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"Technology: Present & Future" featuring Dr. Javier Torner

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Technology: Present & Future

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Javier Torner, Ph.D.

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http://youtu.be/biunZqqVQ2U

Dr. Javier Torner is a Professor of Physics at the California State University San Bernardino. He has over 30 years of teaching and working experience with data communication networks and computer systems. Dr. Torner is the Information Security Officer at California State University San Bernardino and director of the Information Security and Emerging Technology Office. Dr. Torner coordinates and oversees the implementation of enterprise information security initiatives for the university's telecommunications network and computer and information systems, including developing and adopting information security and accessibility policies and standards.

The Information Security and Emerging Technologies Office provide, among others, support to university entities in conducting risk and vulnerability assessments for information assets, manages intrusion detection and incident response conducts computer forensics investigations, and manages the Web accessibility and information security compliance program for the campus. Dr. Torner periodically conducts workshops and presentations on information security topics to different groups inside and outside the university, including upper management, IT directors, and technical staff groups.

Interview:

Armando F Sanchez: Today, the future of today's series is very honored to have someone from San Bernardino who comes to us today in our studio here in La Jolla, California. Dr. Javier Torner, Ph.D. Information Security Officer at California State University, San Bernardino. Dr. Torner is a professor of physics with over 30 years of teaching and working experience with data communications, networking, and computer systems. Dr. Torner is the Information Security Officer for the college and director of the Information Security and Emerging Technology Office. I'll read more of his bio because it's lengthy. It's very impressive. Dr. Torner coordinates and oversees the implementation of enterprise information security initiatives for the university, universities, telecommunications networks, and computer and information systems, including developing and adapting information security and accessibility policies and standards. In the middle of all that, he has a personal life, and I don't know where but my God, What an impressive background, so Dr. Torner, thank you for being here with us.

Javier Torner, Ph.D.: Thank you for inviting me. It's a pleasure to be here.

Sanchez: And I want to, and I also want to add to the viewers that you're of Mexican descent. You studied and came from Mexico City. We are delighted to have you on the show.

Dr. Torner: *Muchisimas gracias!* (Thank you very much).

Sanchez: I want to share that this program is part of the Future of Today series. And first off the bat, I want to thank our mutual friend, Dr. Felix Zuniga, for helping us connect.

There's a question there are several titles in our media, newspaper, print, and radio; we keep hearing them. And those terms are three of them that I can listen to that I constantly run into robotics, artificial intelligence, and the Internet of everything. That's a very impressive statement. And I always believe, is this something that's just sort of catchphrases out there like, you know, superhighway or information super highway? Why are these terms out there, and how do these terms impact our community? Are we about ready to go into a drastic change in the future in our own lives?

Dr. Torner: I think that the terms are yes, everywhere. The Internet of Things is the driving force for artificial intelligence. And also, it is the driving force for anyone in robotics. Why? Because the internet of things what, he's doing for us, and he's already happened. He's not something that is already happening and is taking place where every device that is connected to the ability for sensors, different types of devices to be able to connect to a wireless network, interact with services, interact with the servers, send information back and forth, is really what is the driving force. It's really what is changing. And it's already happening. Many people already have systems in their homes where they can manipulate their thermostats, control their doors, and watch cameras, all from their cell phones. So all of that one is what we're referring to as the Internet of Things. That camera that people are installing on their front door, that if someone knocks on the door, they can take a look at who's at the door. They can transmit their voice; they can answer all of that. That one is one example of a device already using the internet. That is one is one of those Internet of Everything. Everything is being connected; everything is available. You can control everything with your phone. It's incredible. Many things now they're working on your phone. Last week, I needed to go for a trip and take the train on Metrolink. You can go into your phone, download the app, buy the ticket, and then you don't need to stop anymore. Fight the temptation to buy the ticket by going to the Metro office.

Sanchez: My wife and I were talking the other day. My wife says, " Oh, Chihuahua, we are out of milk." I responded' "We need a smart refrigerator that monitors how much milk you have. It would order it through the internet, and we would not run out". She looked at me oddly. She says that there will never have refrigerators like that. I thought to myself, "Not right now, but it will happen."

