



## Women in Software and Cybersecurity: Dr. Lorrie Cranor

*featuring Dr. Lorrie Cranor as Interviewed by Summer Craze Fowler*

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**Summer Craze Fowler:** 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 and operated by Carnegie Mellon University. A transcript of today's podcast is posted on the SEI website at [sei.cmu.edu/podcasts](http://sei.cmu.edu/podcasts).

My name is [Summer Craze Fowler](#), and I am the technical director of Cybersecurity Risk and Resilience in the [SEI's CERT Division](#). This is the latest installment in our series of podcasts highlighting the work of women in software and cybersecurity.

Today, I am pleased to sit down with [Dr. Lorrie Cranor](#), who does so many amazing things at Carnegie Mellon University and throughout Pittsburgh. Dr. Cranor is a professor of computer science and engineering and public policy at Carnegie Mellon University, where she is director of the [CyLab Usable Privacy and Security Laboratory, also called CUPS](#). She is also associate department head of the Engineering and Public Policy Department and co-director of the [MSIT Privacy Engineering master's program](#). In 2016, she served as chief technologist at the U.S. Federal Trade Commission in Washington, D.C. And Dr. Cranor is also a cofounder of [Wombat Security Technologies, Inc., a security awareness training company](#).

Welcome, Dr. Cranor.

**Dr. Lorrie Cranor:** Thank you.

**Fowler:** OK, we have listed a number of impressive titles, but I want to dig a little deeper here. Tell us about your work in privacy and security and public policy. What do you do every day?

**Cranor:** My focus is on the human side of security and privacy. I do research in this area, and I teach and advise students at Carnegie Mellon in this area. A couple years ago, I actually took a year off from CMU and spent a year in Washington, D.C. at the Federal Trade Commission as the chief technologist.



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**Fowler:** That is great. Can you tell us a little bit more about that opportunity and what you were able to bring back to the university from that?

**Cranor:** It was an amazing opportunity. I was working directly for the chairwoman of the FTC and so got a lot of insights into how the policymaking actually happens. I was also in some inter-governmental agency working groups, so I got some insights into other agencies. In particular, since privacy is my main area of interest, I got to see what the FTC can and cannot do with respect to privacy given the current framework that Congress has given them.

**Fowler:** That is fantastic. Sometimes when I go home at the end of a day, I struggle to explain to my family what I do on a daily basis. Can you tell the folks who are listening, what does a typical day look like for you now that you are back at the university?

**Cranor:** Oh, well, my kids think all I do is answer email all day, which is close. No, I spend some time preparing for classes. I teach. I have meetings with students. My favorite thing is the research project meetings. I am on a number of large, collaborative research projects with a bunch of faculty and students, and we are focusing on the human side of security and privacy.

I love discussing the studies that we are trying to figure out how to do. We may be looking at how people use password managers or how people read privacy policies. We spend a lot of time on the details of...if we tell people we are interested in security, they are going to try to behave like good little security citizens, right?

We need to figure out how to do the study in a way that they are not biased, and they are not just going to tell us what they think we want to hear. I really enjoy those sessions of trying to figure how to do this.

**Fowler:** Bringing reality to cybersecurity. You mentioned your kids. I want to go back to your childhood. I know that you play soccer with a group of women here in Pittsburgh. When you were a kid, were you playing soccer? Were you doing math problems in your head? What is it that got you on this path into cybersecurity and privacy?

**Cranor:** I was not playing soccer. I tried it once as a kid and hated it. It took me a long time to come back to that. I was doing a lot of math problems. When I was in elementary school, my school got a computer. It was a [Commodore PET](#), and none of the teachers knew how to use it. My dad was a biomedical engineer, and he knew how to use computers. He showed me how to use it. During my lunch periods, I would go to the office where the computer was and figure out what to do with it.

**Fowler:** That is pretty neat. My first computer was also a [Commodore 64](#). The most exciting thing I can do with it was change the color of the font. I will never forget that.



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**Cranor:** This one did not have colors, so I could not even do that.

**Fowler:** Wow. So you had your dad as someone who helped you along the way. But did you have any other mentors who helped shape the path for where you are?

