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Digital Tech College & Career Readiness Series
Explore Exciting Careers in the World of Cybersecurity

Angel Pineiro
Welcome to our digital tech college and career readiness series. My name is Angel L. Piñeiro JR and I am the Vice President of strategic academic relationships for CompTIA. I am joined by a wonderful set of panelists today and it is my pleasure to moderate this conversation and introduce you to the panel. Dr. Davina Pruitt-Mentle serves as lead for academic engagement for NICE, which stands for the national initiative for cybersecurity education, and they are a division of NIST, the National Institute of Standards and Technology. Sarah Kaleel is a cybersecurity program manager for Jet Propulsion Laboratory, also known as JPL. And our last, but certainly not least, panelist is Judy Hunt, who serves as the technical director for the senior intelligence, and now, analysts authority at the National Security Agency, also known as the NSA. In today's conversation we will explore the field of cyber security. So let's get right into it. So the first question is going to be to all the panelists and I ask you to keep the answers to five minutes. Thank you. So, first is going to be for Dr. Mentle. Cybersecurity is a field that has gained notoriety and interest over the past 10 years. What led you to a career in cybersecurity and tell us a bit about your career pathway. Dr. Mentle?

Dr. Davina Pruitt-Mentle
Sure. So, thank you so much for having me. I think, similar to many within the field at least at this point in time, very serendipitously landed in the position. So my background, originally is biochem taught at four year, two year institutions, four year institutions, and then went and worked at the Naval Research Lab in the chemistry fuels division and missed, kind of the interaction with people. When you're in front of a titrater the whole time in a wet lab, it gets a little stale so I went back into teaching high school, high school chemistry and physics. And then along the way went back for my PhD, which was an ed tech policy, and then came on board as faculty member within the University of Maryland, and the School of Education. And within that got interested in how to attract more students into STEM. And within stem, narrowed down into IT and cybersecurity although that's still within the wider scope of STEM. And so within that came over and came on board with NICE, which within our NICE program office the national initiative for cybersecurity education, we're interested in developing and growing the cybersecurity workforce. And so, it's a perfect match. So mine is more along the policy in the workforce development. But still, an area that is growing in cybersecurity.

Angel Pineiro
That's great. Dr. Mentle. And so let me ask Sarah Kaleel**?**

Sarah Kaleel
Again, also, thank you so much for having me here today, it's a real pleasure. Cybersecurity as Dr. Mentle was saying, was that, you know, originally, maybe there wasn't a fear of cybersecurity so you sort of sometimes evolved into it. What was really interesting for me when I was younger

was really getting into computers and the different operating systems and playing around online, and maybe seeing what I could break or tamper with, and I fell in with a group of people, maybe we were, you know, on one side of the tracks when it came to cybersecurity. But then I found myself in my professional career, managing an online gaming arena. And for those that love to play video games you might know that people get hacked. And those cheats make it really unfun for other people. So then I'd have to go and find that hack or that cheat and learn how to fix all my game servers and make it more fun for all the gamers. And then from there I ended up managing all online safety and cybersecurity for one of the largest social networks in the world at the time called myspace.com and that really took everything off where you see so many different types of online activities, whether it's keeping your password safe, or you know, not sharing information with other people that can then use it to compromise your account. So, you know, we're all here because we had interests and responsibilities that lead into a world of cybersecurity, but everyone is involved in cybersecurity whether you know you have a career in it or not. These days we think about protecting your information and protecting your password so it's been really exciting, and I'm really happy to be here and now working as the portfolio manager for JPL, and we're very proud because we just had our rover land on Mars a couple of weeks ago, so it takes a village to make this happen and it's important that we keep all that information and the system safe.

Angel Pineiro
That's wonderful, and finally the same question for Judy Hunt. Judy?

Judy Hunt
Thank you very much for having me, Angel. I got my start in cybersecurity in a very unexpected way. I was in high school and we had this computer teacher, and we used to really give her a hard time. I felt really bad about it afterwards but we didn't really want to be in the class, but we had a good time. And that teacher made us all take the test to go to NSA and nobody really knew what NSA was. They thought it was NASA, most people think it's NASA. And so, a group of us actually passed the test that they gave to become a work study so in my senior year I spent actually working at NSA on computers. And that's kind of where I got my start, and when it was time to graduate they offered me a job, because they have positions that will allow you to start without a college degree and then grow. So there's lots of training programs and you can take college at the same time that you're working full time. And so that's the path that I chose and throughout all of my career, I've had these opportunities to have these training programs to learn additional skills within computers and with cybersecurity and so that's kind of how I got started. If, you know, that was Mrs Cohen, so Mrs Cohen is still out there, I really appreciate all that she did for me. Even though she wasn't appreciated at the time.

