct research and/or teach in academia, transitioning to non-academic scientific or technical roles in corporate or governmental laboratories, or switch to non-technical positions. Displaced scientists may choose to remain in their host country, return to their home country provided the situation has stabilized, or move to a third country although immigration and visa restrictions may complicate these decisions.

In August of 2020, IIE-SRF inaugurated IIE-SRF Alliance, a global network of academic, non-profit, corporate, and governmental partners that offer practical support to threatened and displaced academics, including scientists. This support includes temporary academic positions, professional development and career advancement opportunities, and other critical assistance. As part of this program, IIE-SRF recruits scientists to act as advisors to IIE-SRF fellows and alumni on a one-on-one basis. Advisors provide assistance with a range of materials and issues, from career counseling—through guidance on drafting curriculum vitaes/resumes, cover letters, and identifying career opportunities in a range of sectors—to advice on effective networking strategies, and guidance on professional or academic writing (e.g., grant proposals, fellowship applications, and journal publications).

In 2020, IIE conducted a survey of IIE-SRF alumni in order to better understand scholars' post-fellowship trajectories as well as the impact of alumni on their home countries, host communities, and academic disciplines. 207 alumni from 38

countries (representing 47% of the survey's population) responded. The survey found that 26% of alumni had returned to their country of origin and 11% to their region of origin. Of the 74% residing outside of their home country (84% of which were in the U.S., Canada, and western European countries), 76% lived in the country in which they had undertaken the IIE-SRF fellowship. Among alumni who were employed (77% in higher education/research institutions, 9% in for-profits, 8% in nonprofit or non-governmental organizations), 78% of respondents who had returned to their home countries, were employed as were and 63% living in a host country.

The results of the survey demonstrate the far-reaching impact of the fellowship opportunity on scholars, and, in turn, the short- and long-term impacts of these scholars in their laboratories, classrooms, and beyond. IIE-SRF alumni have disseminated their work via more than 10,500 scholarly publications, presentations, artistic creations, and public appearances since their IIE-SRF fellowships. Of surveyed alumni, the majority reported that they have made improvements to their education institutions, whether in their home countries (56%) or new communities (62%). A total of 166 curricula were developed by IIE-SRF alumni both in their home and host countries, and 40 alumni created 55 international, regional, and local organizations in educational and technical fields among others in 22 countries. Most IIE-SRF alumni living abroad remained connected to academia in their home country in some capacity. Half of surveyed alumni reported having connected with academic diasporas, from their home countries, participated in distance learning activities in their country of origin (29%), and remained connected to their home academies (75%), with 57% incorporating topics related to their home countries into their scholarly work.[59]

The New University in Exile Consortium led by The New School is another effort to assist displaced scholars, with members working together to create an effective diaspora network and "publicly committed to the belief that the academic community has both the responsibility and capacity to assist persecuted and endangered scholars, to help protect the intellectual resources that are jeopardized when universities and scholars are under assault, and to advocate for academic freedom around the world." A similar network is the Turkish-American Scientists and Scholars Association, which "facilitates communication and interaction among U.S.-based Turkish scientists." A report by IIE-SRF indicated that approximately 50% of alumni living abroad had "engaged with academic diaspora from their home countries," and that 23% expressed the wish to do so in the future.[60] The Networks of Diasporas in Engineering and Science—a partnership among the U.S. Department of State, AAAS, the National Academy of Sciences (NAS), and the National Academy of Engineering (NAE)—was established to support networks of scientific and engineering diasporas "by sharing best practices and knowledge,

convening diaspora groups, and catalyzing their growth by linking them with useful tools and institutions so that these knowledge networks can have greater impact in their country of origin and in the United States."

What can the scientific community do to address these challenges?

Lessons learned from scientist-advisors who participate in the IIE-SRF Alliance, who cover a wide range of disciplines and geographical areas, can help formulate "best practices" for effective assistance for displaced scholars so that they can reestablish their careers. Professional societies can also play a part in the successful career transition of displaced scientists—and several have already joined IIE-SRF Alliance—by providing fellows with free or discounted access to society membership and/or conference registration, access to job listings and a network of scientists in their field, and by raising awareness of the program.

Prior to the COVID-19 pandemic, scientific societies had started to address the impact of travel restrictions, such as the U.S. travel ban on Iranian, Syrian, and Yemeni nationals, with opportunities for virtual attendance. The Society for Neuroscience launched the Science Knows No Borders program to allow scientists who had been denied travel visas under the ban to present their work virtually during the organization's 2019 annual conference.[61] The recent shift toward virtual and hybrid conferences during the COVID-19 pandemic may foster the development of new approaches for engagement, which would allow displaced scientists previously unable to attend such events to do so.

