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## Emerging Technologies and Science Diplomacy

*Kimberly Montgomery and E. William Colglazier*

Emerging technologies span scientific and technical disciplines, are being developed at an incredible speed, and have the potential to solve national and global problems. However, these benefits come with potential risks, including the capacity to reshape the world order and disrupt global stability leading to increased conflict.

It is therefore not surprising that emerging technologies are now not only an increasing subject of research studies and private company R&D budgets, but also a focus of national governments and international institutions. In the United States, there are national strategies for critical and emerging technologies,<sup>1</sup> and Secretary of State Antony Blinken recently announced a new Special Envoy for Critical and Emerging Technology and a new Bureau of Cyberspace and Digital Policy at the U.S. Department of State.<sup>2</sup> This announcement was not without precedent. In 2017, Denmark appointed the first tech ambassador, and since then, more than twenty

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countries have created similar positions, with titles ranging from Technology Ambassador to Ambassadors for Cybersecurity or Digital Affairs.<sup>3</sup> Many of these positions have been placed outside of national capitals, and instead in places like Silicon Valley in the United States, a move that is more akin to establishing diplomatic relations with Big Tech companies as pseudo-nation states—a move which has not been without controversy.<sup>4</sup>

This special issue of *Science & Diplomacy* explores the intersection of emerging technologies and diplomacy.<sup>5</sup> Articles focus on topics ranging from bioscience and quantum computing to neurorights, and are authored by scientists, diplomats, and policy makers. The pieces provide a current snapshot of the landscape, reflecting individual experiences, offering an expansive definition of emerging technologies, and suggesting roles for science diplomacy.

Emerging technologies pose several challenges to diplomacy: 1) they deal with many scientific fields and have diverse applications, some unknown, 2) they have the potential for serious national security risks, risks that are constantly evolving, and 3) they are the subject of tensions across nations. These challenges call for a role for science diplomacy in all three dimensions of the AAAS and Royal Society *New Frontiers in Science Diplomacy* framework.<sup>6</sup> If science diplomacy is to be an effective tool for using scientific knowledge, scientific expertise, and/or scientific engagement to accomplish concrete objectives related to emerging technologies, then the immediate task is to specify clearly the objectives sought and the means for achieving them.

### *Science in Diplomacy*

Emerging technologies cover the scientific enterprise, have many disparate applications, and relate to myriad other policy issues. This makes it difficult to provide accurate information and advice on individual technologies and their uses, to assess their impact on individuals and broader society, and to provide foresight on what might be expected as these technologies evolve. To do so requires a broad overview as well as deep understanding of the emerging science fields and their scientific communities, including the research and development work being carried out at the cutting edge in universities, research labs, and private industry in the United States and abroad. Also needed is an understanding of the connections between specific technologies and other policy and societal issues, and the ability to offer objective advice and informed foresight on possible future scenarios without overpromising or overhyping new technologies and their impacts. Without expert assessment and advice from knowledgeable scientists and technologists, there is

a risk that diplomats and policymakers may not understand the technologies, not comprehend their applications, and under- or overestimate their potential impacts.

Science advisors in foreign ministries are focused on all aspects of science, technology, and innovation for advancing diplomacy to achieve national and global goals. Deeply connected to the domestic and international scientific communities, they are uniquely positioned to help maximize the potential of science diplomacy to capitalize on the opportunities and contend with the threats of emerging technologies. In the United States, the Office of the Science and Technology Adviser to the Secretary of State (STAS) was created in 2000 based on a recommendation by the National Academy of Sciences to help integrate science into foreign policy.<sup>7</sup> To date, the Biden administration has not appointed a Science and Technology Adviser to the Secretary of State, which is unfortunate.

Ensuring a central role for the STAS office in the U.S. Department of State is critical to ensuring that broad scientific knowledge and expertise is properly included in formal diplomatic negotiations and activities focused on emerging technologies. A Special Envoy for Critical and Emerging Technologies alone is insufficient. Thus, the first task for science diplomacy regarding emerging technologies in foreign ministries is to build the internal capacity to understand, anticipate, and assess the rapidly advancing science and technology that can affect foreign policy, diplomacy, and relations between countries.

