

Chapter 14

Improving Women's Participation in the Security Field

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Getting Women Involved Through Education and Publication Opportunities

This chapter shares the experiences of the author while exploring why there is a lack of women in security. The theme of the chapter is getting women involved in the field through education and publication opportunities. It includes outreach programs and resources that are available to help those interested in pursuing interests in this ever expanding area of technology.

Few Women in the Field

Looking back to the early days of my IT career, there were very few women in the field. There was a standing joke that the best thing about being a woman in technology was never having to wait in line for the restroom. A lot has changed since then. Women hold high security positions in some of the most well-known technology organizations such as Google and Microsoft.

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Career Beginnings

I enjoyed math and originally went to college for a degree in accounting. I became an IRS enrolled agent but I was bored sitting in an office for eight hours every day. I discovered that I really liked working with computers. I began my technology career working for a software development company. Learning about Windows NT and integrating our proprietary DOS based software for proper performance on NT was quite the accomplishment. Additionally, installing the software on customer systems required traveling to the customer site, so there was ample opportunity to see what types of networks existed in other organizations.

Education and Certifications

During this time, education and certifications became an important part of a career in technology. It was sometimes difficult to work with other administrators and vendors without having credentials. Certifications came first because they were easier to obtain than a degree and as experience increased, so did the likelihood of passing certification tests.

Technical College Instructor

Tired of traveling and being constantly on call, I accepted a position as an instructor at a local technical college in the Computer Networking Technologies program. In conjunction with studying for additional certification exams, there was opportunity to do technical editing for a local company that published ExamCram books. The contacts at ExamCram also afforded additional visibility as an author and instructor for short technology courses for various companies including HP and Forbes.

Writing Security Books

As networks began being interconnected, security became a topic of concern. I first became involved in security and then digital forensics. While searching for material to study for the CompTIA Security + beta exam, a posting seeking authors for the Security + ExamCram was answered. This began a writing career that continues to this day. The Security + ExamCram SYO-401 edition, which is the fourth iteration of CompTIA's Security + exam, went to publication in 2015. The same three original authors have done all four books. This is a great feat in itself as it often very

difficult to work with other people on a writing project. I have written over a dozen books related to technology, security and forensics.

Academia, Industry and Educational Rigor

I enjoyed my time in education, but missed the field work. For quite a number of years I did both. At first, I worked in industry part-time and in education full-time. Then I worked in education part-time (mainly online) and in industry full-time. During this time, I advanced my education up to the point of completing a PhD in business administration with a specialization in information security. This type of educational rigor is not for the light of heart, but due to all the prior writing work I did, the dissertation process went a bit smoother than for those that did not have the pleasure of previously having someone rip apart their work.

Shared Roles in Industry and Education

For now, my work consists of working in industry part-time and spending most of my time in education. At this point in my life, it is a bit more enjoyable to have some flexibility and not have to travel on a moment's notice. I have presented at a variety of conference venues, served on boards and panels, chaired conferences, and am associated with many industry organizations.

Why the Number of Women Is So Low in Security

With the background information complete, it's time to move on to explore the crux of this chapter, discussing why there is a significantly low number of women in security and improving female involvement in the field through education and publication opportunities. A Cisco report estimates that there are one million global cybersecurity job openings (Cisco 2015). By 2019, the demand is expected to reach six million globally, with a projected shortfall of 1.5 million (Morgan 2016a, b). Traditionally, technology fields have been primarily male dominated. The Women's Society of Cyberjutsu (WSC) states that only 11% of the world's information security workforce are women (Cooke 2016).

The lack of women in the security workforce is attributed to several factors that include unfriendly work environments, family responsibilities, and complex job demands (Georgetown University 2016). Hill et al. (2010), presented eight research findings from the results of a NSF grant for the American Association of University Women (AAUW). The study drew on a large and diverse body of research, providing evidence that social and environmental factors contribute to the

underrepresentation of women in science and engineering. One of the report recommendations was that encouraging more girls and women to enter vital fields such as security, will require careful attention to the environment in our classrooms, workplaces and culture. Since I have a direct impact in these areas, I hope to make a difference by encouraging more women to enter the field of security through sharing my experiences and helping them be successful.

