SEI Podcasts

Conversations in Artificial Intelligence, Cybersecurity, and Software Engineering

The Importance of Diversity in Cybersecurity: Carol Ware

featuring Carol Ware as Interviewed by Palma Buttles Valdez

Welcome to the SEI Podcast Series, a production of the Carnegie Mellon University Software Engineering Institute. The SEI is a federally funded research and development center sponsored by the U.S. Department of Defense. A transcript of today's podcast is posted on the SEI website at sei.cmu.edu/podcasts.

Palma Buttles-Valdez: Welcome to the SEI Podcast Series, a production of Carnegie Mellon University Software Engineering Institute. My name is [Palma Buttles Valdez](), and I am the director of the SEI's Office of Diversity, Equity, and Inclusion. Joining me today is Carol Ware, a senior cybersecurity engineer in the SEI CERT division. Today, we are here to talk about Carol's experience and work in cybersecurity and the importance of diversity in this field. Welcome, Carol.

Carol Ware: Thank you, Palma. I am honored to be here.

Palma: I am so happy to have you today.

Carol: Me, too.

Palma: Since you are new to our podcast series, as am I, let's take an opportunity to introduce you to our audience by telling us a little bit about yourself and the work that you do at the SEI.

Carol: OK, thank you. Once again, thank you for having me. I am Carol Ware. I am currently a senior cybersecurity engineer at the SEI. I actually support a team at the federal government for cybersecurity assessments. I love what I do. I love the SEI. It's a very good experience for me. And some of my background—I have been in IT since I finished college in the early 90s. Well, I shouldn't say that, but I started off as a developer, actually. IT has been my foundation since the beginning of my career. It was kind of like a natural progression for me to go from development to project management and now to cybersecurity. For me, it was just a good fit. It was the missing piece to the puzzle. I enjoy what I do, and I am just happy to be able to represent the SEI today.

Palma: Thank you. Well, what is the best part of your job at the SEI?

Carol: There is a lot. The best part, I think, is just the variety of projects and tasks that go on. Like I said, I am heading a team of people for a training program for people to become certified and doing assessments for a federal agency. But, I do enjoy just seeing all of the other projects that go on at the SEI and being able to be involved in them as well. I think for anyone, if you have a variety of things that you can do at a job, it keeps it interesting. You are constantly learning something new. You are constantly pitching in and helping with projects and that's what I really like. Especially the people who have been here for a while, just being a mentee to some of them and hearing about how things got started. It is just a good fit for me and a good place to be right now.

Palma: Before we dig deeper on the importance of diversity in cybersecurity, I would like to learn a little bit more about your early influences. We all have someone who inspired us or helped us to visualize ourselves in the field of STEM. Do you have someone or someone that helped you? What did they do in particular? Because I always like to talk about the actions that they did so others can replicate those as well.

Carol: My influences, I would have to say, are mom and dad and, actually, my faith. As far as my work ethic, I get it from mom and dad. Growing up a '70s child, my parents, mom worked at the school that we went to, and then she sold Avon. Dad worked for the federal government. Then he actually drove taxicabs, and that was in Pennsylvania. But they did what they had to do to support four children. Just seeing them always humble and steadfast and doing a good job at what they did, it was my foundation, basically, and helped me know that I could do whatever I wanted to. I just had to make sure I maintained a good work ethic. Getting into cybersecurity, getting into STEM,

and even majoring in computer science in college was just a part of me saying, *I can do whatever I want as long as I work hard, as long as I study in school. I stay humble and just try to do a good job*. Those are some of my foundations.

Palma: You are now working in cybersecurity. You said you were in IT. What drew you to work in cybersecurity in particular?