### *Diplomacy for Science*

Emerging technologies have great promise, but also pose serious potential national security risks. What if an adversarial nation obtains a transformative technology that could disrupt a national economy, create new weapons that could cause massive human casualties, or gain access to national intelligence systems? We share these legitimate concerns but also want to ensure that new policies to address these threats do not create unnecessary or insurmountable obstacles to international scientific collaboration on fundamental research relevant to emerging technologies.

International scientific collaboration plays a vital role in increasing scientific intelligence, improving domestic and worldwide scientific capabilities, and attracting foreign talent. The United States has benefited greatly by being a magnet for talent, attracting bright students and early-career scientists for education and research. The leaders of U.S. science in almost all fields have recognized that for the United States to continue to be a world leader in all important areas of science now

requires being even more committed to international scientific collaboration.<sup>8</sup> The National Science Board stated in its report, “State of U.S. Science and Engineering 2022,” which accompanied the 2022 National Science Foundation *Science & Engineering Indicators*, that it is no longer feasible for the United States to lead “across the board” in science and engineering, and that the United States should therefore position itself as a hub for international talent and work to influence global values and norms for the conduct of research.<sup>9</sup> By contrast, creating roadblocks through visas and excessive restrictions ends up harming national security by hampering American science, technology, innovation, and economic competitiveness.

To balance the protection of national security with the promotion of international scientific collaboration requires dialogue and collaboration between the scientific community and the national security community. Such dialogue is now happening in the United States, where security and law enforcement agencies are revising recent policies and actions seen to be counterproductive and the Biden administration recently announced new actions for retaining international STEM talent.<sup>10</sup> Thus, the immediate task for advancing science diplomacy related to emerging technologies is continuing this dialogue between science communities and the national security, foreign policy, and law enforcement communities. With the domestic dialogue progressing and increased consensus on the appropriate balanced approach, science diplomacy initiatives can be undertaken with similar bodies in allied countries to build consensus there. That can also lead to new initiatives for increased collaboration on emerging technologies to advance the interests of all allied countries.

### *Science for Diplomacy*

Emerging technologies are also the subject of diplomatic tensions, increasingly between the United States and China. In the United States, legislation such as the U.S. Innovation and Competition Act and the America COMPETES Act of 2022, which focus on innovation and national security and provide a significant increase in funding for public research, are increasingly being framed through the lens of competition with China. As those bills move through the Congressional process, China has warned of possible retaliation if they are passed.<sup>11</sup>

To support formal diplomatic efforts, we urge the increased use of “Track II” informal diplomatic efforts focused on topics such as international standards for emerging technologies. These informal diplomatic efforts can help maintain relationships and communication channels outside of official diplomatic channels and lay the groundwork for formal “Track I” diplomatic efforts. These initiatives

can be led by national and international scientific organizations and include scientists and research leaders from involved countries. As with Track II dialogues between U.S. and Soviet scientists in the 1980s that helped lead to arms control agreements, such efforts on emerging technologies may create similar “windows of opportunity” for governments to reach agreements.

This is being done now with allied countries, and a broader set of countries can eventually be included. These dialogues could be used for promoting allowable research areas and developing consensus on the rules and objectives for collaborative projects and joint research centers. The leaders of American physics are currently having Track II dialogues with the leaders of physics in China. Using Track II as well as formal diplomatic efforts to establish broad collaborative programs and initiatives will strengthen domestic and worldwide scientific capabilities and counter actions that unnecessarily restrict international scientific collaboration in the name of national security.

## **Towards a Balanced Approach**

We have outlined three areas for diplomacy regarding emerging technologies, and all require taking a balanced approach involving both the scientific community and the foreign policy community. Further complicating these efforts is the remarkable speed of the development of emerging technologies and their applications. Governments do not have a lot of time to implement policies and processes that ensure diplomatic efforts are informed by the most current scientific knowledge to provide understanding and possible foresight of foreign policy and societal implications. It is essential that dialogues between foreign policy and scientific communities help avoid overreactions by national security actors, which can unintentionally hinder innovation and economic competitiveness. As countries have recognized previously, diplomatic progress can sometimes be facilitated by dialogue between scientific communities that maintains a channel of communication between estranged governments.

We are in exciting and evolving times. What the next emerging technologies are, how they will be used, and how they will affect society may be unknown, but it is clear that there is a need for science diplomacy to play an important role. **SD**

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