As noted earlier, displaced scientists are often at an advanced career stage prior to their displacement and may be unable to secure a similar position upon the completion of their fellowship in the host country. Displaced scientists may not fit neatly into the existing scientific hierarchy of positions; many are more accomplished than postdoctoral fellows but may lack skills needed to thrive as principal investigators in their host country. These may be technical skills, due to the differences in scientific resources and priorities between their home and host countries, or skills in scientific communication or publication. Scientists who have not published in western journals may struggle with changes in scientific publication, including the emergence of both open-access and predatory journals. Moving from systems where research is funded as part of the university's budget to a competitive grant system, in which scientists tune their ideas and pitches to match research priorities and grant submission processes of government funding agencies, may require a level of mentoring not usually provided to mid-career scientists. Together, these hurdles point to a need for transitional positions,

through which scientists can make their technical abilities, publication records, and scientific management skills more competitive.

A related challenge is that a displaced scholar's relative lack of published papers in international, English-language journals may hamper his or her scientific reputation. This could be addressed by listing such papers, with their abstracts translated into English, in general scientific databases (e.g., Scopus, Web of Science) and field-specific databases (e.g., PubMed). Prior non-English language publications could also be posted in translation on relevant pre-print servers, such arXiv for physics or ChemRxiv for chemistry. Existing databases that can be populated by researchers themselves (e.g., Google Scholar, ResearchGate) provide an additional option for displaced scientists to showcase their previous work while facilitating connections and collaborations with peers. Implementation would benefit from strong support from the scientific community, comparable to the 2016 push by several Nobel laureates who posted their research work on the bioRxiv preprint server before submitting it to a peer-reviewed journal, contributing to widespread adoption by life scientists.[62]

Raising awareness about the many challenges faced by displaced scientists would further expand the advisory network to scientists who have left research but have maintained their networks. Many in the scientific community are not aware that displaced scientists are hosted in their country, or even their own institution. Bringing awareness through scientists who are already involved with the support programs, research institutions, and professional societies, in addition to traditional refugee networks, would help further expand the support network, and improve career outcomes for displaced scientists.

Challenges requiring the involvement of the wider community

Policy measures aiming to support displaced scientists through specific funding and visa schemes, as well as the creation of organized networks spanning the public and private sectors, would complement efforts by the scientific community, and help preserve scientific capacity as well as the human rights of this group. These measures would be further bolstered by explicit recommendations geared at diplomats, enabling them to effectively support displaced scientists, including aiding their emigration if needed.

In addition to professional needs, the psychosocial needs of displaced scientists and their families should be addressed. Professional psychological support for displaced scientists and their families who recently fled high-stress environments, may be separated from their close relatives, and feel uncertain about their futures, among other issues, will contribute not only to their well-being, but also more successful long-term professional and personal outcomes, as well as integration into host countries. Such concerns should be addressed by professionals that have experience working with this type of population and recruiting such entities should be included in efforts to support displaced scientists.

Other worthwhile initiatives to support displaced scientists both professionally and psychologically could include the creation of networks of exiled scientists. The New School's New University in Exile Consortium and distance fellowships, such as the two-year program established by the Committee on Human Rights at NASEM in collaboration with Carnegie Mellon University, which allows scholars at risk to continue their research and teaching, provides access to the university's online library and facilitates connections with peers, are examples. Such networks would allow for a more effective exchange of information among displaced scientists, and much-needed support from like-minded individuals, particularly in light of challenges related to the COVID-19 pandemic.

In addition to rebuilding the research enterprise in their home country upon their return, displaced scientists contribute to that in their host country in many ways, both during and beyond the fellowship, highlighting the pressing need to support this valuable group.

VI. Conclusion

The combination of global migration triggered by national-scale crises and targeted persecutions of individual scientists has led to an increase in the number of scientists forced to temporarily or permanently continue their careers outside of their home country. The benefits of a systematic response can be understood in a science diplomacy framework. Diplomatic measures, such as aiding the movement of displaced scientists, can contribute to maintaining intellectual capital. Accelerating the rebuilding of countries through preservation of scientific capacity, where the scientific capacity of a country undergoing political turmoil is preserved in exile, contributes to larger goals of international stability. The experience of Iraqi scientists shows that support of scientists in exile can achieve this goal. Even in cases of extended turmoil, the presence of organized scientific diasporas can jumpstart rebuilding of both the scientific enterprise and the country as a whole.

Providing scientists the opportunity to continue their careers in exile also supports their individual human rights. Preserving scientific capacity and protecting the human rights of individual scientists advance the "right to science" included in the United Nations' Universal Declaration of Human Rights.

A range of NGOs, educational organizations, and governments have attempted to support displaced scientists, with both individual and national successes. However, the challenges and scope of the problem are growing and threaten to overwhelm an uncoordinated response. A coordinated response, in which NGOs, educational institutions, scientific societies, governments, and other organizations share resources and expertise, stands a better chance of meeting these challenges. Such a response may require additional resources. The policy benefits of such a response, and the opportunity to preserve instead of rebuilding scientific capacity from scratch, are likely to outweigh the costs. An organized response, coordinated with other actions to protect the human rights of individual scientist and a "right to science" at the national scale, serves as an affirmation of a science-based response to international challenges such as climate change and the COVID-19 pandemic. SD

About the Authors

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Endnotes

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