**Fowler:** Yes, so my dad, also my mom. My mom recently retired as a math professor and a college administrator. So great, great role models there. I think I have had role models throughout my career. In graduate school, my Ph.D. advisor was a tremendous mentor to me. Then I think at each place where I have worked, there have been colleagues who have become mentors to me.

**Fowler:** Absolutely. So now you have shifted, I am sure, in where you are not the mentee all the time but you are mentoring other people. So what have you taken away from those mentors that you emulate when you mentor students today?

**Cranor:** I think a big thing is to really listen to them and to hear where they are coming from and what their concerns are, and then trying to both be supportive but also giving them the bad news. Trying to tell them the things they don't necessarily want to hear but need to hear but also trying to be very supportive of what they want to do.

**Fowler:** So those are the roadblocks for them. What roadblocks did you maybe stumble into when someone gave you the news that you didn't want to hear? And how did you overcome those?

**Fowler:** I had lots of roadblocks. One thing I think that is important is that people assume that I had a plan about my career. I can tell you, I never had a plan about my career growing up or like ever. So I never plan things out. I always look to the next opportunity. The good thing about that is that most of the roadblocks were that I was trying for the next opportunity and I didn't get it, something got shut down.

But I was then open to something else. I didn't have my heart set on this for the past 10 years, right? Whenever a door has closed, yes, I have been disappointed, but I've also taken that as an opportunity to step back and say, *Well, I am going to make myself open to other things*. Every time that has happened, I think something that I totally didn't expect has come along and has been great.

**Fowler:** That is fantastic advice, and it is really inspiring. For kids who may hit a roadblock to not let that be the end for them. So that is great. Let's shift focus a bit. In 2017, there were approximately 350,000 current cybersecurity openings, [according to Cyber Seek](#). Yet, according to [an April 2018 NBC News report](#), only 11 percent of cybersecurity professionals working



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today identify as women. Tell us how you would like to see educators or just the community in general address this deficit.

**Cranor:** Well, I think that there is a whole range of cybersecurity careers. Often people focus on cyber like it is just one thing. But you and I both work in cybersecurity, and we do completely different things. I think there is a range of careers. There is a range of the types of educational preparation that you would need, depending on the type of cyber career that you are interested in. I think we need to not think of it monolithically but really think about that range. Then when we encourage young people to go into it, we can find out what their interests are, what their aptitude is, what sort of educational background they bring, and try to help them find the path that is actually going to work for them.

**Fowler:** Yes. And that is a really great point, because you have done some really cool things with bringing technology into other fields. If you are watching the podcast right now, you can see [Dr. Cranor's amazing dress, the famous password dress](#) that you have. I want you to tell us about that and then also tell us a little bit about quilting. After you tell us about the dress, I want to talk about some of the quilting and exhibits that you have had in Pittsburgh. Can you tell us a little about the dress that you are wearing right now?

**Cranor:** Sure. So the dress is a word cloud made from the 500 most common passwords from the [RockYou data breach](#). And they are scaled according to their frequency and color-coded based on themes that I observed.

**Fowler:** It is beautiful as fabric, and it really makes a statement. But you have handmade a number of quilts, and you had your own [quilt exhibit here in Pittsburgh at our children's museum](#). And one of those quilts also featured the most popular passwords and was featured in Science Magazine. So what is this intersection between quilting and fashion and cybersecurity and privacy?

**Cranor:** Well, I have always been interested in art. And I minored in fine arts when I was an undergrad. And then in grad school, I felt like I wasn't making progress on my thesis, and I needed to do something with my hands. And I wanted to do oil painting. And I think my husband said, that wasn't a great idea in our very small apartment living room. And he said, can't you find something less smelly? And it was kind of a whim that I said, well, I've always wanted to quilt. And I bought a quilt book and some fabric and I started making quilts.

And then when I graduated and had a job, I bought a sewing machine. And one of the things that I've always liked about quilting is the patterns in it. And rather than just following the traditional patterns, I like to create my own patterns. And I use computing tools to do that. Largely I use PowerPoint. It's a complete abuse of PowerPoint, but it works. But I've also done some other



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things. And so a few years ago on my sabbatical, I actually spent a year in the art school at Carnegie Mellon making quilts. Which, like, how cool is that?

