Science, Technology, and U.S. National Security: Engaging the Next Generation
Science, Technology, and U.S. National Security: Engaging the Next Generation


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The mission of this initiative is to strengthen information-sharing and networking among policymakers, analysts, and the scientific community; to communicate security policy concerns to the scientific community; and to facilitate the dissemination of scientific information to policymakers and analysts to identify, understand, and resolve complex national and global security issues.
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**Background**

Women in International Security (WIIS) is the premier non-profit, non-partisan membership organization dedicated to increasing the influence of women in foreign and defense affairs by raising their numbers and visibility, while enhancing dialogue on international security issues. WIIS offers a comprehensive set of programs designed to foster and promote women in all fields related to international security, and in a variety of sectors. WIIS is a part of the Center for Peace and Security Studies (CPASS) in the Edmund A. Walsh School of Foreign Service, Georgetown University, located in Washington, DC.

On Monday, March 26, 2007, WIIS convened experts from the public, private, and academic sectors—with knowledgeable professionals in the science, technology, and security communities in Washington, DC—to discuss challenges facing young scientists and engineers interested in national security careers and to identify new ways of thinking, and as a corollary, recommendations. As the global community confronts grave security threats, the interdependence of science, technology, and security has become increasingly evident. International security concerns are now more complex than ever before, with threats ranging from biological attacks to environmental crises, to cyber-terrorism. As a result, there is a critical need to connect scientists and policymakers – women and men – to develop new approaches to national security.

In 2002, WIIS was awarded a grant from The John D. and Catherine T. MacArthur Foundation to support the development of a Science, Technology, and Security Initiative through which $50 million in grants were made to increase the pool of independent experts providing scientific and technical advice on issues related to international security policy. Programs WIIS has implemented under this initiative are integrated and complementary, targeting the U.S. Congress, the security policy community in Washington, DC, scientific communities across the U.S., and the media. They include Congressional staff briefings, public panels, collaborative workshops, and policy bulletins. To learn more about the MacArthur Foundation Science, Technology, and Security Initiative, please visit, [http://www.macfound.org](http://www.macfound.org).

The WIIS consultation, *Science, Technology, and U.S. National Security: Engaging the Next Generation*, is part of a nationwide series of policy fora to further the mission of this initiative: to strengthen information-sharing and networking among policymakers, analysts, and the scientific community; to communicate security policy concerns to the scientific community; and to facilitate the dissemination of scientific information to policymakers and analysts to identify, understand, and resolve complex national and global security issues.

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*Science and technology have been, and will increasingly become, of critical importance to the nation’s security as the U.S. confronts the pressing issues of its time, including nuclear proliferation, cyberterrorism, and bioterrorism.*
SECTION I: Executive Summary

Addressing the arrayed threats posed by U.S. adversaries in the war on terror, while protecting America from another terrorist attack, requires an advanced multidisciplinary national security strategy. Science and technology have been, and will increasingly become, of critical importance to the nation’s security as we confront the pressing issues of our time, including nuclear proliferation, cyberterrorism, and bioterrorism. As the U.S. adapts to the changing threat landscape, sustaining a strong cooperative relationship among the science, technology, and security communities will require additional effort and a concerted investment of resources: time, funding, knowledge, and will. However, the science-technology-security relationship presents a particular set of challenges, and if overlooked, the implications could be detrimental. Today, the science, technology, and security communities face the potential risk of a diminished science and technology workforce. Past and recent trends suggest more attention needs to be paid to actively educating and engaging the next generation of science and technology experts in national security. There is a time horizon for this challenge: the sooner the better.

The objective of the March 26, 2007 WIIS consultation, Science, Technology, and U.S. National Security: Engaging the Next Generation, was to open the channels of communication among experts in these three communities, and also to:

- Frame the key issues and challenges that underlie the science, technology, and security nexus within the context of “engaging the next generation;”
- Connect key experts, at all levels, from the science, technology, and security communities to discuss related topics;
- Provide a forum for open, candid discussion, as a means to identify viable solutions; and
- Create momentum to ensure sustained, widespread support and interest in the topic.
SECTION II: Consultation Recommendations

1. Establishing a Time Horizon: The science, technology, and U.S. national security communities must recognize and act upon their responsibility to prepare future generations of young professionals, and enable current practitioners to engage in a rapidly changing global security landscape.