Carol: Well, I started out as a contractor for one of the high-tech companies, maybe almost 20 years ago now. They wanted me to come in and help write policies, because they were starting to deal with the federal government, and they wanted to make sure they were securing their data. They told me about this thing, this NIST 800-53 Revision 1, and they said, *We want you to write policy*, because they were actually using an ISO, and at that time, it was 17799. They wanted to write to have a policy based on the guidance in NIST 800-53 and the ISO 17799. As I started writing it, I said, *This is kind of interesting*. Like I said, the missing piece to what I was looking for, something that I was comfortable with. I was able to get my rhythm. I was able to fall back on all of my IT experience and bring it forward in cybersecurity. Like I said, it was almost a natural progression. Starting off with the policies, learning about something that is still used today and is like one of the standards for cybersecurity, the NIST 800-53, it just developed my skills even more, made me go further into being an information system security officer, and working with FedRAMP, and doing things like that, mainly on the compliance side. It was just a good fit for me and comfortable, and it still is today.

Palma: Sounds like you were in cybersecurity in it is early years.

Carol: Yes.

Palma: Yes. I would imagine you had an opportunity to influence other women to see that as a career option as well. Do you have any stories that you could share with us about that?

Carol: Yes, I have met several young people who are getting into the field and not really knowing where they want to be. I think some of the advice that I have always given people is to find what is comfortable for you. Some people might want to be a penetration tester, and someone else might want to write policy. You have to go with your background, what you are used to, what you are comfortable with, and try to figure out where you fit in with cybersecurity. As always, there is always something new to learn, so I always

encourage to just keep up on what is coming out. AI is the buzz now, but just always try to maintain your ear to the ground and what is coming in and what is new. Also, encouraging my young counterparts to just volunteer for different projects at your job, even if it is not something that you are doing, if you have an interest in it, just ask, *Can I do a task for this project just to learn about it?* That helps you set a path as to where you are going to go from there.

Carol: Great advice.

Palma: OK, we are going to switch gears a little bit and talk about cybersecurity and diversity. According to the [2023 ISC^2 Cybersecurity Workforce Study](#), 69 percent of the cybersecurity professionals surveyed said that an inclusive environment is essential for their team to succeed. Yet, that same study found that in the under-30 demographic, women represent only 26 percent of the workforce. Can we talk a little bit about the importance of gender equality in the workforce, in particular in the cybersecurity workforce?

Carol: I just say women bring a new perspective on cybersecurity on the workforce. I believe women under 30 who are not seeking to be included in cybersecurity may think that cybersecurity is a man's task, may think that they don't have the education or the experience to come into a cybersecurity workforce. But, I beg to differ. It is open to women. It is open to women under 30 and women way over 30, because I still say you can home in on the experience and the skills and the education that you have had and apply it to cybersecurity. The field is wide open. You can work on firewalls, you can configure firewalls, or you can actually do some training in cybersecurity. It' is wide open, and I hope the future brings a chance to lessen that gap of women under 30 and over 30 not in the workforce for cybersecurity. I hope we can close that gap as the years go by.

Palma: I agree completely.

Carol: Thank you.

Palma: The same study by ISC2 also found that 43 percent among those surveyed identified as being nonwhite. So how does ethnicity or cultural diversity impact the field of cybersecurity?

Carol: Once again, I think if it is not marketed in certain communities by certain ethnicities, people won't know that they could be involved in

cybersecurity. I think working with different universities and colleges, seeking out people who maybe are math majors and don't really know what they want to do with it. I think seeking out people who are even business analysts, and they are analyzing systems, but let them know they can come into cybersecurity with their experience. I do hope that we still work towards closing that gap for the people who are not of certain diversity groups, that they can come into cybersecurity and bring their experience.

Palma: Carol, early on, you mentioned about making connections in IT because you started out—you are a computer scientist who started out in the IT field—but you were able to make those connections. So maybe, organizations can do something, working with the colleges, or even high schools, that will help to help the students see that, *I can be that even with a background, not necessarily in computer science*. Do you have some suggestions that other things that organizations can do to address this gap specifically? It can be women in cybersecurity, or it could be just diversity in general in cybersecurity.

