

# The U.S. Department of Defense... Resilience with SERDP + ESTCP

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## SPEAKERS

Dr. Daniel Eisenberg, Deborah Loomis, Dr. Jinelle Sperry, Abigail Rice, Michelle Michaels, Lisa Miller, John Conger, Erin Looney, Dr. Kimberley Spangler, Doug Parsons



Doug Parsons 00:00

Hey everyone this is America Adapts the climate change podcast Hey adaptors welcome back to a fantastic episode. This is the 200th episode of America Adapts I wanted to do something special in this episode is I partnered with the US Department of Defense, and we're highlighting some of the innovative work they're doing in adaptation research. I am honored to be working with DOD and what better way to celebrate the 200th episode of American Adapts I wanted to do something special in this episode is I partnered with the US Department of Defense, and we're highlighting some of the innovative work they're doing in adaptation research. I am honored to be working with DOD and what better way to celebrate the 200th episode of American apps. We both use red, white and blue as our theme colors. This is my second episode partnering with DOD. Late last year I attended the Department of Defense, Energy and Environment innovation symposium in Washington DC. In this episode, we'll hear from the strategic Environmental Research and Development Program or cert up at DOD. It's a program that focuses on innovation and research and they are the ones who hosted the symposium, I'll talk to senior leadership within the programs and people attending the event doing really important and interesting resilience research. It was a huge event, you'll hear how the DoD is interacting with partners in providing resilience research for military installations, you'll hear things about surprise events and E DNA. And that's just scratching the surface of the type of research that they do there. You'll also go behind the scenes and what it means to take a research idea, fund it and see it through for in the field applications. It's not easy and startup is looking for ways to quicken that process. You'll hear from university researchers, DOD staff, policy experts and those working in the field. We cover a lot of ground in this episode, they're focusing more on resilience within cert up and I was there to cover it. I did an episode with Department of Defense last summer, but that focus more on policy and we're talking with the research arm of the DOD. I hope you enjoy these conversations as much as I did kicking off is Dr. Kimberly Spangler, the executive director of the startup program. There are a lot of acronyms in this episode, and I do my best to try to explain them. But for the sake of brevity, we use the acronyms quite often. And as I noted earlier, this is the 200th episode of America Adapts I wanted to do something special in this episode is I partnered with the US Department

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with Dr. Kimberly Spangler of startup. Hey, adapters Joining me is Dr. Kimberly Spangler. Kim is the executive director for setup and II s TCP at the Department of Defense. Hi, Kim, welcome to the podcast.

**D** Dr. Kimberley Spangler 02:23

Hi, Doug. Thanks for having me.

**D** Doug Parsons 02:25

Let's just get it out of the way. What did those acronyms stand for?

**D** Dr. Kimberley Spangler 02:29

So startup is the strategic Environmental Research and Development Program. And II s TCP is the environmental security technology certification program.

**D** Doug Parsons 02:41

We're here pre conference, and I want to ground folks on what you guys are all about. And then you're going to come back on at the very end. And we're going to talk about the conference and more about the work that you do there. But just broadly, what's the primary mission there with your programs?

**D** Dr. Kimberley Spangler 02:54

So startup, any STCP have a broad and diverse portfolio, we address the top priority issues for the Department of Defense from installation energy, and all the environmental challenges you can imagine DoD is a very large organization. And there are quite a few Energy and Environment challenges that we take on within that space.

**D** Doug Parsons 03:19

This might not be that easy. But how does it fit within the broader Department of Defense? I think a lot of people just think of this huge department. How do you guys plug in there.

**D** Dr. Kimberley Spangler 03:29

So it is a huge department and we are the department level investment in research and development for energy and environment. We are setting the technical direction for the Department of Defense for the technical term is research development, testing engine and

evaluation. But we're setting the technical direction for the department we work with and coordinate with the services. But our ultimate goal is to be on that leading edge of Energy and Environment work so that it can be matured, and then ultimately transitioned out to the field as

**D** Doug Parsons 04:03  
rapidly as possible. And you report directly to who so I report directly

**D** Dr. Kimberley Spangler 04:07  
to the Deputy Assistant Secretary of Defense for Environment and Energy resilience within the Office of the Assistant Secretary of Defense for energy installations and environment.

**D** Doug Parsons 04:20  
Let's talk about the symposium. It's going to be in DC I always love getting to DC I used to live there tell us a little bit of the history of the symposium.

**D** Dr. Kimberley Spangler 04:27  
The symposium has been going on for decades. It is an event where we bring all the folks together who we fund with syrup and ESCP projects. And we also bring in stakeholders, colleagues peers from around the national and international community to have a scientific conference. Now in recent years, we've actually partnered with our operational energy innovation counterparts that has been amazing. This will be our second year doing And that we've then really brought in the entirety of the Department of Defense, innovation work for Energy and Environment.