Dr. Torner: Yes, but they're there! So you can now get many appliances that they can connect to the wireless network, and then they can tell you. So what we're going to start seeing more and more is technology, the use of that so that one brings the other pieces. The more we are connected, the more we are part of everything. Cars will be connected in the future where cars will know where to go. How many people now don't use the voice commands on their car to do that. Because now those devices now they can recognize voice commands. You can turn on your TV and then set it up to listen to your voice and voice commands. So I think that to some extent that one is also a robotic, right? Now, I have to be cautious about it. Be careful when that microphone is because it is listening to you. It is consumerism and connected to everything happening around it right now. Do you want your TV to know what you're doing?

Sanchez: I always thought also about my *Abuelita* (Spanish; grandmother), and my *suegra* (Spanish; mother-in-law), and others; I hope she doesn't keep trying to switch the shows where they are speaking

in English and Spanish. They mix them up in their sentences, and they're trying to give commands to the television or something else. I always think that's funny.

Dr. Torner: Yes, but let me tell you something. Another example of that. One is that artificial intelligence is coming up with the artificial intelligence piece is, "Can't those new applications recognize that they will have an accent and then adapt to our characteristics? Or, to our idiosyncrasies?

Sanchez: Hey, what do you mean, idiosyncrasies? I'm not sure I have any! (laughter)

Dr. Torner: And that is the other piece that also comes in. So you can see that everything seems to be interrelated because of the technology. The technological advances allow us to now have computers in our pockets that are so powerful. Much more powerful than we thought. The next generations are going to get even more. But the processes of artificial intelligence adapt yourself back toward needs. You probably have seen that thermostat that you can install in your home that you control with one of those boxes, that it learns what your pattern is. It learns when you come in the morning and the afternoon. And then, it adapts the temperature of your house based on the pattern when you go in and where you leave. That is artificial intelligence. It might not be what we consider very intelligent, but that is artificial intelligence. Someone who directly interacts and knows that you're going to be coming on Wednesday, usually at 7:30 pm, and then it turns on the air conditioning and is pleasant when you arrive. So all of those items are examples of functionality that was not possible ten years ago. But now, thankfully, technology makes it possible.

Sanchez: So these items, robotics, artificial intelligence, and the Internet of Everything, are real. They're here. That's what I'm picking up from you. And how does that impact the community in terms of future jobs, since more and more are going to these artificial intelligence systems? Will that affect the job opportunities of the future? And I'd like to slip in a second question: how does one educate our youth to be ready for this new brave world?

Dr. Torner: So let me respond to the first question. The answer is "Yes"' I think that then we are on another revolution, and I think this is the promotion of the information revolution. This is part of it. Your system will recognize it. And now we are getting more and more into that. So that one parallels the Industrial Revolution at the beginning of the 20th century. Back then, every skill had to be every division had to retool their skill; they had to acquire new and adaptive skills. Now, individuals need to be adapted to the Information era. This is where all the jobs will change in nature. Now we're much more dependent on computers.

The information is out there, but if you go, you can Google everything you can find knowledge at the tip of your fingers at any given moment. So the skills of individuals have to change and the way that they will learn in school from an environment where learning knowledge, skills, and critical thinking to a new society where we have the information that people will figure, and now we need to know how to use that information, how to exploit all of those things and now they're coming back to work. So, emphasis on critical thinking skills will fundamentally change people's ability to be successful in the next-generation jobs if I take a look at it. Twenty years ago, web developers didn't exist. That is an entirely new job, a new set of skills for people to develop websites. So now they have all that industry fueled by the need to be more websites and more and more web applications. All of the ones require new knowledge and new skills from individuals. So people have to change and then slowly started to change within the schools. But it also allows them to adapt to a fast-changing environment.

I think that you were talking about and saying how do we adapt? How do we keep ourselves up to speed with all the new changes? Just to give you a perspective, the Industrial Revolution started in 1900. It took several years, say ten years, so they gave people time to readapt their skills and learn new

things. Technology is changing now much, much faster than that. It is changing quicker than that in five years or less. So people now need to learn new things. They need to adapt to the latest technologies that are coming back. So good news is that we have to teach critical thinking skills. And develop lifelong learning skills. That learning skills you continue to use and will continue to use even after you finish school.

Sanchez: Sort of a core amount of information that helps you access all the ongoing changes.