Carol: I think it is sort of what we're doing now at the SEI: having you as our director of DE&I. I think having women of color see someone like you and me represent an organization and know that, *Hey, I can be involved. She is here, so that means there is a door open, and I can be involved as well*. I think the SEI has a good plan in place, just with the office that we have, with you running it, and actually participating in different conferences. I always think it is a good idea to seek out candidates who are at the HBCUs [Historical Black Colleges and Universities], not just the Ivy League schools, but also look for people who are active in your community. I think someone who has a strong work ethic and enjoys serving. I think it's more than the academic sometimes to kind of come into a field. You have to have those soft skills or social skills, as well, to come in and find where you belong in cybersecurity. But I think, so far, the SEI is doing a great job, and I commend you for what you do.

Palma: Thank you. Well, you are my partner in this. I work for all of the SEI. I work for you, and you are a partner in here. You brought up a topic about students and then some of the conferences that we go to. When I go to conferences, I often have students come to me and say, *Oh, I could never do this. I went to community college*. The pathways to get there—I want to be able to tell students that it doesn't matter if you went to community college, or you got a GED and then you went to community college, or you didn't go to an Ivy League school. What would you say in a conference or say to someone in the audience who is considering this as a field, and maybe they don't have a traditional path, maybe their parents both worked. They could have been—

and they, too helped their family business. What would you say to students like that, that would like to pursue a career in cybersecurity?

Carol: Yes, I just think the world we live in now, for the younger generation, they have so many options. Even if you go to a community college, you are still learning the basics. It is not that you have to start out as a cybersecurity professional in order to get into the cybersecurity field. I really think you can take what you know, what you are good at. What if you are a writer, and you enjoy writing, there is something for you to do in cybersecurity. You can be a technical writer. I work with one of the greatest persons I know in cybersecurity, and she is one of our technical writers. There is so much that you can do. I think going out and talking to different people, you just want to have somebody who kind of has been there and done that before. I think when I started out and I started hearing about computers, I just said, *I want to learn about computers*. I didn't know what I wanted to learn, but it was when Apple was coming out with their new whatever they were at those times. That is how I got into the field, because I said, *I know, I want to know about it*. I think if you have an interest on doing something different or you just don't know where you want to go, you just have to have an attitude that, *I can do anything I want*, but you can also just put some feelers out there to see what is there and what works for you and which field you need to be in. I would definitely encourage them to just seek out a field that they are comfortable with. If it is writing, see what you can do in cybersecurity to write. That is what I would encourage them to do, for sure.

Palma: We talked a little bit about students, and then we will circle back to women in cybersecurity. Much of the advice that you gave applies to women of all ages. We have young girls pursuing STEM [science, technology, engineering, and mathematics]. We have women changing careers and cybersecurity is a career for women of all ages. Do you have any advice that you could share with us there?

Carol: The same thing. Just, whatever you are good at already. Even if you are going on an interview, I always say an interview, you are interviewing the company just as much as they are interviewing you. You want to find out what they have to offer that aligns with your education, your background, your experience, to make sure that you follow a path that you are unsure of, but you know you want to do something. Just make sure that the company offers something that aligns with what you have and where you see yourself in five or ten years. I just say, try it. Go to the career fairs and talk to different organizations. Look online at different websites and find out what people are offering. Just be your own advocate and make sure that you are trying to

tailor your career based on what it is you want to do. Because, more than likely, starting out or starting over, you want to do something that you are pleased with. You want to have a job that you are happy to go to, that you are making a contribution to. Just do the legwork and find out where you should be.

Palma: You have had a career in industry, and now you are working in a [federally funded research and development center [FFRDC]](), which is what the SEI is. I am often letting folks know that this is a career opportunity for you to go into the federal workspace. How does it feel transitioning into an FFRDC and into that world and that fabulous impact that we make on our country and our women and men in uniform?