2. Increased Cross-community Dialogue: More open discussion among the science, technology, and security communities is required to address cultural perceptions, and perhaps misconceptions, which create unwarranted complications and directly hinder shared progress.

3. Proactive Engagement of Young People: A more proactive strategy of engagement of young people is needed in science, technology, engineering, and mathematics (STEM) areas; academia, government, private, and public sectors have a role to play.

4. Correcting Gender Bias and Barriers: Special attention must be paid to fostering interest among young girls and women in science, technology, and security who face a particular set of challenges, resulting from gender bias and barriers.

5. The Role of the U.S. National Security Community: The national security community, in particular, must do more to educate young people with technical backgrounds about viable career opportunities. Also, there is a need for more quantifiable data on science and technology professionals in national security to examine specific trends with regard to career paths of those interested in the intersection of science, technology, and U.S. national security.

6. The Role of Academia: Academic institutions (elementary, secondary, and higher) are a critical starting point; young people should be educated and excited about STEM areas, the valuable contributions of STEM, and how to make an impact in these areas as early as possible. Strengthening academic counseling and career advisory services is an important first step.

7. Enhance Academic Curriculum: Educational paths available for young people interested in the science, technology, and security nexus require further exploration. A hybrid, accredited degree program should be explored as a mid- to long-term objective. Immediate steps should be taken to better inform young scientists and engineers about security career options.

8. Increased Funding: Increased funding for research and development (R&D) and additional fellowships, scholarships, internships, travel and study grants, and other opportunities is a key step; academic institutions, government agencies, private companies, and external foundations should develop and promote programs that integrate STEM areas with security policy.

9. A Clearinghouse for Issues and Opportunities: A forum, or clearinghouse, for relevant opportunities and the exchange of ideas about this
issue may require a significant time commitment, but can be implemented with readily available technology. The science, technology, and security communities must determine where this mechanism would be housed, and who would manage it.

10. Establish Critical Networks: Mentor and peer networks, bringing together experts from the science, technology, and security communities with students and young people, require limited financial resources and a negligible time commitment, but can have a significant impact. Academic institutions should take the lead in establishing the networks and seek support from external government, public, and private sector entities.

11. Public Awareness: Public awareness of STEM areas, among local communities, families, and students, is lacking; public awareness campaigns should be used to provide context, particularly to parents, who have a strong influence on their child/ren’s career path.

12. Role Models: There is a shortage of visible female role models in the science, technology, and security fields; bringing women experts from these respective fields to the forefront is vital to encourage young girls and women to pursue career paths in the science, technology, and security area that may seem daunting, exclusive, and/or require considerable sacrifices (e.g., work / family balance).
SECTION III: Introduction

There is no such thing as an isolated issue in today’s security landscape, as the U.S. and the international community – as well as those seeking to harm the U.S. and its allies – become increasingly interconnected. The U.S. faces a daunting array of complex threats, which include the proliferation of nuclear weapons, the threat of natural disasters and pandemics, the emergence of various chemical and biological warfare tactics, and the use of information technology by terrorists to promulgate radical, extremist ideology and to share tactical science and technological know-how (e.g., how to build an improvised explosive device; Internet-based terrorist training). Confronting these threats requires an adaptive, multidisciplinary approach. Science and technology are central.

The U.S. depends on the highest quality of scientific and technical expertise to inform, guide, and advance key national security interests and to protect U.S. critical infrastructure from threats. In the post-Cold War era, however, defining the role of science and technology accurately within the context of U.S. national security has proven challenging, as these three communities seek to balance their respective priorities with broader security interests. What is agreed on is the need for a robust, highly-skilled science and technology workforce to tackle the complex threats confronting the U.S., today and in the future.