**D** Doug Parsons 05:07  
Tell us a bit about some of those things, though, because part of the reason that I'm going to this event is that resilience is a major theme. And it hasn't always been, right.

**D** Dr. Kimberley Spangler 05:15  
Correct. So well. So since 2009, startup in ES TCP have been responding to requests from the department level on climate resilience that has really ramped up over the last several years, especially given direction from the administration and Congress. And you'll see that this year at the conference, how our investments are really playing out and how those technologies have been maturing,

**D** Doug Parsons 05:39

can you just give us a really broad overview of some of the ongoing or even recent projects that your office deals with?

**D** Dr. Kimberley Spangler 05:45

Definitely. So in the area of adaptation, we've been working a lot on our new initiative, which is the National innovations landscape network, I'm super excited about that initiative, I would love for you to be able to attend some of those sessions. But the bottom line is that we are working hand in hand with installation managers to test out our innovations in real time for regional aspects of the country and at different installations. And by working so closely with those installation managers, we are actually coming up with new ideas on the fly that we can put into place, working on things like wildland fire, working on things like coastal sea level rise, working on things like permafrost degradation, working on things like desertification for our installations in the West. We have a lot of great projects on that, and a lot of posters and technical presentations, and also policy discussions that will be featured at the symposium.

**D** Doug Parsons 06:48

Now I attended and did an episode around the climate resilience workshop that occurred in St. Louis in the middle of the summer. How are you guys related to that? .

**D** Dr. Kimberley Spangler 06:56

Yes So listen to your podcast on that that was a great podcast, able to hear from a lot of my colleagues there. So we are the counterpart conference to that event that happened during the summer. And what's really unique about startup and also the operational energy innovation programs is that we work hand in hand with the policy teams. So what you saw over the summer was primarily a policy focused conference that had innovation aspects of it. What we have here in November is an innovation focused conference with policy aspects also being featured. The key is that if we're going to make real change for climate adaptation, we need to be sure that we are integrating innovative work with the requisite policy.

**D** Doug Parsons 07:45

Can you give my listeners a preview of some of the keynote speakers and didn't even have to be the resilience focus speakers, but just folks that you've recruited to come to the conference, it looks like a blockbuster in that respect?

**D** Dr. Kimberley Spangler 07:56

Yes. So we have some very high level folks that are either current or former senior leaders within the Department of Defense, we'll have Daz D acting Mr. Michael McGee will be giving what we're considering the State of the Union of DOD innovation. We'll also have Miss Sharon Burke will be giving a plenary talk She's the former assistant secretary of defense for operational energy, Major General Constance Jenkins, will be there from NORAD. And then in

some of our sessions will also have former assistant secretary level folks. Now, it is great to have the support of current and former senior leadership. I'd also like to offer that this is the first year at the conference that we'll be having exemplar projects that will be briefing at our breakfast sessions. And what's great about that is that the entirety of the attendees of the conference will be able to see the breadth and the scope of the work that sort of ES TCP and the OE operational energy innovation programs are doing we'll see presentations by folks in their very early career, believe some folks are first year professors all the way through people that are just really preeminent in their field. So I think it'd be really great just to see that breadth and scope. And also to mention that where we do see a lot of innovation is exposure. And so if we can have folks in perhaps our climate space that are being exposed to the type of work that we're doing in our operational energy space being exposed, the type of work we're doing for remediating underwater, unexploded ordnance, there's opportunity there for really dynamic innovation. .

**D** Doug Parsons 09:36

Fantastic. So we're gonna get you back on at the end of the episode, and we're gonna dig in a bit further and what happened at the conference and more about your program. But I will see you in DC and I'll talk to you soon. Yes,

**D** Dr. Kimberley Spangler 09:46

looking forward to it.

**D** Doug Parsons 09:49

Hey, adopters, I'm back. And I'm with

**E** Erin Looney 09:51

Aaron Looney. I'm from MIT Lincoln Laboratory, where we're building up our climate resilience portfolio. And starting here with our connection with ESTPs new Climate Resilience Program fully.

**D** Doug Parsons 10:02

Oh,so you're working with cert up here. Tell me a bit about that relationship.

**E** Erin Looney 10:06

Sure. So I'm on the technical committee, which is the group of people that work to understand the proposals that come in, make statements of need for their portfolio and help set direction for new statements of need in the future. We also do site analysis sometimes which I gave a talk on here at this conference.

**D** Doug Parsons 10:22

Okay, tell me a bit about your role here at the conference.

**E** Erin Looney 10:24

Sure, I helped chair a session with the DOD to understand how climate resilience is impacting their critical infrastructure. I also gave a little bit of an insight into the analysis I've been doing on the budget breakdown for the DOD, fiscal year 2023, I took a look at the adaptation budget as well as the mitigation budget, which are both parts of climate resilience to understand how much is being funded in both areas, and how es TCP is critical to the adaptation piece of that, which is really important for DOD missions.