The low percentage of women in security does not truly reflect the current state of the security profession. The number of women employed in the certain areas of security has actually increased at a greater pace than that of men. For example, in the most recent Frost & Sullivan ISC2 survey, one in five women is in a governance, risk, and compliance (GRC) role compared one in eight for men (Frost & Sullivan 2015). The difference was attributed to women pursuing and seizing new opportunities that were emerging in GRC to a greater extent than men. The study also revealed that the percent of women with either a Master's or Doctorate degree exceeds the percent of men in both practitioner and leadership roles. In leadership roles, 58% of women had advanced degrees versus 47% of men (Frost & Sullivan 2015). Based on the figures provided, it can be deduced that the security profession not only attracts, but requires individuals of high academic achievement. The report recommendation was that organizations promote the profession by supporting cybersecurity education in primary schools, offering internships, pairing new hires with mentors, and adapting compensation plans and training to better align with flexible working arrangements.

A Network of Contacts and Connections

Most seasoned industry professionals have built a network of contacts and connections. For those just entering the industry, finding a job or making contacts can seem a bit intimidating. There are ample opportunities for networking and industry contacts depending on the direction one wishes to take. In addition to in-field job leads there are additional careers that can be explored such as publishing and teaching. This quote from Yogi Bhajan touches on the value of writing and teaching: *“If you want to learn something, read about it. If you want to understand something, write about it. If you want to master something, teach it.”*

Sharing Industry Knowledge Through Teaching

Various venues are available for sharing industry knowledge through teaching. Many professionals enjoy teaching part-time while others take the plunge into a full-time position. Numerous colleges have open positions posted for faculty in information security programs. Community and technical colleges are more likely to accept part-time faculty without an extensive educational background. Public

institutions are often bound by accreditation requirements and may allow an industry professional to teach at one level lower than the highest degree held. For example, someone with a master's degree can teach at the bachelor level. Full-time educational employment usually means that the person is either working toward or already has an advanced degree such as a PhD. Private colleges are different in this respect. Many look for industry experience as opposed to educational background. One of the best elements of working in education is that more and more institutions are offering online programs. Teaching in online programs affords one a lot of flexibility as well as the opportunity to still work in the field. I spent several years teaching only online and really enjoyed being able to adjust my schedule at a moment's notice without affecting the classroom experience.

Publication Adds Credibility and Visibility

Publication is a way to add credibility and visibility to one's profile. Publication opportunities are varied and include books, journals, and white papers. Book publishers such as Jones & Bartlett Learning are always open to suggestions for technical books. This publisher in particular has quite a few security related books. Technical writing for publication is a bit different than writing a best seller. Contrary to popular belief, there is not a lot of money in technical book writing. For example, one Amazon reviewer believed that my book royalties were being used to pay for classes while I worked on my PhD. If only writing a technical book was that lucrative. Most people publish for the visibility, not the money. Advances are small and royalties usually aren't paid for several years.

That's not to say there isn't money to be made if you enjoy the solitude of spending your day researching and typing. In fact, a literary agent will procure writing contracts for you, usually for a percentage of the royalties. I have published work that is under a literary agent contract and some that is not. Most of the agent related work originated early on from an established agency partnership. Literary agencies such as Waterside Productions, Inc. serve non-fiction authors and publishers for print and digital media. Agents generally help keep the project on track, negotiate contract terms, and issue royalty payments.

Writing a book is an experience that may leave one ambivalent. It is great to see your name on the cover, but sometimes by the time you get there, you never want to repeat the experience. Book projects tend to be multi-author, allowing the book to get to market in a timely fashion. If all authors meet the deadlines, the project tends to go well. If an author does not meet deadlines or is unresponsive, the project doesn't go so well. When an author becomes unresponsive, the project falls behind and sometimes the contract has to be renegotiated. All book publisher websites have information on how to publish a book and some offer help as well as insight into writing a book. Elsevier SciTech Connect has a blog page titled "*What is it like to publish your first book?*".