Over the past ten years, institutions – academic, governmental, and public – have published various reports on the decline of the U.S. global edge in the areas of science and technology (e.g., a decline of the U.S. share of global R&D spending; a decline in the U.S. share of science and engineering graduates; a decline in the U.S. share of scientific publications and citations) (see Appendix A for relevant reports and articles). However, most convey a sense of cautious optimism regarding the capability of the U.S. to maintain its edge and provide a wealth of recommendations, primarily to the academic and governmental sectors. One of the most important trends detailed within these reports relates to the next generation of science and technical experts: filling the pipeline. While some reports indicate an increase in degrees obtained in the science and engineering fields at the higher education level, in particular, and an increase in overall science and engineering employment, others show steady declines, due to the degrading quality of education at the secondary and post-secondary education levels in these areas, for example. Despite some conflicting findings, these research documents have stimulated widespread discussion, analysis, and activity around the critical issue of “the next generation” and have attracted the attention of the U.S. national security community, which continues to rely heavily on scientific and technical expertise (see Appendix A for relevant reports and articles).

The March 26, 2007 WIIS expert consultation, Science, Technology, and U.S. National Security: Engaging the Next Generation, centered around the issue of preparing the next generation of young scientists and engineers, which focused discussion of the broader issues, including improved infor-
information sharing and networking among the science, technology, and security communities and the dissolution of bias and misperceptions. These fundamental issues, and others, have a significant impact on attracting young scientists and engineers to the national security field. Women scientists and engineers, in particular, confront additional obstacles, potentially deterring young women from pursuing careers in these fields and depriving the U.S. security sector of valuable expertise. Curbing these negative trends in order to maintain an edge in science in technology is vital to U.S. national security, which encompasses homeland, political, economic, and citizen security.

The precise, but complex topic of the consultation required a layered approach. The consultation discussion was guided by the following four key issues:

1. Understanding the shortage of young science and technology talent;
2. Attracting the next generation of young scientists and technology professionals to U.S. national security careers;
3. Confronting specific barriers to women scientists and engineers in the science, technology, and national security fields; and
4. Identifying recommendations for policies, programs, and other initiatives.

The consultation yielded consensus about the following needs:

- Greater dialogue and proactive engagement among the science, technology, and security communities to address underlying challenges to improved cooperation and information sharing and the implications for young people at professional crossroads;
- Incremental reforms to the U.S. education system with regard to science, technology, engineering, and mathematics (STEM) areas, in addition to academic counseling and career advisory services;
- Quantifiable data on trends related to undergraduate and graduate students earning degrees relevant to U.S. national security, including germane background information, career paths for technically trained people in U.S. national security positions, and historical trends of scientists and engineers with advanced degrees in STEM areas applying their skills to national security;
- More and visible female role models within the science, technology, and security fields for young girls and women interested in professional careers;
- Additional opportunities for young people, primarily post-secondary students, interested in the science, technology, and security nexus; and
- Enhanced public awareness about the critical role of science and technology in U.S. national security, coupled with a targeted marketing campaign for young people at the secondary education level and above.

The following sections are a synthesis of the consultation discussion sessions. The consultation was non-attribution.
Section IV: Assessing the Deficient S&T Talent Pool

Participants commenced the expert consultation with a balanced discussion about the current state of the science and technology talent pool. As a point of clarification, one participant noted, as the problem of a talent shortage relates to U.S. national security positions, the issue may not be a shortage of talent, but one of available opportunities within the security sector for young scientists and technical experts. Participants acknowledged it may be difficult to quantify a shortage of science and technology talent in U.S. national security, given the classified nature of many positions in the field. It was agreed that there are important, causal issues and trends within the science and technology fields that will have a significant impact on the U.S. knowledge base, and, as a direct result, U.S. national security.