**D** Doug Parsons 10:54

Tell us a bit about that relationship in regards to that you're helping them set resilience policy, and it's kind of informing what they're doing here at the conference. Give us a bit about that.

**E** Erin Looney 11:03

Sure. So we're always thinking about how DoD missions can be more resilient, as a part of that is adaptation. So mitigation is one part of that. That's where you take greenhouse gas emissions away from the atmosphere, you do carbon sequestration for material, building materials, and a bunch of other things that are mitigation related, including renewable energy. But there's also adaptation, where you take measures to withstand the impacts of climate change. And that's really important for a mission resilience and our installations and the surrounding communities. So a big thing that ESCP does in three key areas, is understand how we can make our DOD missions more resilient by adapting them to the future climate. Those three areas include our large premier tools like decat, which is the defense climate assessment tool, or dorsal, which is the defense sea level rise tool, so we can understand how the large scale climate will be impacted. But we also look at key geographies, like the Arctic, which is greatly impacted the southwest, which will be greatly impacted with droughts, wildfires, etc. And we also look at the southeast and other areas in CONUS. So we help them set direction and how to do the best rd T and D, which is Research, Demonstration, test and evaluation to help all of those efforts.

**D** Doug Parsons 12:22

Okay, tell me a bit about the session. Don't necessarily all the speakers, but what were you hoping to accomplish? What's key messages were you trying to get out?

**E** Erin Looney 12:29

One thing I found in my analysis that I thought was really interesting was the DoD is heavily

One thing I found in my analysis that I thought was really interesting was the DoD is heavily investing in mitigation, which is something that other areas of the federal government are really interested in the DOD, DOD etc. Mitigation super important as about but about 90% of the budget was put into mitigation efforts for rd T and D, and only 10% was put towards adaptation. And ESC CPS program holds up about 30% of that, which means it's vital to the RTT, and D for adaptation for the DOD. And that part of the budget is held up with all of the programs that were on display this week, and that we're continuing to try to help the DoD with basically. So within that session, we had several different speakers, some very experienced ESCP speakers some less experienced, including Tom Douglas, who works in the Arctic for many years, who works on permafrost. We also had Michelle Michaels, who talked about the Alaska innovation landscape network, which is a part of a new program that es TCP is putting forward called the National Innovation landscape network are trying to really bridge the valley of death. So we can get our r&d into the field as quickly as possible with rapid cycles of iteration. So those are two we have others, including Peter Larsen, who works at Berkeley National Laboratory, he takes a system that's already in place, which is called builder within the DOD, and takes back into models to understand the economic impacts of climate change on components within each DoD building, to understand when we're going to have to replace them quicker and understand all of the economic fallout of that. And there are several other speakers on hydrology from the University of Delaware with Carolyn voter. Another speaker was Dan Feldman from Lawrence Berkeley National Laboratory, he was speaking about downscaling of global circulation models and to a regional or local level. So it can be used by an installation or DOD installation, or community around that installation. That's a community that has a bunch of experts from all across the board. And he's really bringing together a community of practice around that area of science in a way that's never been done before. So I was really exciting to see that

D

Doug Parsons 14:37

you gave a presentation, what was the title of the presentation? What were you trying to share in that?

E

Erin Looney 14:41

Sure, it was kind of an intro to the entire topic of critical infrastructure for the DOD and climate resilience for that critical infrastructure. And the point of that talk was to really get across how ESC CP is playing a vital role in the space for three main ways. One is that it's aligning itself with two of the climate adaptation plans priority is one is climate informed decision making. And the other is resilient, built in natural infrastructure. And it's the premier RDT and E part of those two priorities of the DOD. So it's really playing a vital role in that area. It also has two other really unique features. One of it, its features is that it does six one, which is basic research all the way through to demonstration and evaluation. So it's in the hands of practitioners out of DOD installations, that's really the entire development pipeline, which is rare for an institution to support all of that. The third way it's really unique is that it brings in state of the art climate science from all area. So it takes research from the DOD, from other national labs, from academia and from industry. So it takes from all of the best of climate science and brings it to our missions. And that's really unique.

D

Doug Parsons 15:50



**D** Doug Parsons 15:30

Okay, so I did an episode A while ago, looking at all the federal agency adaptation action plans. And we've looked at the Department of Defense. And I think on one of your slides, you had it up there as the various documents and reports and strategic plans that are guiding the Department of Defense. So that adaptation action plan that came out in 2021, how does that guide down into the level what sort of is doing?

**E** Erin Looney 16:11

Sure, yeah, so it's highly aligned. Serbia's TCPs climbers lines portfolio goes back, and was anticipating the needs of the DoD way before the DoD knew it needed that. So that's really great for your CCP to be anticipating those needs, all the way back in 2008 2009. The first statements of need were put out by sort of an ESTP, to look at climate resilience for the DOD. And the DoD didn't put out anything until about 2013. So it was really revolutionary is leading the way in in this area. So going forward from there, and 2022, the Climate Resilience Program was started, that was about over 10 years after they had first put out there first statement of need. And that was a year after the climate adaptation plans you were just talking about were released. And so it's highly aligned. And the team works closely with the policy team that writes those reports to understand the rdt. And he needs for all of those priorities. So I mentioned before there were five top priorities. And the needs of use TCP that are put out, are directly aligned with those priorities in different ways for anywhere from the high level policy down to your key geography.