Dr. Torner: That one is a core of abilities that will allow an individual to continue learning on their own, even after being prepared, because that's the only way they will work to continue to do that.

Sanchez: Could I tap into a little bit of one of those points, if you can, sort of off the top of your head, call three or four of those necessary core abilities skills?

Dr. Torner: I think one of them was communication skills. They will need to improve their communication skills. Whether it's in writing or verbal, people need to develop that because then we're becoming more and more of a society that relies heavily on communication and how effective we are in communicating our ideas. The other one is critical thinking, right? People need to be able to analyze information and extract from that information. What is really about the information? How do I use that information? I still think that one other point is problem-solving skills, where one can identify the core of the issues and try to find solutions for them. Though once I think that there are three primary skills that individuals have, it will help them continue learning regardless of what changes on demand. Are we teaching our youth those skills where they're coming from?

Sanchez: That's an important question. And you know, I recently retired from teaching. I'd have to say, "No."

Dr. Torner: Because I can tell you, for example, now that what are we teaching? I was just reading an article on computers that are currently used to prepare to do some projects in elementary school. So children now in elementary school are using computers. They put together elementary computers, right? They are the size of a credit card that they can pay program and do for many other problems. So they're learning problem-solving. They are learning to program; they're learning information. So is everyone going in that direction? I would bring those skills back into the children in some schools; we are the majority. And I think that is the other piece, right? The technology divide, unfortunately, between different areas. It is also an important player not only getting the same funding to support that you have learning or teaching.

Sanchez: You know, we could go on this one issue all day long. We discuss the idea of the technological divide as computers and software are becoming cheaper and cheaper, and technically that technological divide shouldn't be there. However, it's sad to say that the divide is getting worse.

Dr. Torner: Yes, and I think that that's also happened because it changed fast. The lifetime now an iPad and iPhone or phone or Android is just a few years. It's not that you could buy a computer that will last for ten years or five years. What happened? It's difficult for individuals to have new technologies in their hands because it's too far in some societies or areas that need to keep practicing to keep up to that pace.

Sanchez: So, in a way, sort of indirectly. I guess what we're doing here is recommending to parents who are watching and listening to the show. You must keep your child up-to-date with technology. It's expensive, and you know it has to be invested because their equipment doesn't last that long. But they

have to understand how to use these tools (computers). They have to! You can't take it away from them.

Dr. Torner: The thing that happens near is to teach those fundamental problem-solving skills. Make sure that children understand and have the opportunity to challenge problems and become involved in real issues.

Sanchez: One of the things is that when you say real issues, you mean actual life problems.

Dr. Torner: Yes, suitable for use in our community. One of the things that then we know that happened under retention or how more individuals are retained in school, how they learn is when they get involved in problems with our communities when they can see that there is a value for their education that they can apply that one in the context of their lives and their problems within their communities. And we don't do it very often.

Sanchez: One of the things that came to mind when you said communication, critical thinking problem solving was also the need to be proactive—sort of something. I always tried to imagine that we have all these resources and facilities. We don't have to wait until somebody says, " Oh my god, there's a problem. Take care of it." It's like, you know what? We are now open with all this information facility we can move on our own and take care of problems. We don't have to wait for permission to say, "Go ahead and do it!"

Dr. Torner: I think there are many problems in any community that can be addressed or brought up. So yes, it is bringing all of those initial principles within it. The other thing that I think we need to be conscious about is privacy. A significant issue that technology brings is that our information is out there. What do we eat? What do we drive? and where do we go? All of that is information that is being collected. More and more, I think that it's essential also to teach the children to protect their privacy from being able even to use the technology is "What are they communicating? And "What are they sending in information" because they don't know who will be looking at the other end. They don't know what that information is going to be used later. So technology brings a lot of interesting things. It's going to make your life easier. But, it also means that there are some crucial aspects of that technology that pay attention to that one is in particular when it comes to how our information is being used, who has access to our personal information, and who has access to many of the things that they would do on an everyday basis.

Sanchez: So it sounds to me that persons in your career area will be around for a long time to work on information security. It is important, right?

Dr. Torner: Yes, it is becoming more and more as everything goes into the internet. As we talked about it before, if you have the microphone on your television, and someone maliciously hacks into it, what they can listen to and can go for that. Can you afford that? We see it on people who are being recorded without permission.