Several reports have been published on the subject of the next generation science and technology workforce. The findings of these reports vary with regard to the depth and scope of the issue but some of the key questions that are addressed include: Is there a diminishing science and technology workforce? Will the pipeline continue to be filled? Or will the U.S. lose its global competitive advantage in science and technology? The National Science Foundation, for example, reports an increase in the number of science and engineering degrees attained at the higher education level, an increase in graduate enrollment in science and engineering, and a recent increase in science and engineering graduate enrollment “across all major demographic groups, including women, minorities, white men, and foreign students.” The United States Government Accountability Office (GAO) reports that despite increases in the overall enrollment and degree attainment by women and minorities at the graduate level, “the number of graduate degrees conferred fell in several STEM-related fields from 1994–1995 to 2003–2004.” According to the GAO report, “College and university officials and students cited sub par teacher quality at the high school and college levels, poor high school preparation, more rigorous and expensive degree requirements for STEM majors, and lower pay of STEM occupations relative to such fields as law and business as factors that discouraged students from pursuing degrees in STEM fields.” And a report published by the Congressional Research Service (CRS) for Congress in May 2006 indicates low levels of achievement in math and science among elementary and secondary students.

The U.S. Commission on National Security / 21st Century Hart-Rudman Commission, which published a three-phased report from 1998 to 2001 on major U.S. national security issues and trends, asserted that the U.S. will maintain its competitive edge in science and technology, but concluded that educational inadequacies in America, particular in the sciences, pose “a greater threat to U.S. national security over the next quarter century than any potential conventional war that we might imagine.”

Limited data exists on science, technology, and national security trends.
Participants agreed that it may be prudent to begin collecting quantifiable data on trends related to undergraduate and graduate students studying U.S. national security, including relevant background information, career paths for technically trained people in U.S. national security positions (e.g. intelligence analysts), and historical trends and career paths of scientists and engineers with advanced degrees in STEM areas in national security.

Improving the current situation, participants agreed, requires a multifaceted strategy; the critical starting point is education.

**Elementary and Secondary Education**

Although the bulk of the working group discussion focused on higher education, participants agreed on the need for improvements in education, particularly science and math, at the elementary and secondary education levels. Perhaps the most detrimental trend, participants noted, is the negative perception of STEM among young people, particularly young girls (“Science and math are hard”; “Science and math are boring”). These perceptions can have a strong deterring effect for young people during a critical, formative period. Mitigating such misperceptions, participants agreed, is imperative. Also, participants stressed the importance of creating a strong continuum of interest in STEM areas from the elementary education level through the higher education level. Providing accessible context to teachers, parents, and students about the important contributions of STEM areas, the vast opportunities available at the student level and beyond, and the ever-increasing value of STEM areas is needed. Participants also suggested engaging families and students in educational STEM programs during early development. Tapping into existing summer and extracurricular programs available to students to learn about STEM (e.g., The Sally Ride Science Program, NASA Kids Science News Network; see Appendix B for related organizations and opportunities) while creating new opportunities in conjunction with families, public institutions, corporations, and government agencies would broaden the geographical distribution and availability of science and technology programs.

**Higher Education**

Incremental change, not complete overhaul, was the guiding principle for the working group discussion about higher education institutions and engaging the next generation of scientists and technology experts in U.S. national security. Participants presented an intricate matrix of cultural and institutional factors that, in combination, create a complex case for paradigmatic change.

Students and young professionals in attendance identified a series of educational and professional obstacles, the impact of which is significant for those considering how to balance technical science and technology interests with policy-driven aspirations. The primary issue, one participant
explained, is the lack of multi- or inter-disciplinary curriculum opportunities available to students seeking a hybrid technical/policy education. Existing models that may be referred to include, for example, the Center for International Security and Science Cooperation (CISAC) and Mirzayan fellowship programs (see Appendix B for relevant organizations and opportunities). Two corollary issues are deficient college and university counseling and career advisory services in this area and a lack of fellowship and internship opportunities. Regarding the latter issue, it was noted that various opportunities exist for students at the undergraduate and graduate levels, but that academic institutions, as well as government agencies and private corporations, may need to more proactively market these programs to students and student groups interested in the science, technology, and security policy nexus. However, of the existing opportunities available to students, younger participants maintained that more flexible, hybrid technical/policy opportunities are needed as the first step toward defining a viable career path.

