



Women in Software and Cybersecurity: Eileen Wrubel

featuring Eileen Wrubel as Interviewed by Suzanne Miller

Suzanne Miller: Welcome to the SEI Podcast Series, a production of Carnegie Mellon University's Software Engineering Institute. The SEI is a federally funded research and development center, sponsored by the U.S. Department of Defense and operated by Carnegie Mellon University. A copy of today's podcast can be found at sei.cmu.edu/podcasts.

My name is [Suzanne Miller](#). I am a principal researcher here in the Agile-in-Government team of the SEI, and I am here to interview [Eileen Wrubel](#) as a part of our Women in Software and Cybersecurity series. In addition to everything else, Eileen Wrubel is actually my boss, so we know each other a little bit more than I might know some of the other people we interview, so I want to welcome you, Eileen, and thank you for doing this interview, because we always learn things about our colleagues when we do stuff like this, so it will be fun.

You and I share something. We both are what we call military brats. Both of our fathers were in the Air Force and moved us all around with them. That creates a childhood that is a little different than what it might be for somebody who grew up in one place. So, let's talk about your childhood and what kinds of things do you think contributed to where you are today and how you look at the world.

Eileen Wrubel: As a military brat one of the places I lived was West Berlin in the mid '80s. That was a pretty interesting time to be alive and a pretty interesting place to live. I went to three second grades and two third grades and two fifth grades. My education was a little disjointed. We have talked about in the past how you go to one school, and they have already done that, and you go to another school and you sort of miss a unit.

That really created some challenges for me as a kid when it came to learning math, in particular. You get to one school and they teach things differently, and they are at a different place, so you sort of miss or speed through some of the mechanics. Not having sort of a steady foundation in math ed, I think, clobbered my self-esteem for a while, and it hampered how I approached mathematical problem solving.

SEI Podcast Series

Suzanne: OK, you go from clobbered math self-esteem to working in software at the Software Engineering Institute. What made the difference for you in making that something that was even possible in your mind?

Eileen: There are a couple pieces to this story. But in high school I was part of the [Air Force Junior ROTC Program](#). Because of my involvement in that, I was eligible for, competed for, and won a four-year, type-one ROTC scholarship. That meant at the time it was four years of the full tuition and books and a stipend. That was great. They tailor the major fields of study that are available for the scholarship recipients to meet the needs of the Air Force.

I was looking at a list of things like nursing and meteorology, various kinds of engineering, computer science and math. All through high school, I was a gifted student. I was in all the advanced classes. I always just had this dogged block about how maybe I just wasn't a math person, because I look at my friend Charlie and think, *Wow, it just comes so much easier to him. Here I am just hanging on by my fingernails.*

I had a talk with my high school calculus teacher, Mr. G., and I said, *Here is the thing, I have this really incredible opportunity to go to college fully funded in a STEM field. I just don't know that I can hack the math.* He looked at me and basically said, *You get in your own way. You are perfectly capable. You can do the work. You keep up with everybody. You have just convinced yourself that you can't. So, stop complaining. Don't talk to me about this again.* I thought, *OK, well, the Air Force says I can do it, and Mr. G. says I can do it. Maybe I ought to let go of this idea that I'm just not born to be a math person.*

So, I went to Carnegie Mellon. I studied applied math. Then, when I got out of school, the Air Force had commissioned a lot of lieutenants that year and was supportive of opportunities to take your commission into the guard or reserves, take educational delays. I found a national guard unit and went off and looked for a civilian job. I talked to a little software company that recruited at just a few schools. They said, *We love mathematicians because you can do anything.* It turns out the software was all about applying operations research techniques to strategic, tactical, and real-time challenges in moving ground freight and positioning vehicles and drivers. That is how I wound up in software, sort of this windy, windy kind of path.

Suzanne: You are typical of people that I talk to—male, female, doesn't matter—about, *I got here not by doing what would be the expected. I did math problems in my head and, I was in this math competition, that competition.* I am the same way. I think a lot of us came at this from places...I know, somebody, more than one person, that actually came out of this after having music education and working in the music field.



SEI Podcast Series

The thing that I am drawn to is that we all have barriers that many times we put on ourselves. How do you get past that today? Because I know for myself that doesn't stop. Just because you say, *Get over that*. It doesn't stop. How do you get through that? What kind of obstacles did you have to overcome along the way? How did you build that confidence that you have today?

Eileen: We deal a lot with things like even unconscious bias in the workplace. It doesn't matter how confident we are sometimes, if someone else's unconscious perception puts us aside. One of the things that has really helped me over the years, and looking back now on a 20-year career, you can get a much more objective view of these kinds of things. But one of the things that really helped me along the way is having really strong mentors. Like I said, I didn't really appreciate how valuable professional and personal mentors were when I was younger.