Angel Pineiro
Shout out to Mrs Cohen. Yes. All right, well thank you for that. So let's go on to the next question and this one will be, we'll start off with Dr. Mentle. What education and career training is required to work in your career, and what sort of skills are required for someone in your field?

Dr. Davina Pruitt-Mentle
So that is a great question, and a very exciting question. So within NICE, we have a NICE workforce framework that's a cybersecurity workforce framework. And that provides the building blocks, or provides a common lexicon, about the different categories of cybersecurity. So there are seven broad buckets, if you will, from securely provision, which is more building things secure from the onset like engineering, computer science, and then you have, you know, operate and maintain, and oversee and govern, which is more than management. So there's these different categories of cybersecurity and then within that there are the tasks, the knowledge, and the skills that make up particular competencies for work roles that are across those seven broad categories and there are 52 work roles at the current time and those work roles are what the government is required to code people that are in the workforce and have a certain percentage of their work is associated with cybersecurity. They are coded for that particular work role that feeds into the census data. So, those SOC codes are those Standard Occupational Classifications are what many students and educators are used to seeing in the Department of Labor where you look up, you know, what is the projected forecast for a software engineer 10 years from now, the projections. So those knowledge skills and tasks for those particular areas is a great way to get started in what your particular passion is. So if you have many times folks feel that cybersecurity has this stereotypic look and feel of someone in the basement with a hoodie hacking into somebody's computer, and it's much broader than that, hopefully that's not one of the options, but it is much broader than that, so if you have a love for linguistics or digital forensics you might choose a different pathway, or if you have are on the manager side or on auditors with policy that's a different set of skills. Besides, going to the actual workforce framework, and probably getting overwhelmed with the knowledge and skills that are available there we also help, with CompTIA and Burning Glass, we have a tool cyberseek.org. And that is a way of looking at all the job descriptions that are out there that feed into the job boards to, to try to look at what positions are open in particular areas, because again, something in cybersecurity in the Mid Atlantic region will be more probably in cyber defense but if you go up to New York, it's more in the financial sector. If you go up into Chicago and Detroit it's more in the manufacturing and status system so that's a long way of saying it depends on what particular area of cybersecurity you're going into, and you have to determine that piece of the equation, along with, do you want to just go through, maybe a CTE program with some certifications, and then get into an entry level position, or do you want to go into community college, or a four year. So there are many pathways to get there as well.

Angel Pineiro
Awesome. Yeah I'm familiar with their framework and certainly cyberseek, great thing, great to know that they are best practices and there's a framework out there available for those that are interested. But let me ask Sarah the same question. Sarah?

Sarah Kaleel

Yeah. Everything that Dr. Mentle mentioned is on point that cybersecurity isn't just having a very technical skill set that’s puddled in coding. It is a huge umbrella. And I like to throw, pivot things, where it's not about like, well, what skills do I need to go and develop but, what do I as a person like to do? Do I like to put together puzzles and problem solve and team together for that answer, then maybe cyber forensics would be exciting where you get to look at all the puzzle pieces and figure out how that compromise happened. Or maybe you love building stuff, you know, even if it's like Legos or models or systems, then maybe you want to go into something like system architecture where you have the database and the website and how you protect these things. Or maybe you like breaking stuff, well that’s a big part of cybersecurity that's well, how can I go and get that website to come down or how can I break it. So if you have these things that do just keep--or maybe are a deeply organized person and then end up in project management or program management such as myself, where I see all these different activities are very organized, but at the same time, I see how they all relate, right? I see that we need the architecture and then someone to come in and try to break it to make it safer, and then have someone to be able to analyze all this information so we can continually improve. And then I do just want to call out that there are careers that are cyber related and cyber adjacent, such as law enforcement. There's entire law enforcement teams dedicated to cybersecurity investigations. I have lawyers dedicated to just cybersecurity law. And so there are a lot of fields that all interconnect, where, when you think cybersecurity, maybe you always thought about becoming a lawyer or going into law enforcement, but you can still be on that cybersecurity perspective. So there's just so much opportunity. So just think about what you really love to do, what really interests you, what are your hobbies, what do you read about. And then, like Dr. Mentel suggested maybe looking at some of the job descriptions or companies you like and look what jobs they're posting, and then you can see what they're looking for, right? X college or this experience, with that background.