Expert participants from the academic, public, and private sectors offered a different, but complementary perspective to expand the discussion of the deficient science and technology talent pool and opportunities for change. Energizing undergraduate, graduate, and doctoral students about science, technology, and national security is part of the solution, one participant noted. However, a changed campus culture, one participant explained, is a significant hurdle that must be overcome. Unlike students in the early sixties and seventies, there is a different level of political engagement on university campuses. Participants shared two important perceptions: (1) students are seemingly divorced from political issues, and (2) making a profit, not making a difference, is the primary career motivation for many young people today. Participants attributed the latter, in part, to the broader cultural shift happening in America toward a business-driven society and agreed that what may be lacking in undergraduate and graduate institutions may be as simple as context: are academic institutions properly framing for students the relevance and importance of science, technology, and U.S. national security?

Participants identified various programs at the higher education level, some more feasible and accessible than others, such as supporting organizations (e.g. Student Pugwash USA, The Triple Helix Global Forum for Science in Society; see Appendix B for related organizations and opportunities) that engage and excite young people in science and technology. Another feasible task would be to strengthen academic advisory and career counseling services for students interested in science, technology, and national security. Developing multi- or inter-disciplinary curricula (e.g. joint degree programs), however, may be more difficult and longer-term.

“Reluctance,” “resistance,” and “difficulty” were terms frequently used as participants discussed how to garner “buy-in” from the top-down for multi-disciplinary, accredited degree programs, bringing together science and technology with national security and policy. One participant sug-
The science, technology, and security relationship has changed significantly since the end of the Cold War and there is a sense of urgency about the need to reshape this relationship to meet current and future national security needs.

Participants agreed that the science, technology, and security relationship has changed significantly since the end of the Cold War and expressed a sense of urgency about the need to reshape this relationship to meet current and future national security needs. However, participants explained that progress may be difficult as they considered:

- How do we balance a culture of openness (science and technology) with a culture of classification (security)?
- How do we maintain current institutions and processes while creatively adapting for the future?
- What is the starting point for progress?
- What do we mean by progress?

As a first step, providing a clearer, more explicit definition of “national security” to relevant groups, which may be perceived as pejorative (and as some participants suggested, too broad), might improve efforts to redefine the science, technology, and security relationship. The security community, participants agreed, must clearly articulate the role of science and technology within the definition of “national security.” Agreeing on a common definition as a point of origin for progress would be beneficial.

As a next step, airing perceptions and resulting tensions that underlie some of the barriers in this critical relationship, including institutionalized hierarchy, systemic bureaucracy, and unwillingness to cooperate, is imperative. A majority of participants conceded that there may be inherent cultural characteristics of the academic community which are fundamentally incompatible with the policy community. However, participants strongly agreed on the need for continued, constant dialogue.
Section V: Engaging the Next S&T Generation in U.S. National Security

Two key ways to engage the next generation of science and technology professionals in U.S. national security are: networking and mentorship. As several participants explained, incentivizing the next generation to pursue national security careers may be challenging. Participants agreed that fulfilling the requirements of academia and the national security sector, while reconciling conflicting perceptions of the scientific academic community (“publish or perish”) and the national security community (“less esteemed than scientific bench work”), can be discouraging. Connecting young people with early career and experienced professionals in the science, technology, and security communities for insights and guidance may be an effective, untapped strategy. Participants offered a wealth of insights and recommendations which can serve as a guide.

Networking

Educating young scientists and engineers about important careers in U.S. national security may be challenging, as much of the work cannot be discussed publicly. However, participants explained that helping undergraduate and graduate students build relationships within the national security community would be highly valuable, for example, by establishing cross-sector mentor and peer networks. These relationships can help to inform and guide young scientists and engineers interested in U.S. national security and expand their understanding of the field and available opportunities. Participants urged academic institutions and government agencies, including the Department of Homeland Security (DHS), Department of Defense (DoD), and intelligence agencies to create more networking opportunities for young undergraduate and graduate students.