But the things that you learn from somebody else's experience and from facing a challenge and thinking about, *How would somebody I admire and respect approach this problem?* Those kinds of things have helped me out a lot. And trying to sit back and think, *I'm at the table, so I know I deserve a seat at the table. So, I need to take away all those niggling voices that say are you sure you belong here? Maybe you don't belong here.* But really having those professional relationships where I am able to bounce ideas off of people and watch how others have sort of navigated these paths has really been tremendously helpful.

Suzanne: So that is actually a very actionable thing—actually actionable—thing that others can take away from this, is that if you don't already have them, find those mentors that can help you. When we first talked about the idea of mentorship, my initial reaction is, *Gee, I don't really have mentors*. But when I thought about it more deeply, it was like, *Well, there was this person and that person, and they guided me in these different situations*. Mentors are not always declared, I guess, is the thing I would say. I think many of us don't always think about where were our mentoring kinds of episodes. Is that true for you as well?

Eileen: Yes, absolutely. Mentoring is kind of...there are behaviors and there are relationships. And I'm certain there are people who have watched this and say, *OK, I can see myself in this conversation*. But I am sure that there are people that I view as part of my personal board of advisors who might be surprised to know that I think of them in that way. Like you said, sometimes it is something that happens in a defining moment and you think, *I am going to package that up, and I am going to pocket it, and I'm going to keep that with me. That is a lesson that is going to be with me for my career*. Sometimes it is really, over the course of a relationship, watching how someone's perspective is applied to problems and applied to obstacles.



SEI Podcast Series

I think it takes a lot of different forms. Knowing how important I think this is now, I have not been as strategic about seeking out those opportunities to both give and receive as I probably should have been certainly earlier in my career. I am trying to be better about that.

Suzanne: You have got a few decades ahead of you, so it's not too late. All right, let's move forward to the present. You are the lead of the [Continuing Lifecycle Solutions Initiative](#), and we work together in that arena. I know at least one of the really cool things you get to do. You are very active within our academic and SEI communities. You are actually the reason that this podcast series was started. Tell me a little bit about why did you see a need for a series about women in software and cybersecurity?

Eileen: I have spent my whole career, as I know you have, in male dominated spaces. And we joke, you joke that you can count. You go to a senior level meeting, and you can see the gender representation and diversity, and we all know that representation matters. Where it's sort of an inflection point in the industry, still something like 14 percent of engineers are women. But the [incoming computer science class at Carnegie Mellon this year is either gender balanced or tipped slightly towards women](#).

[Women still leaves these careers at a rate that's 45 or 50 percent higher than men](#). I feel we are at a tipping point where we are trying to bring more women into these careers so that we have that diversity of representation, but we're not there yet. We need to make that a trend. I'm at a point in my life where I have the luxury of looking back a little, and I have two daughters. So, all of this sort of combined. I started thinking as part of more collaboration in our professional community and across the SEI and working on these podcasts. I have been meeting a lot of really fabulous people both inside and outside the SEI. This was an opportunity to really explore how women are approaching these careers.

Suzanne: What's the coolest thing you get to do in your current role? Let's motivate some women to sort of stay in software long enough to get to where you are at.

Eileen: My favorite thing about what we do is... We talk a lot about how it's so socio technical and culturally dependent. It's not just enough to write good software if you don't know why you're writing it, and if everybody who's involved is not on the same train. And, so, over the course of our work, A, we put together a great team of personalities, people who are...

Suzanne: Oh, we're personalities all right.

Eileen: We are curious and hungry and committed and compassionate. And then we built this extensive professional collaborators network, where folks from across the industry—Department of Defense, the federal government, whatever—where we get together and talk about the problems and the challenges we're facing, the ideas that we have, what we see coming down the



SEI Podcast Series

road. Being able to get insight from so many different people in so many different settings, so many different angles on these problems is really enriching. Then when we have our annual [Agile colloquium](#) every year, which is a small group where we roll up our sleeves and really go to town about what has happened in the last year and what were our influences and what changes do we want to see and how can we work together regardless of are we in the government, are we at a university. I love doing that so much. I absolutely love the opportunity to collaborate with so many people who view that collaboration as an asset.

Suzanne: That's right. Let's talk a little bit more about the socio-technical aspects of software. One of the things that we have talked about is we don't need all software engineers to build good software. One of the things that I look for is people that have that ability to communicate, the ability to translate. An ability to translate between the technical and the business or operations is one of the hardest skills to find and one of the most valuable in building software systems.

What would you say to younger women who are making decisions that go well, *That's not me. I don't do math, I don't write software*. How can they be involved in software and cybersecurity? What are paths that they might want to take that you would recommend?