**D** Doug Parsons 17:16

It's a big issue within the adaptation sector of using the language of resilience versus adaptation. And so the department defense had an adaptation action plan, why was in a colder climate resilience plan? Because most of time you're hearing DoD use the word resilience?

**E** Erin Looney 17:30

Sure, that's a really great question. Definitions are really hard in this space. I have a graphic that has resilience built on top of mitigation and adaptation. Those are the two key founding stones to build resilience. Mitigation is the greenhouse gas portion. And then you have adaptation, which is what the plan was named. And adaptation is probably the preeminent part of yesterday's plan. If you break down all of their sub priorities, 13 of those are adaptation related. And three of those are mitigation related. So adaptation plays a large roll. And I think the DoD strategy if you read their documents, and yes, TCP primarily supports that with RD 20.

**D** Doug Parsons 18:08

When you look at the DOD, they're doing a lot of ambitious things around adaptation and resilience. Do you see that they're interacting with other federal agencies? Some of them are farther behind? Or is it just everyone's kind of doing their own thing? Is there that cross agency integration,

E

Erin Looney 18:22

sort of talking about federal agencies? So the DoD definitely has its own climate action plan, and the executive order put forth a mandate for all federal agencies to put out climate action plans? If you read them, they're somewhat related. But I would say that they're pretty unique to the organization and the needs of those organizations. I think the DoD is a little bit different in that it's so mission focused. So everything that's done whether mitigation or adaptation related has to be to further the mission of the DOD.

D

Doug Parsons 18:52

So we're here at this conference, anything stand up for you?

E

Erin Looney 18:55

Sure. Yeah. I think it's the biggest amount of attendance that they've had at one of these conferences before, I think over 1300 people are here. And that's great to see, I think there's a lot of interest both we have a new director of sort of beanies, ESCP, which has brought a lot of interest. We have people from outside of the community coming in, which is great for cooperation. And you have all of the projects, hundreds of projects here presenting posters, and other our r&d that both support the DOD and the surrounding communities, which represents millions of Americans.

D

Doug Parsons 19:24

Okay, for me, just being an outsider is a bit bewildering the amount of projects that sort of funds and it's kind of exciting, but at the same time, how do they keep track of all this? Is that part of the process? And when you think about even the conference next year, are you able to identify gaps? Okay, this is what we're doing strong. Do you have that conversation like a month or two after this conference?

E

Erin Looney 19:42

Certainly, there's a lot of after action that happens after any of these conferences, both reports come out, meetings happen, and it's really a way to strengthen those connections, where people are all over the country. I specifically am at MIT Lincoln Laboratory, which is in Lexington, Massachusetts, but a lot of the people that I work with r&d You see are in Georgia are on the west coast in the middle of the country. So it brings us all together. And after this, I think our ties are a lot stronger. So when we get together for our sometimes four times a year meetings, we have one other conference in the summer, but we don't see each other often. So it's really a great way to connect. Did you have a favorite poster, a favorite poster? I really like Dan Eisenberg's poster on resilience, they have a game where you can test resilience, and a kind of a dystopian land. And so it's a game to understand how resilience is played out. And you can actually play the game and see how resilient you are, and resourceful you are.

**D** Doug Parsons 20:39  
Thanks for coming on the podcast. Hey, adapters, I'm back. And I'm with Dr. Daniel Eisenberg. Hey, Daniel, nice to meet you.

**D** Dr. Daniel Eisenberg 20:48  
How's it gone?

**D** Doug Parsons 20:49  
I have you on and you're the only person that I've have on that is focused the there's a poster that you did, and I was really impressed with what you're doing there. So you know, we're gonna dig into that. But just that 30,000 foot level, what were you saying that poster?

**D** Dr. Daniel Eisenberg 21:02  
So the work that we're doing for the strategic Environmental Research and Development Program is trying to understand and adapt to environmental surprise. So this includes trying to think through new theory for how surprise effects are infrastructure systems for military installations and communities, as well as developed tools and games to try and train people to better understand and think through resilience problems as well as surprise.