Angel Pineiro
That is absolutely awesome and great insight. Thank you for that Sarah. Let's go on to the next question and this one will be for Judy. Judy, tell us how cybersecurity functions within your organization, and does it play a central role?

Judy Hunt
Yes, Angel, it plays a huge role. Cybersecurity is actually half our mission, and you know as a National Agency, we have two major missions, if you think of a sports team you have an offense and you have a defense. So our offensive mission has cyber related events as well but then our defensive mission is to defend our national security systems. It defends our military when they are abroad or when they are doing things for our country and we want to make sure that they're protected and the things that they do with their networks and such. So there's a lot that goes on with cybersecurity and the investment and our agency, being half the mission as part of that cybersecurity and not just defense we're actually putting out the materials to protect the encryption packages that our nation uses to try to keep our assets safe. And that could be our weapons, that could be our nuclear weapons, that could be all the things that we have as a

country to keep our country safe from anybody that would want to do us harm. So it's really an exciting mission at NSA to have our cybersecurity half of the house, and with those folks working on the assurance side, and that's the encryption side, we put out information for the public, we put out if there are problems. We have advisories and mitigations that go out to the public now which is newer in the last few years, because we have found that we have a great brain source of folks learning and putting great work behind trying to protect our country and so we want to protect and share that information with others and so that makes us a little bit unique as well.

Angel Pineiro
Gotcha, gotcha. I'm going to stay with you for the next question, Judy. So, NSA, you know, National Security Agency right, think about top secret clearance, top security and everything. We often think that cybersecurity is about top secret. So, tell us about your organization, and what's your organization work environment like?

Judy Hunt
Well, you know, we do require a top secret clearance, and you know most people get nervous about that because you do take a polygraph. They do a background investigation on you. They make sure that you are honest and that you have integrity, and that you would not do any harm to the United States. And that you're living in a way that's legal that you're not, you know, using illegal drugs and things like that that would put you at a compromising position. So sometimes people get nervous about that polygraph but once you're past the polygraph, you know, our environment is really really kind of exciting because we have a huge ops floor, and I posted a video with this session, and that video will actually have some clips of that ops floor you'll see. And on the ops floor we are doing a lot of monitoring to see what's going on on our national security systems, we have cubicles just like a lot of other places where you can go and you can team, and be with other cybersecurity specialists because what we have found is you can study any part of cybersecurity, but you'll never be an expert in all of it. So we really need to network and work as a team to fill the gaps when we're not experts in certain things that are happening, and that happens quite a bit. And so being able to team, and then we also have labs where we do research, and we do experimentation, so we have a whole research arm as well devoted to cybersecurity and working with colleges and universities to see what's up and coming. So there's quite a bit going on in our organization and it's held pretty highly.

Angel Pineiro
Wow. That's interesting, and that all-important networking again, it’s so important in every field including cybersecurity. So let’s jump over to Dr. Mentle, and the next question is, Doctor, from the range of careers on this panel we can see that cybersecurity is essential to both government agencies and the private sector. Are there any differences between working in cybersecurity for the government versus the private sector?

Dr. Davina Pruitt-Mentle

Well, I certainly think there are differences, even differences in the security clearances--there's differences in the security clearances even between the federal agencies. But, and there are a lot of industries that still need cybersecurity work, or workers, that work on unclassified tasks and ideas and workflows, where that makes it a little bit different. We also see that some of the job titles are different. They're different. You can actually be doing the same work or the same tasks, but the job title is different from industry and government or even between different industries as a matter of fact. But the bottom line is we're all trying to reduce risk. That is the main focus of our, I think the main mission across all, whether you're government or industry, is trying to reduce the risk. And it's the risk management piece that is the same I believe across all, whether it fits, you know, your drugstore down the road, or whether it's at NIST or at JPL or NSA, that is sort of the bottom layer.

Angel Pineiro
Yes, it seems like we're in catch up mode. We have to be right all the time. Right? And you have to stay on top of the game. That's why you always have to be studying. You never stop studying, I don't care what career you decide to study, you never stop learning. Just because you leave school you never stop learning. In fact, I say that once I left school that I found myself, you know, in a position where I'm reading more than ever before.

Dr. Davina Pruitt-Mentle
I actually think that is a skill set, going back to one of your earlier questions. One of the skill sets that we see for all of the different work roles is the ability to learn and to have that initiative to stay up to date on tasks and resources and tools, because the field into technology overall is changing so quickly. And there's a need to just keep up with those tools, and then keep up with all of the different strategies that are being used to try to have those attacks and so forth so learning being a good learner is really, really important.