Eileen: There is a joke that, I don't even remember where I first saw it, it says, *Science will teach you how to clone dinosaurs, but the liberal arts will teach you why that might not be the best idea*. I have had talks with other women as a part of this series, and I think we have talked about this a lot recently, the idea that technology enables even those liberal arts pursuits, and liberal arts pursuits enable technology. The thing isn't to think, *Well, I need to go get STEM smart, because that's what I'm supposed to do*. But really think about do you have a potential to shape or to make demands on technology.

My teenage daughter is a huge history buff. She is very into public policy and politics. She worked on her first series of political campaigns this year. She got really good insight into how do we use technology and how do we use data science to understand things about voters or to manage canvassing or to understand the impacts of policy choices.

She is on a path that is completely different from, say, my youngest, who is into genetics and physics and chemistry and using all sorts of fun little tools to model chemical reactions and everything. Our liberal arts and our—I almost don't like to call them—but our soft skills have to meet our technical skills in order to enrich the world.

Suzanne: So, one of my mentors is known for saying, *The soft stuff is the hard stuff*.

Eileen: Yes, that's very true.



SEI Podcast Series

Suzanne: At least once a week I am reminded of that when I'm out working with clients. We all have had challenging moments in our careers. Is there any one that you would want to share that might be able to help others that are going through kind of the challenging moments in their careers and making decisions. As you said, many women decide to pull out of the tech industry. What is something you would say helped you to get past that?

Eileen: I have a classic story along those lines. When I was pregnant with my first daughter. It was 2002, so we were still doing the post 9/11 economy. I was maybe six months pregnant when I was laid off from my job as part of a large layoff at a tech firm. That is not a fun situation to be in when you are in your 20s. This is when I really started understanding the value of mentorship and networking. The gentleman who had been my boss at this job moved onto somewhere else and was able to sort of... When another opening appeared there, he was able to sort of see what that job needed that I had. It wasn't somewhere I would have thought to go looking. Having somebody who knows you and can say, *Hey, you might want to...*

Suzanne: *This is a match.*

Eileen: *This is a match. You might want to go look at these places. You might want to explore these things that didn't come to you initially.* Having that extra perspective was really a game changer for me. My husband and I were a dual career family. We had long thought about sort of strategically stepping in and out, so that we're as a family strategically focusing on one career at a time.

After a few years at the SEI, I said, *OK, I am going to step back now. I am going to go stay at home, and I am going to reevaluate the work force in a few years.* My manager said, *Well, you might not know this, but we have a history of people sort of moving in and out, stepping in and out, going various degrees of fulltime and part time.* I was able to turn that situation from an exit of the workforce into a little bit of consulting here and there that ultimately led to viable, engaging part-time technical work in my field.

Then, when I was ready to come back to work fulltime, when we were ready to shift our strategic focus as a family, I had remained integrated into all of these networks and had kept my skills and my interests current in our field. It was a relatively smooth transition back into the full-time world. I mention that because I think it is unique about the SEI, being that we have the academic heritage at the university. Those opportunities... I don't think they exist enough. But I also don't think they're as readily apparent to women to ask for...

Suzanne: Even if they are not visible, they might still be there. I will also say, just on the other side, that is when I met you, was when you were in your part-time stage. And having contact with somebody in a—You are not there all the time, of course, none of us is. We travel too



SEI Podcast Series

much—but having contact with you there when you wanted to come back in, I’m not the only one. You know, there was a whole network of people that you had maintained relationships with. That’s the thing I would say. Exiting it reduces your ability to maintain those relationships, where reducing time is another way that you can maybe keep the relationship so you can come back in when you are ready to do more. That is another takeaway.

Eileen: Yes. Managing those relationships through career changes or changes in the season you are in in life is so important.

Suzanne: I agree with that. I want to know something I don’t know about you that doesn’t relate to work because we are not just workers; we are people. Tell me something interesting about what you do outside of work. OK, it can be something I already know, but they’re not going to know.

Eileen: OK, so I will tell you something interesting about me that’s really unusual, and then I’ll tell you something that lots of people don’t know about me, that is less unusual. One of my wedding photos appears on a greeting card in Poland.

Suzanne: I didn’t know that.

Eileen: The photographer who shot our wedding provided all the negatives to us but retained copyright for publication. One of the photos was published in a photography series, and we have a copy of the book. We also discovered that it was on a lovey dovey greeting in Poland for a few years. That was fun.

Then another thing about me, I am an avid runner. When my husband I vacation, often there is a marathon attached to it. Then, we can sort of say, *Well, but look, we are doing hard work.* We love to travel anyway, but I love to run. I have done a handful of marathons and a pile of half marathons, and that really helps me get my head space cleared out on a regular basis.

Suzanne: We have talked about the fact that when you are in these very intense kinds of career fields, whatever it is, whether it’s running—I go do weird camping every year—other people go to the coast of Maine and disconnect. You have got to have some way of balancing that intensity with letting your brain rest a little bit or at least have something else taking over your brain for a while. Endorphins when you are running is a choice that a lot of people may not think of, but is one that I know has worked for you, because if you don’t run for too long, you are not as happy.