Mentorship

Participants explained that effective mentoring simply requires helping students and young people advance their respective career interests in the science, technology, and security nexus. In turn, mentees can leverage their mentors’ networks. “Cross-pollination,” as one participant called it, between fields and departments is an opportunity to broaden information and relationship networks, the impact of which could considerably ameliorate current information sharing and cross-sector communication problems. “Speed mentoring” is an effective tool for academic career development and allows young people to interact with many mentors in a short period, gaining varied insights in a structured, time sensitive environment.
Developing a Clearinghouse for Ideas and Opportunities

Younger participants agreed that creating a forum, or clearinghouse, for the exchange of ideas and the posting of relevant fellowships, internships, and other programs would be a useful tool. A forum might also encourage proactive, creative thinking about new opportunities. Securing external funding for science, technology, and security opportunities (e.g., fellowships, travel/study grants) would provide more flexibility in choosing programs. Participants discussed existing opportunities that bring together science, technology, and national security (e.g., Department of Defense SMART program; see Appendix B for related organizations and opportunities) and suggested referring to existing programs for new ideas. Another participant suggested implementing university-sponsored “Hill Days” in Washington, DC, which would provide young people an opportunity to observe the policymaking environment and meet with legislators to discuss national security issues.
Women scientists and engineers confront a particular set of barriers to career advancement, in addition to various disincentives, resulting from gender bias. In the past, participants noted, women were discouraged from entering certain fields, including STEM areas, and although these areas are no longer “closed” to women, existing barriers hinder women’s progress. A recent report entitled “Beyond Bias and Barriers: Fulfilling the Potential of Women in Academic Science and Engineering,” published by the Committee on Maximizing the Potential of Women in Academic Science and Engineering, explains that women “typically receive fewer resources and less support than their male colleagues.” One finding of this report reveals that the pipeline is an oversimplification of the issue, and that despite the percentage of women obtaining doctorates in various sciences, women “are virtually absent from the nation’s leading science and engineering departments.” The report attributes this trend, in large part, to institutional constraints, including systematic structural constraints. Barriers specific to the national security sector add an additional layer to this already complicated issue. Still, participants expressed a strong commitment to mitigating these trends for the next generation of young women.

Academic institutions – elementary, secondary, and higher education – offer an opportunity, as well as a physical institution, for change in this area. Providing clear leadership for young girls during early childhood development and adolescence, and beyond, is critical. Young girls and women need strong role models in the classroom, in popular culture, and in professional fields, and participants agreed there is a shortage, particularly within the U.S. national security field. Proactively engaging current professional women in these fields to reach out to high schools, universities, and student groups to inform young girls and women about the challenges and opportunities is one important step.

Participants also agreed that more programs are needed to engage women scientists and engineers in national security, and explained that female participation and representation in STEM areas of specific importance to U.S. national security is low. Again, participants reiterated the need for statistical data to track these trends (e.g., analyzing case studies to determine career paths of women in STEM areas).

An incentive for women scientists and engineers to enter into the national security field is greater career flexibility. However, participants agreed that balancing career and family is a significant factor for most women professionals in all fields and that more women in more visible, top-level positions are needed to support the career/family path.
Section VII: Conclusion

It is not enough for the science, technology, and security communities to simply coexist; the globalizing world demands more from our nation’s national security system. Science and technology have a significant role in protecting America, and the U.S. national security community has a responsibility to scientists and technical experts who make a considerable contribution. There is a shared responsibility for the next generation of science and technology experts who will assume leadership and accountability, not only for the nation’s security, but its global competitive advantage as well. Preparing the next generation to address the most challenging national security threats may be the most pressing issue of our time. For the science, technology, and security communities, meeting this demand is no easy task, but the algorithm for progress is clear: increased dialogue, institutional change, cultural reevaluation, the engagement of young people and professionals, more opportunities, additional funding, and a commitment to U.S. national security.