**D** Doug Parsons 21:27  
Okay, and I forgot to mention, where do you work? Yeah.

**D** Dr. Daniel Eisenberg 21:31  
So I'm an assistant professor of operations research at the Naval Postgraduate School, I'm also the Director for our Center for infrastructure defense. It's a research group that's been at the University for many years operations research. For those who don't know, it's kind of anything you would think of for data analytics, optimization, data science kinds of stuff, we do all of that. The NPSL, our department's, like the oldest in the country, and potentially the world, started back in the post World War Two, and we've been studying infrastructure vulnerability and resilience for a very long time. Okay, so

**D** Doug Parsons 22:03  
I'll be honest, what really stood out for me on this poster you weren't there at the time when I looked at the poster. And there was talk about, I think, some of this modeling that's happening, and that you highlighted that there's events that are just very regular and predictable. If we're talking about rain, these are things that we know, but then there's these rare events, like maybe a hurricane along those lines, but then you had this language. And please correct me

that I just interpreted this wrong. You have surprise events. And now you are trying to help. I guess the military here plan for those things that are just completely random and just haven't been thought about before is that a good way to sort of talk about was in that poster? Sure.

D

Dr. Daniel Eisenberg 22:38

I wouldn't use random because it implies certain things in our statistics world, but so we try and distinguish. In general, we're trying to deal with big bad disasters, natural disasters, adversarial threats, things like that. Surprise can be thought of in a couple of different ways. From an infrastructure management perspective, we talked about three different states. One is like normal variation, which are events that you can kind of expect based off of normal maintenance and operations planning, pipes will break power lines will go down just from normal operations. Situational surprises are events that it's like playing the lottery and winning, you know, it's like a rare event. But it's something that you could anticipate, and it works within your model of how the world works, right. This is a major blackout, and it was caused by a hurricane that just blew over and knocked over a bunch of power lines. Then there's these other events that we're trying to get a better handle on that we call fundamental surprises. This is really related to just us not even knowing things about the world, that we're living us not knowing things about the systems that we operate. So these disasters actually trigger new knowledge and new thinking and create problems that we've never seen before. And the question is, can we try and adapt to those, right? At least theoretically speaking, we can try and even model and study situational surprise using techniques that have been well established over the years for mathematics. But whether we can model and study fundamental surprises and open questions, we have to experience the disaster to really start dealing with it, or can we try and train and adapt to it before they actually occur? One case study that we completed, which was on Marine Corps Base Camp last June, after it was hit by Hurricane Florence. That was a major storm. But that region has experienced many major storms before. So it's like why was this one so much worse? What happened during this event that was potentially a situational surprise, or a fundamental surprise, we found that fundamental surprise really affected certain decision making like with the reopening of schools and different base infrastructure, because people just weren't thinking about the mold and other kinds of impacts that were going to occur, which hadn't occurred from previous disasters, and so they just completely overlook it. And the question is, we can now identify when fundamental surprise happens, what it looks like, can we now get people to better adapt to them in situ right before they occur, and ideally when the actual disaster is occurring? So

D

Doug Parsons 24:59

I've been involved with was scenario planning in a previous life? So would this be like a tool, fundamental surprises be sort of an aspect? Because a lot of that scenario planning, you do come up with these worst case scenarios? And is that just another some language that you're trying to go with this fundamental surprise concept? In

D

Dr. Daniel Eisenberg 25:15

a sense? So actually techniques for assessing and identifying worst case scenarios, to at least in the mathematics and the things that we try? And do, we have techniques that can figure those out for us to a certain extent, this is somewhat beyond this notion of worst case, right?

It's it's trying to deal with the situations or the events that you just couldn't define a priori. And so in a certain context, if you had, let's say, an infinite budget, and you can name all your scenarios in some kind of established risk management program, you could make it so the hurricane just blows over and nothing happens. But it turns out, there's parts of our infrastructure, whether it's our water systems, or power systems or installations that we just don't even know how they work or what they're doing. And so when the hurricane blows over, we just don't have that perfect information to act upon it. How do we build an adaptation and capabilities that allow us to reconsider, and even transform and change the way that we're understanding the disaster as it unfolds, which is different from hardening our infrastructure or designing a particular way to deal with the risks that we can identify? So

D

Doug Parsons 26:27

a lot of agencies, they have triggers and policy triggers based on storm events. And I'm just thinking like this notion of fundamental surprise, they need permission to release funding based on metrics and such. And so do you see policy applications like what you now have this concept of fundamental surprise, it's sort of it allows you to just bypass all these other things, because it's such a radical, and I'm using language that maybe statistically, like you said earlier, is off, just excuse me, I never took steps that I'm trying to think of the applied applications of this concept like embedding it within policy development.

D

Dr. Daniel Eisenberg 27:02

Yeah. So one application, right. So the camp was one case study, for example, what we've essentially identified from a practical standpoint, is situational surprises, practically speaking, are usually budget or resource limited, if you just had more money, more manpower, more equipment, you could likely deal with them. Because your decisions that you're making are solving the problem as you see it fundamental surprises do not get solved by just flooding the zone with more money. And so there are potential policy applications and or ways that we can have triggers where it's not just solve the problem. And like the traditional emergency response, or emergency management, let's just get a lot of money and resources to this location. But actually spend time and realize that we need to adapt our models adapt our understanding of the system before we start applying those resources. So the key idea here is to distinguish between those events that if you were to just, you know, activate the congressional budget to support this disaster, you will manage it well versus you need to spend time and think of a new solution before providing those resources. In the fundamental surprise context, providing more money and actually acting on it too quickly could make the disaster worse, because you end up trying to fix things in ways that don't actually work. You end up wasting resources, potentially hurting people causing more pain.