Eileen: I’m not as happy.

Suzanne: We don’t want that. We don’t want that. Advice that you would give to people that are thinking about a tech career and a software and a cybersecurity career that may not be sort of



SEI Podcast Series

what you would call the typical advice that you will hear from everybody else, what would you add to that list of things that people hear?

Eileen: Be constantly curious. It can be easy to get good at something and stay good at that one thing and watch the world pass you by. So, constantly staying curious, A, I think helps people stay more fully engaged, but it also ensures that you're going to have lots of long terms options. And you're going to be fun to work with because you always want to learn new things and you're always bringing new things to the table.

My other thing is, I can't stress enough, the importance of actively seeking out mentors. Those don't have to be people that are going to spend a ton of time with you, but really looking around your professional settings, volunteer work that you do, and seeing who has lessons that you think you really want to hang on to that you can build long-term relationships with. Those two things really matter.

Suzanne: OK. One of the challenges in our industry is staying current, you're talking about being curious. So, how do you decide where to put that curiosity, where to put your focus when you're trying to keep up with everything that is going on in our world.

Eileen: Filter, filter, filter. It is hard. There is this influx of information, this deluge. Things are always happening, and you can't keep up with all of it. You can't pay attention to everything. I had to let that go a long time ago.

Suzanne: And not all of it is worth paying attention to.

Eileen: That is true.

Suzanne: That is one of the things that I think is really hard about this is it's as valuable to know what to let go of and not finish even sometimes, as it is to find the good stuff.

Eileen: Right, to keep the signal-to-noise ratio really, really high. This is a space again where I looked at my colleagues and I look to the people I look up to and I think about, *What are they reading? What are they bringing to the table?* There are things I pay attention to on a regular basis, [Jez Humble's Twitter feed](#). I read [Jennifer Pahlka's blog](#). [LinkedIn](#) is really useful for this because I can see not only what people are reading, what they're commenting on, but a lot of our collaborators and friends are also publishing in various ways their experiences.

Being able to pull things out of experience reports that go with trends in industry and everything else, being able to sort of assemble those things into a meaningful space in my head is useful. But I really rely on my network of colleagues and mentors as a filtering function. If you walked into my office and said, *I read this book, and I think you really need to read it because it's going to change your perspective on what we're doing with X*. I am going to prioritize that and put it up



SEI Podcast Series

at the top of my stack. Likewise, if I need to know, *Hey I want to get smart about this, or write about this problem over here*, I can ask the people that are in my network, *What is the thing I should read on that?* I kind of know who to go to to ask those questions. Then you don't have to filter through as much of the chaff to get at the really good stuff.

Suzanne: You know something else that I do that is kind of weird, I realize, is when I go into somebody's office, I look at their bookshelf. I look at what are the books on their bookshelf that I haven't read that might be useful. I can ask them about it. Most of the time they have read it and they can either tell me, *Oh, it's trash or not*. There are some things that are actually much more physical, like, than what I have in my Kindle reading list per se.

Yes, I struggle with that too. The filtering... I think we all do the same thing, if somebody I know and respect says, *This is something important*, then I am more likely to go ahead and make the time to read that than if it's just something random that comes across in the recommended reading. *Because you read X, you might like Y*. That is something for people to pay attention to.

Eileen: Last year at our Agile Colloquium we did a round table where we said, *What's on your bookshelf now? What are you reading now?* We were able to have conversations with folks as we are putting up our stickies about what we are reading. That was a lot of fun. But I also try to reach out when I am asking people to come speak at events or come to a meeting where they are something they're keynoting or they're featured speaker or someone people would be curious about, I always ask them if they can be prepared to say, *What am I reading right now* or, *What two things would you recommend that people read?* That's just a useful way to keep building that mental list.

Suzanne: Of course, in today's world read is not just with your eyes, right? You've been working on me to get more into the podcast world.

Eileen: Podcast, yes.

Suzanne: I film them, but do I listen to them? Not so much. But that is another vehicle that we have for a lot of technical content out there. I'm amazed at how much content is there, either through YouTube videos or just through audio podcasts.

Eileen: If you are going to be commuting, podcasts are a really good way to get smart while you are a captive audience.

Suzanne: Yes, I know, so you say. I'll get there. All right, I do want to thank you for joining us today. I always learn new things when I talk to you. I am very, very grateful that you started this series and very happy that we got a chance to talk together like this.



SEI Podcast Series

For our viewers, this podcast is available in many places now. And you can find it on [Stitcher](#), [SoundCloud](#), and [Apple Podcasts](#). If you can't find us there, then it's always going to be at sei.cmu.edu/podcasts. In addition, if you have any questions for us, please don't hesitate to email us at info@sei.cmu.edu. Thank you very much for viewing.