Carol: It means everything. I have actually been in industry. I have been in the federal government. I have been a federal worker, and now I am here at the FFRDC. I love the combination of academia, and—I guess we are not contractors—but supporting government agencies. I love the combination of that. I love that the SEI was known as the birthplace of cybersecurity back in the 80s. I knew that story before I even thought about working at SEI. I love that we are responsible for CMMI and CMMC and other things. It has been a very good transition for me. I am on, not the tail end, but I am getting closer to thinking about retirement, and I think it was a good move for me to come here for that. Not just the opportunities I have to take courses, but the [blogs]() that come out that I can read, [and] the people that I work with that are doing interesting things. I just met a young man who was in Mozambique a couple of weeks ago, and he told me about his travels and what he was there to accomplish. I think the SEI offers very good opportunities for people to just come in and find where you need to be—early in your career or at the tail end of your career as well.

Palma: Well, great. Carol, you mentioned about the importance of keeping informed and keeping your ear to the ground. Can you give us some examples that you could share with us today and for our listeners or watchers about how you might go about doing that?

Carol: Sure, this might sound kind of nerdy, but I go to publications like *Cybersecurity Magazine*. I read the blogs that we have on SEI. On our website, we have blogs about new technologies and known vulnerabilities. I think there is always something that you can read up on just to keep up on what is new, what is coming, what is happening, how things were fixed. Just so if you find yourself in a room around a water cooler, you can talk about some of these occurrences that happen in cybersecurity. Just always keep your ear to

the ground, even if it is going to seminars and talking with different organizations, seeing how AI is going to eventually change or have input in cybersecurity as well. Just always stay informed as much as you can.

Palma: Great. Thank you. Carol, you mentioned you had an opportunity to be a mentor before. What advice would you give to others that could be a mentor or a mentee?

Carol: Well, as a seasoned cybersecurity professional, I think it is my role to be a mentor to women coming in from a different workforce or women coming in, younger women, coming out of school. I think we should be more role models. I think women coming into cybersecurity should see another woman as a professional, as someone who has a good work ethic, someone who is humble, and someone who gets the job done. I think it is important, too, because this field is so wide open, because there are so many varied jobs you can do under cybersecurity, you want young women and women who are changing careers to be able to look to you to say, *That is what I want to do, and that's how I want to be*. I think as a seasoned professional, it is our job. I know the younger generations don't really ask for help. I mean, they are more self-sufficient than I was at that age. But, I believe that if we just show them a strong force, a strong work ethic, someone who is not keeping up a lot of mess at the office, but just doing their job and helping people get their jobs done and being fair and open and honest, I think that would build, and that would certainly close the gap of the women, the inequality of gender in cybersecurity. I think it is my goal to always try to be a role model, even if not asked, but just let them see a professional woman, a professional woman of a different race, of a different ethnicity, and just let them pattern their work based on who I am. I feel strongly about that.

Palma: That is also a recipe for inclusion. If people would just follow your advice that creates that more inclusive environment for women or anybody that is part of a marginalized community to thrive.

Carol: Yes, I agree with that.

Palma: I know you also attended the [WiCyS Conference](#) as well to mentor women that are coming up. I know that is an option as well. The SEI partners with WiCyS [Women in Cybersecurity].

Carol: Yes, it was a good time. We were in Denver. We had a very good time. It was good to see so many women and it was very empowering. Somebody asked me how did I enjoy it, and I said it was just wonderful being around

several thousand women who were focused on cybersecurity. There were men there also, but it was just an opportunity to hear keynote speakers who were women in the field, and it just gave me a sense of pride and gave me a sense of community by being with women in the same field. So, those are also good things to do as well.

Palma: Great. You and I will be together at the [National Society of Black Engineers conference](#) in March in Atlanta, Georgia. If anyone that is watching today, they could check out our booth where we will be recruiting for employees. Come and meet our fabulous cybersecurity specialist, Carol Ware. Thank you, Carol, for talking to us today.

Carol: Thank you.

Palma: We will include links in the transcript to resources mentioned in today's podcast. Finally, a reminder to our audience that our podcasts are available every place you download podcasts as well as the SEI's YouTube channel. If you like what you see, and what you heard today, please give us a thumbs up. Thank you.

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