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Doug Parsons 28:29

Okay, I'm going to push a little bit further here, though, can you give me like an agency or a process or an event where they're using this notion of fundamental surprise? It's, you're applying it on the ground?

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Dr. Daniel Eisenberg 28:40

Yeah. Well, it's kind of new. So we have developed some training tools. And we've been trying to get folks within the naval facilities command NAVFAC. So we're part of the civil engineering Corps officer school sea coasts. We've been doing training with them, who are essentially all the public's works officers who work for naval installations, to try and get them to at least understand these basic concepts. Currently, though, I wouldn't say notions of situational and fundamental surprise have been directly applied and policy even though they could be they're relatively new this is served up as a funding program is basic research, right? So this is like new concepts, even though their initial ideas are coming from like military intelligence, community literature from back in the 60s and 70s. They've never been used in infrastructure never been actually applied in emergency management explicitly. We're doing our best to develop trainings and still work with the Navy. We've been doing work with DHS training programs related to FEMA, and other folks, we're in the kind of broader DHS ecosystem, as well as we've done trainings with other militaries, foreign militaries to just get these basic concepts there. So hopefully, in the near future, there's actually policy and or practical decision making like on the books that supports this kind of response. Okay, so

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Doug Parsons 30:01

you're talking about the scale of military and these sort of partners, but a lot of my listeners to or local government, people, urban planners, and I see potential experimentation with this concept is your information available to the, let's say people listening to this? And they're like, I mean, it's your poster. And this whole concept has a lot of probably interesting work could be happening out there because people are looking for models outside the normal adaptation planning process.

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Dr. Daniel Eisenberg 30:26

Yeah, I worked for the Naval Postgraduate School, but we're not necessarily just talking about Navy infrastructure here. These theories apply to civilian systems as well. For example, we've been working closely with the University of the Virgin Islands and helping them develop their new Hazard Mitigation resilience plan for the territory, which there is no military installation out there. It's just a bunch of communities, some small islands that have deal with really bad storms and hurricanes, droughts and disasters. And so they're trying to incorporate notions of surprise and surprise management, in their Hazard Mitigation resilience plan, which is a actual policy that has to be on the books for FEMA to provide funding to the territory for the next disaster. So the things that I'm talking about, actually, we focus more on the military installation, and even islands scale, we've done work out in Hawaii, we will have done work, like I mentioned, for various military installations like camp lagoon, Marine Corps, base, Hawaii, places like that. We've worked in Rhode Island, Naval Station, Newport. So these are all places embedded in communities are at the scale of communities more so than militaries. Right? I'm actually doing less on the Pentagon level than I am doing at the local level. Has it been a highlight at the conference for you? The highlight of the conference for me? Well, you know, it's always exciting to get together with other folks that, you know, I was pleasantly surprised with some of the other researchers that I know in the field that have come here this year is actually I would say, the biggest cert at the STCP symposium I've been to, I think it's because they integrated with the OEI F and other offices, I don't even know these acronyms very well myself. So look them up, but various places in the Pentagon. And so it's been really interesting

seeing just like kind of this groundswell of individuals that last year, the rooms were partially full, and now there's spilling out the doors. So that's probably the nicest surprise to me. The content is always good. And the people are always interesting, but just the fact that there's kind of a growing community is kind of exciting.

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Doug Parsons 32:20

If someone was really curious and they want to get in touch with you, what would you recommend?

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Dr. Daniel Eisenberg 32:24

Well, you can go to our website, [nps.edu/cid](https://nps.edu/cid), that center for infrastructure defense, you can reach out to me Daniels at Eisenberg at NPS study to you. I'm always interested in working on infrastructure management, surprise studies. And we have an online game that you can play it's disruption with a y dy s [disruption.net](https://disruption.net). You can go check it out. And it's kind of like a basic version of what we've been using for our training. Thanks so much for coming on the podcast. Thanks for having me.