Angel Pineiro
Absolutely. So, let's get on to the final couple of questions and so this one’s going to be, let's go back to, let's go to Sarah. And let's keep this down to, try to keep it down to one minute now, so we're getting towards the end then here. So Sarah, what are the benefits of working in cybersecurity?

Sarah Kaleel
The number one benefit of cybersecurity, in my opinion, is that it's never boring. It is never boring. It's always changing. If you want a job that you go to every day, every week, and it's something new that comes up that requires you and your team to tackle, you can never stop learning. Because the technology changes the attack vectors change the ways to reduce risk changes, and that's what makes it exciting right? It's that love to learn, that curiosity and that ability to continually change and adapt, so every day brings something new and something fun.

Angel Pineiro
So true. So true and Judy?

Judy Hunt
I don't know if I could say it any better than that, that was right on point. It is very exciting. You don't get bored in this field at all. And what I love about cybersecurity is that I know I'm protecting my nation, and I know I'm protecting those that are our military members out forward, and those that, you know, would want to do harm. We are trying to make sure, even to our economy and things, that sometimes we don't think about, our cars, our way of life here and some of the privileges that we have. I'm just thankful that we're able to protect from that.

Angel Pineiro
So let's get to the final question for each panel. Keep it down to one minute as well. What advice do you have for high school students as they try to determine their own career path?

Sarah Kaleel
I have two areas of advice: really focus on what makes you happy--what are you spending your free time reading about online or books that you're checking out at the library? What do you find yourself doing or drawn to? And you can make a career out of that. The second one is as Judy touched upon I cannot stress enough: internships. Take internships, take jobs while you're young and can rely on the support of others because you'll quickly find out what you like and don't like. And then that helps you establish where you want to go in your career.

Angel Pineiro
Absolutely. Dr. Mentle?

Dr. Davina Pruitt-Mentle
I would say the work based learning is a key component to again see which particular area of cybersecurity you're most passionate about. I would also suggest learning the different pathways that are possible. If you have a love for one particular area and all that is really needed is a two year, then it's more economical to go down that path, although you know four year is always an option as well. But I think looking at the different pathways to get to your final destination, as well as with those pathways, what are the scholarships and internship possibilities because there are so many out there because of our need for this particular workforce. There are multiple scholarships available that you can take advantage of if you're interested in cybersecurity.

Angel Pineiro
That’s awesome. Scholarships, now we're talking. All right. And finally, Judy?

Judy Hunt

Yes, I just have to foot stomp with Sarah and Davina said, as well as, you know, you may have to do cybersecurity as its own career, but cybersecurity is going to help you in whatever career that you take, whatever path you take and so having basic skills and cybersecurity is what I recommend. But also, not just knowing your skills, reach out and start building your network now getting to know people that are around. I know folks on this panel would be willing to speak to you or give career advice. But it is building that network now so that you have an idea and can test out the different places that have cybersecurity jobs and different interests, because within that network they're going to help you get to where you need to go.

Angel Pineiro
Wow, this is amazing. It's been awesome. The feedback has been great. Thank you, ladies. You guys were on point. I'm just going to mention a few things that I've learned here. You know, one is, you can start a cybersecurity career without college or you continue, you know, to do a community college two year maybe a four year college everything's going to get you towards that end goal in getting a great job in cybersecurity. We learned about a framework, there is best practices that are out there, earned by cyberseek source that you can go to. We also learned that it’s good to have coding experience in cybersecurity but it's not only about cyber. We also learned that there's two roles in cybersecurity, both offense and defense that you can go into and that's great to know. Integrity, integrity -- you need integrity in any job that you're going to get but especially in the cybersecurity field because people have trust in you that you're going to protect them. And networking, networking is a big part, I cannot stress that enough. I wholeheartedly agree with all the panelists, network as best as you can, reach out to all the people, that will never harm your career. Cybersecurity is about reducing risk. It's not a boring field, it's an exciting field. It's an honorable field because you're protecting people and you're protecting your nation. Don't forget about internships, get that workplace study, you know, it's not just about learning something in the classroom, you have to see it in a practical environment. And wow, I mean I could go on and on and on, but thank you ladies, this has been great. I'm sure that the students that are listening to this are going to get a lot out of it. Thank you for listening, and on behalf of Capital CoLab, thank you for joining the Digital Tech College and Career Readiness series.