As the U.S. adapts to the changing threat landscape, sustaining a strong cooperative relationship among the science, technology and security communities will require additional effort and, a concerted investment of resources: time, funding, knowledge, and will.
Appendix A: Science, Technology, and U.S. National Security, Related Articles and Reports

“Beyond Bias and Barriers: Fulfilling the Potential of Women in Academic Science and Engineering”. Committee on Maximizing the Potential of Women in Academic Science and Engineering, National Academy of Sciences, National Academy of Engineering, and Institute of Medicine. To obtain a copy, please visit: http://www.nap.edu/catalog.php?record_id=11741


Appendix B: Science, Technology, and U.S. National Security: Organizations and Opportunities

The American Association for the Advancement of Science, Center for Science, Technology, and Security Policy
http://www.aaas.org; http://cstsp.aaas.org/programs.html

Association for Women in Science (AWIS)
http://www.awis.org

Belfer Center for Science and International Affairs (BCSIA), John F. Kennedy School of Government, Harvard University
http://bcsia.ksg.harvard.edu/

Center for International Security and Science Cooperation (CISAC), Stanford University
http://cisac.stanford.edu

Center for Technology and National Security Policy (CTNSP)
http://www.ndu.edu/CTNSP/home.html

Central Intelligence Agency (CIA), Directorate of Science and Technology
https://www.cia.gov/cia/dst/index.html

Commission on Professionals in Science and Technology
http://www.cpst.org

Council on Foreign Relations, Roundtable on Science, Technology, and Foreign Policy
http://www.cfr.org/project/1235/roundtable_on_science_technology_and_foreign_policy.html

Department of Defense (DoD), Science, Mathematics, and Research for the Transformation Defense Scholarship for Service Program (SMART Scholarship Program) and National Defense Science and Engineering Fellowship

Department of Homeland Security, DHS Scholarship and Fellowship Program
http://www.dhs.gov; http://www.orau.gov/dhssed

Jefferson Science Fellows at U.S. Department of State
http://www7.nationalacademies.org/Jefferson

NASA Kids Science News Network
http://ksnn.larc.nasa.gov/21Century/indexorig.html

National Science Foundation, Statistics on Women, Minorities, and Persons with Disabilities in Science and Engineering.

National Security Education Program
http://www.iie.org/programs/nsep/default.htm

National Youth Science Program
http://www.nysf.com/overview.html

Massachusetts Institute of Technology (MIT), Washington Summer Internship program
http://web.mit.edu/summerwash/www

Promising Practices in Afterschool, Science, Gender and Afterschool (SGA)
http://www.afterschool.org/sga/index.cfm
Science.Gov, USA.Gov for Science  
http://www.science.gov  
Student Pugwash USA (SPUSA)  
http://www.spusa.org  
The John D. and Catherine T. MacArthur Foundation, Program on Global Security and Sustainability, Science, Technology, and Security Initiative  
http://www.macfound.org  
The National Academies (Sciences, Engineering), Women Adventures in Science and The Christine Mirzayan Science and Technology Policy Graduate Fellowship Program  
The National Science and Technology Council (NSTC)  
http://www.nostp.gov/nstc  
The Sally Ride Science Program  
http://www.sallyridescience.com  
The Triple Helix Global Forum for Science in Society  
http://www.thetriplehelix.org  
United Nations Educational, Scientific and Cultural Organization  
http://portal.unesco.org/en  
U.S. Department of Energy (DoE) National Security Department  
http://www.energy.gov/nationalsecurity/index.htm  
U.S. Department of Health and Human Services, National Institutes of Health (NIH); Women in Science Careers Page  
Women in Science, Technology, Engineering, and Mathematics, ON THE AIR!  
http://www.womeninscience.org/  
Women in International Security (WIIS)  
http://wiss.georgetown.edu  
Women-Related Websites in Science and Technology  
http://www.research.umbc.edu/~korenman/wmst/links_sci.htm

Endnotes
3 To report in its entirety is available online, http://www.fas.org/sgp/crs/misc/RL33434.pdf.
4 The Hart-Rudman Commission report is available online, http://www.fas.org/man/docs/nwc
5 “Speed Mentoring” is a relatively new networking model, being used by universities, as well as private and public organizations in the US and abroad. Speed mentoring brings together a group of students and young professionals with experts for a set time, generally 60 to 90 minutes. With a steady, regulated rotation, each young person has approximately 5 to 10 minutes with each expert to ask career-related questions, seek professional advice, and gain insights.
6 “Beyond Bias and Barriers Fulfilling the Potential of Women in Academic Science and Engineering”, published in 2007, provides additional context on related topics, including discrimination, bias, and academic organization barriers.
Appendix C: Participant List

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