**Fowler:** So do you have algorithms hidden in your quilts?

**Cranor:** I do, definitely. I could go on for an hour about that. I have one quilt that I want it to look sort of randomish but in a controlled way. Basically I have an algorithm that I use for placing the colors in the quilt. So it is done algorithmically, but the effect looks like it was done randomly. But it ensures that you don't have like two of the same color next to each other and things like that.

When I was on sabbatical, I was working on hand-drawing a design for a quilt in the art school. One of the art professors came up to me and he's like, *You could write a computer program to do this. This looks very tedious.* And I said, *I'm not a graphics programmer, I don't do that.* And so he started writing the program for me. And then sent it to me half done. And said, *oh, you're a computer science professor, finish it.* I had no idea how to do it, but out of pride I had to at that point. But it was actually a lot of fun, because I had this little tool where I could experiment with, *Oh, what if I change this color? what if I change the proportions, right?* I could experiment with that. And then I had—I print on the color printer all my different variations and then pick the one that I was actually going to make in fabric.

**Fowler:** That is really awesome. And it's fun because it is bringing art and technology together. And it's a great part about being at an interdisciplinary place like Carnegie Mellon. That is fantastic.

So you are keynoting at the [2019 Women in Cybersecurity Conference](#) that is being held here in Pittsburgh in late March. CMU is one of the cosponsors of the conference. Can you tell us a little more about this conference and why events like this are important to you?

**Cranor:** This is a conference that brings together women who are interested in cybersecurity. There are a lot of students there. I don't know the numbers, but I went a few years ago, and it seemed like every other person there was a student. They bring in speakers who are really inspiring for the students to see. I think there are a bunch of employers who are talking about career options and collecting resumes. There are workshops on various technical issues as well as career issues. It really is a great opportunity for these women, both students and junior people in the field, to see, *Wow, there is a critical mass. There are other women here and to learn from them.* So yes, I think it is a great event.

**Fowler:** What do you think that you're going to be saying in the keynote, just as a small preview so that people want to come back and hear more?



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**Cranor:** I asked them should I talk about my career, or should I talk about the research that I do? And they said *yes*. I will have a story about basically the things that I did throughout my career and some of the research but also tying in some of the kind of life lessons that I learned along the way.

**Fowler:** That is fantastic. You have accomplished so much already. I know you said you don't have a clear roadmap that you are following, but what are some of the next goals that you have when it comes to your professional life in privacy?

**Cranor:** Well, so I have gotten interested in taking more of a leadership role in things. I actually completed at the [Tepper School of Business at CMU](#), they have [a leadership academy for women](#).

**Fowler:** I am a graduate.

**Cranor:** OK, great. So I did it last year.

**Fowler:** I love that program.

**Cranor:** Yes. So that was actually pretty inspiring. I have been trying to get involved in more of a leadership role on campus. I hope to be doing more of that.

**Fowler:** That is awesome. It sounds like you are a lifelong learner and that you like to learn more all the time, but we are in an age of information overload. So where do you go to get the best information? What books do you read? What articles? What podcasts do you listen to?

**Cranor:** Definitely there is information overload. I wish I could say that I was more systematic about it, but it is very haphazard, and often it is whatever has landed in my email or a student has handed me or whatever is what I read. I do get a few daily newsletters. The [International Association of Privacy Professionals \(IAPP\)](#) has a daily dashboard of privacy news. I do try to read that almost every day and then dig down on the articles of most interest. Politico has a morning newsletter on cybersecurity, and I do read that as well. But a lot of it is just stuff that I see on my Facebook feed from my friends or things people hand me or send me.

**Fowler:** If you could give one piece of advice to a young person who is listening right now who's considering entering this field, what would that be?

**Cranor:** I would say that this is a great field. There are obstacles. There are roadblocks, but you can overcome them. Don't let something that somebody said to you or looking around the room and seeing that there aren't very many other women hold you back. You got this.

**Fowler:** That's great. Thank you so much for joining us today, Dr. Cranor.



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**Cranor:** You are welcome.

**Fowler:** This podcast is available on the SEI website at [sei.cmu.edu/podcasts](http://sei.cmu.edu/podcasts), and on [Carnegie Mellon University's iTunes U site](#) and the [SEI's YouTube channel](#). As always, if you have any questions, please don't hesitate to email us at [info@sei.cmu.edu](mailto:info@sei.cmu.edu). Thank you.