Sanchez: You know, I see that danger, as you say, to have the TV turned itself on and hacked into your conversation, but I always think of the hacking of airplanes or my car if it's a driver-less car. Suppose they hacked the big things, my bank account, etc. So you're right on a small scale. Sure there's a danger, but then all the doors are open. And the last point before we close the show because I have to respect your time as the IRS has been hacked.

God Almighty, you know, it's not even hacking into my system. They're hacking into top-notch systems. And I think the Defense Department was hacked about two-three years ago. Thus we need more people like you. That's where your work is to make sure that it is prevented.

Dr. Torner: Let me just mention something about it. And the reason is that statistics show that 80% of those hacks were due to an error that someone on the inside made. Someone who compromised their credentials. So it was not that attackers were able to penetrate everything, and they were able to do it. They only needed one person who failed to protect their credentials, allowing hackers to exploit that access. And then from there, that's how they started then to get more ground on the inside. And that's how they were able to get into those systems. So what I keep telling people is that we are all responsible for security. Each of us has a responsibility to protect our credentials, protect our access, and make sure that we don't abuse it. And have passwords to make sure that we protect all of that. Why? Because if one of us fails to defend it, that one is like the beginning that someone can use to get their first foot in the door, so to speak, and from there for the yes collect, and they can compromise more and more.

Sanchez: You raised the issue of ethics and the individual, right?

Dr. Torner: Yes. All this is also a social issue. We are all civics. Remember about civics? Yes, we have a responsibility to make sure that we all take our responsibility seriously for the protection of not only our information but for everyone. It's a matter of one wow was the one with risk capital.

Sanchez: And things turn around the real fast impact on you think it's on someone else it can come back and haunt you back later as the proponent who started the process. Again, I want to respect your time. Dr. Toner, thank you very much for being on the show. I'd like to give you a few minutes to make your closing statements on this wonderful conversation and the highly educational information you've provided.

Dr. Torner: Well, I think then the other thing is to thank everyone. Thanks for inviting me, it's a pleasure. We all like to talk a lot about what we are passionate about; it indicates one of them for me. Then I can only tell the audience that you need to emphasize those mental skills in your children, regardless of the direction that they will go in. Technology is everywhere. Critical thinking in kids will be utilized everywhere. It doesn't matter where they want to be an artist, and artists use technology in ways that they wouldn't even imagine. Technology, The Internet of Things, and robotics are changing every aspect of our lives, and everything else is happening everywhere in our education. So we need to emphasize those skills and encourage individuals to go into education. Education is the door to having a better life. It is sad to see that, in our area, we have one of the lowest rates of students going to college graduating in the area, the Inland Empire. We need to change that. We need to emphasize the need for our children to go to college. To have that as a goal. Why? Because that's how they will be able to be successful in life so that they will be able to find good jobs and improve their own lives and their families. So, education is the key. We need to continue to emphasize it. We need to provide support for it and encourage it everywhere. San Bernardino is here. I know that you are far away in La Jolla. But our university is here, and there are tremendous opportunities for everyone to learn how to take advantage.

Sanchez: So this show is global. Thus the message, I think, carries around the world no matter where you are. Education is essential, whether live or online, but you need to keep learning. That's what I'm learning from you.

Dr. Torner: And they will. They need to keep learning skills and continue the need to keep continue learning. This is a journey that does have a goal, and it is that you're going to be learning how to live; you need to learn those skills because then you're going to use all of them during your lifetime.

Sanchez: Having a good attitude about learning is what I'm hearing. Dr. Toner, again, thank you very much for your time. Thank you very much again for your insights and your experiences. And what I'm learning from you is that no one can hide from this. We may not like it, but we can't get away from it, and we have to understand it.

Dr. Torner: That's right. Look at the technology we were using a few months ago!

Sanchez: Can you imagine this only 10-20 years ago? I mean, it was just that it wasn't even there. It wasn't even on my radar. So yes, now I want to share an invitation to you to do the show again in Spanish. And we look forward to hopefully doing that shortly. But thank you for your primary notes about the idea of the core abilities, communication, critical thinking, and problem-solving, and our need to get our schools up to par to get these essential skills out there. Thank you very much for your time.

Dr. Torner: Thank you, Armando. Have a great day.