In some instances, there is no payment at all to authors especially when it is part of a large project. Academic publishers such as IGI Global require the submission of a proposal form outlining the details of the book idea. The book proposal is reviewed and accepted, the submitting editor does a call for chapters, and then numerous authors respond to the call for chapters. Once your chapter is written, it is submitted, peer reviewed, revised, and then resubmitted. As an author, this type of project is good because once your final chapter is submitted, you are done with the project until the final publication is released. These publications are almost always marketed internationally, giving the author's work exposure to a wide audience. I just completed a chapter for *The Encyclopedia of Information Science and Technology*, 4th edition. This work is a 10-volume major reference work for which over 900 papers were submitted for publication.

Journal publication is less intensive than writing a book or book chapter. This type of publication tends to be a bit more academic. Most journal submissions are double-blind peer reviewed and the submission structure tends to be based on some type of research. Academic employment requires publication of this type simply because the work is reviewed by peers.

The last type of publication is a white paper. A white paper is a technical or business benefits document that introduces a current challenge, then makes a strong case why a particular approach to solving the challenge is preferred (Stelzner 2007). Generally, white papers describe a solution to a problem, but may also outline how to perform technical tasks or introduce a new concept.

White papers can be published on vendor websites, professional organization websites, or more formal location such as the Cornell University library. Publishing a white paper on a professional organization website may have other advantages. For example, if a Digital Forensic Certified Practitioner (DFCP) publishes a white paper and posts it to the DFCEB website, credit is given toward the member's recertification requirements.

Many Ways to Be Involved in Security Without a 9-5 Office Job

As one can see, there are many ways to be involved in the information security field and not all require working a regular 9 to 5 job. I do better in a position where it is not mandatory to spend 40 h in an office environment and there is a reasonable amount of flexibility. The career choices I made have allowed me to be successful in some of the more non-traditional, yet vital aspects of information security.

This last section contains a few final thoughts, followed by resources that are available to help those interested in pursuing interests in this ever expanding area of technology.

How to Increase the Number of Women in the Field

When we involve girls at an early age, they are more likely to pursue a career in the field. A key factor in predicting STEM career interest at the end of high school was interest at the start of high school. Early exposure to information security that sparks an interest in the field is often a precursor to a girl actually pursuing a career in the field (Corbett and Hill 2015).

Encouraging girls to enter and stay in the field, will help close the gender and employment gap in information security positions and help strengthen our country's cybersecurity posture.

Women stress the need to look beyond technical skills in the hiring process for information security jobs. Technical skills are an important part of the job, but technical skills alone are inadequate for resolving the complex risk management problems that leaders in information security face on a regular basis (Frost & Sullivan 2015).

The world of information security is vast and constantly changing. We have the power to make a difference not only for ourselves, but also for the women that will follow in our footsteps.

Resources for Women in the Field

Crystal Bedell, a freelance technology writer, posted these top resources for women in technology to the IT Job Cafe blog in September of 2015:

- Anita Borg Institute (ABI)—ABI seeks to help women in computing reach their career goals by providing opportunities to learn, network with other women and stay inspired
- The National Center for Women & Information Technology—NCWIT is a non-profit community that seeks to increase the number of women working in computing and technology
- Women Who Code—WWCode is a US-based non-profit dedicated to inspiring women to excel in technology careers
- Women in Technology International—WITI is a trade association for women who use technology in any job function, including finance, human resources, marketing, management, sales, and IT.
- TechWomen—TechWomen is an initiative of the U.S. Department of State's Bureau of Educational and Cultural Affairs to help strengthen relations between the U.S. and the Middle East and North Africa.
- STEMinist—STEMinist was created in 2010 by Ann Hoang to increase the visibility of women in the fields of science, technology, engineering and mathematics (STEM)

These resources were recommended on Forbes Tech Blog in March of 2016:

- SANS CyberTalent Immersion Academy for Women—This accelerated training and certification program offers women a fast track to top jobs in cybersecurity
- The Women’s Society of Cyberjutsu—(WSC) is a 501(c)3 non-profit passionate about helping and empowering women to succeed in the Cybersecurity field
- The Women in Cybersecurity Project—As part of New America’s Cybersecurity Initiative, the project brings together cybersecurity companies, government, and big thinkers to promote methods to bring women into the cybersecurity field
- Women in Cybersecurity—WiCyS—brings together women in cybersecurity from academia, research, and industry for sharing of knowledge, experience, networking and mentoring

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