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Doug Parsons 32:55

Hey, doctors. Joining me is Kevin hires. Kevin is the Climate Resilience Program Manager for SC RDP and yes, TCP. Hi, Kevin. Welcome to the podcast. Hi, Doug. Thanks for having me. Oh, all right. Great, Kevin. So before we get started, I just want to acknowledge that you and I actually go way back, we went to graduate school together at the University of Georgia, and the ecology program there. And when we saw each other at the DoD conference in July, we knew each other, but we weren't quite sure where it was because it had been so long. So it was amazing that we went that far back, right? Absolutely. We had to go do some consultations just to find the connections. But finally to let's pivot a little bit here. First off, before we get into the conference, what is your role there as manager for the Climate Resilience Program? So syrup is a research and development program within the office of Secretary of Defense and es TCP is a demonstration and validation program. So as a program manager, I simply help set the strategic direction for those programs under my purview. And we manage a technical committee that selects, solicits and selects proposals to do the science that we need to meet our climate resilience goals as a department. Before we dig into more details about your program there, this is being recorded after the conference. And we're going to talk a bit more about specifics from the conference later on. But just some 30,000 foot view, like first impressions, what were your thoughts about the conference, it was amazing. We had the largest attendance we've ever had for sort of innovation symposium, we had just the breadth of talent and topics that were discussed across all of our research programs, from environmental restoration to biodiversity conservation, and climate resilience was pretty amazing. And the quality of work being done by the performers, really exceeds all expectations. So it was, I think, without a doubt, just one of the best symposium that we've ever put on. Okay, let's dig into your program a bit more. Now. The resilience side of things. I mean, you guys are there directing funding, research and such but the Resilience Program is relatively new. How long has it been there? At your program, I mean that will the office there. We've invested in climate resilience research, as well as demonstration evaluation for a long time. But having a separate

standalone climate resilience portfolio is just about a year or two old depending on when you start the clock. So with this our second fiscal year that we've been soliciting and funding projects under a standalone Climate Resilience Program, and as such, we are relatively new, but that novelty really doesn't reflect the depth and time that we've been thinking about climate resilience, thinking about climate change, and adaptation and requirements that the department needs. Those projects actually have been at least part of our portfolio, although they can all the way back to about 2008. So a lot of groups out there that you fund, the lot of them haven't been doing adaptation, planning, resilience planning for a while. And they're going to have to just thinking about resilience. And when you come up with, I guess, ways of getting these research dollars out there, how does that all work? Because there's probably some learning going on from the people that actually want to apply for research grants, right? Absolutely. In the Department of Defense is a pretty unique organization. It's massive for services that each have unique combinations of needs. They occupy different landscapes, and then have research partners and outside agencies and economic performers come in and try to compete for the application of their ideas for the Department of Defense needs, often does take a translational piece, performers have to understand the military mission, they have to understand that the department, though people have an impression, it's top down. It's very decentralized. Each installation, or facility has kind of a unique combination of threats via environmental or encroachment that got a unique combination of mission requirements, Air Force, Space Force, Navy, and so being able to really give those academic performers or research agencies a sense of how their technology or their tools or their models might be useful for the military mission is an essential part of the outreach we do. And what about your team? So the program itself is relatively new, even though you've been doing the work for a while? Do you have a big team there? How do you guys do everything you do? So the program office while it's pretty small, we only have five program managers and Executive Director, the support staff through our operations and maintenance contract with nobilis is pretty large. But we have within the climate resilience, folio, we have probably seven or eight individuals that support my program, doing everything from strategic communications to document review, to organizing proposal reviews, and our technical committee and peer reviews of projects. So we do have quite a bit of support. But the real work is done. But the project PIs themselves the principal investigators that are applying for the funding, and the bring in their innovative ideas to try and bring the market. So you have this resilience tracking is the first time that you this annual conference has done that. And so I was there and it was just huge. You had so many people there and there was so many different things going on. Besides resilience, my head was kind of spinning, figuring that out. And obviously my focus for that episode is on the resilience work that you're doing. But with this resilience track for the conference, can you tell us how that unfolded? If this was your first time, what did you really hope to accomplish with it. So we sponsored several tracks to try to give folks an idea of what the Climate Resilience Program is currently and where we are trying to go with our investments in research development technology to support adaptation and mitigation. The first track was an overview of the program. And we brought in a variety of projects that we funded everything from linear features in the Arctic, such as roads and firebreaks, and constructing them on permafrost to coastal resilience and wave modeling off the coast of Virginia. And so to really give that program overview so that attendees kind of get a sense that, that climate resilience is broad. That certainly doesn't prevent us from doing deeper dives, though. And we had a separate session that we sponsored on coastal resilience with the expertise that we have represented on our department events Climate Action Team, which is also within our organization, supporting those policy needs and the data needs is essential. And so doing a coastal resilience focused Special Session allowed us to also show 10 ds that were capable of supporting the depth needed on the strategic areas that are affecting the department, as well as covering the breadth of the kinds of crises that we'll face as climate change continues to affect military



installations across the globe. The third special session that we sponsored though, was one of my favorites and that is an innovative approach we introduce an innovative approach to technology transfer through CO production within user communities, rather than seeing research and development and adaptation as a sort of linear process of science support from idea generation to refine Meant to hand that hand off to an end user community. We've actually embraced CO production stepped into those in user communities through a series of pilot projects called the National Innovation landscape network. And we're doing that with partners, agency partners, like USGS Army Corps of Engineers, US Forest Service, US Fish and Wildlife Service. And we're doing it with our science investment, as well as the managers and engineers out on installations and their partner landscapes. And so that focused and introducing that focused and CO production as a thematic area that's essential to adaptation is something that really was excited well attended and well received. So you been doing this for a while then even though you have this new Resilience Program from the conference, did you have to have any takeaways that really is going to help inform doing something maybe a bit different in your program? Absolutely. Essentially, we know we have to go faster research and development, when done well can be super strategic when we're thinking about science needs and support for the next decades problems. But increasingly, we're being asked both within the department and through partners, we're being asked to produce results much faster. And so we took away a variety of ideas, both in conversations and presentations, for how to improve the speed and responsiveness of our program. One of the themes that we're really highlighting within the climate resilience portfolio is going faster, and being able to deliver priority needs to the end users with their engagement throughout that process. And I'm excited to see how fast we and how responsive we can be across the entire syrup and ESTC portfolio, I came away with a variety of opportunities and ideas for at least how we're going to do that within climate resilience. John Kongers, part of this episode, and he spoke at the conference. And his thing is how do you speed up this what you're just talking about there. And so he has a lot of interesting things to say, because his own previous experience in government, and I want to bring up I went out to dinner with you and several of the guys there and you guys were just on a roll and innovation and doing things more efficiently. And I had trouble keeping up because I wasn't doing the work that you're doing. But that dinner, you're you were talking about the things that you're talking about right now, though, right? What are some of the ways that you could really just make everything more efficient? Could you maybe just give some insight on that, we have to not just think about whether or not we're funding a new technology that's ready for an end user to refine and utilize, we need to think about how everything from top to bottom, how we can change processes. So what John and I were discussing at length is contracts are often the most time consuming part of research or technology acquisition. And so taking advantage of every single tool we have available to get through the acquisition phase, contracting cooperative agreements, interagency agreements, thinking about what is really the logistics of acquisition as a research and development program, and stepping back and asking What about our processes need to change and that doesn't mean they need to change wholesale. But do we need to add another tool to the toolbox, we need to be thinking about the way we coordinate with other funding agencies as well as thinking in creative ways that are really outside the box. And my hope is that in working with folks like John Congre, they have a tremendous amount of experience in budget and planning, that we're able to communicate our own programmatic innovation, in trying to improve our responsiveness to the end user needs requirements, and the landscapes change changes that we're already experiencing across the department. Kevin, going back to the conference, it's been a little bit of time, but the poster sessions were amazing. Again, I got kind of whiplash looking at the diversity of the research that you guys fund out there. Was there a couple because you can't go into too much detail that you that stood out for you that you were really impressed. I really don't know that I can pull off just one out of the hat. I think there were more than 1400 posters represented across

what four nights of presentations. And they really do just cover a tremendous breadth. One of the things that I was really excited about was one poster in particular was presented by Dr. Gina Henderson at the Naval Academy. And she's been working on issues of glacial melt and the late summer storms that impact the west coast of Greenland. And that project is a tremendous example of how we're not only leveraging great scientists like Gina, but also our future leaders in the services through our work and focus with the service academies, on those projects being performed by future officers. For those out people out there, maybe just in doing research, but they weren't familiar with it. You guys are up to what do you recommend that they do to interact with you? I guess there's a formal process and such but hopefully there's informal ways that they can kind of communicate with your program. Absolutely. One of the ways that we were hoping that we can be responsive to both ideas and in user requirements is Through the innovation landscape network as we've established the initial five pilots, and we're hoping to expand that to seven by the end of next year, we're hopeful to have coordinators that really are embedded within those key geographies. They have high concentrations of department of defense assets. And so from the departmental perspective, we're hoping to continuously perform a needs assessment with our end user communities and our research partners through those more dynamic CO production relationships. Outside of that, we definitely host workshops to evaluate science needs requirements across all of our program areas, we do that frequently, when we met up there, the St. Louis climate resilience workshop, we actually were co hosting at that workshop, our own science needs assessment for ecosystem process models. And so we try to bring in the science and engineering community whenever we can to really unpack whether it's a class of tools like that, or a topic, like invasive species in the Pacific Islands. We try to work with our partners to understand the need and prioritize the research opportunities. Can you give us a favorite moment from the conference overall, the workshop, for me really comes down to having people exchange ideas. For me, the National Innovation landscape network special session, listening to Deb Loomis have who has a policy vision for how adaptations going to occur within the Navy, have her relate her fearlessness and risk tolerance, the idea that we have to go, we gotta get off the beach, the old saying, Ryan, saying the department and its leadership is capable of taking good risks with respect to our focus on adaptation and science support for it. We're not afraid to fail. And as she said, in her speech, to fail fast, fail forward, we're going to learn fast, but we're going to learn through action. And that really was inspiring to me. All right, Kevin, it was a treat to have you on and just fantastic that we were able to reconnect after so much time and it sounds like you're doing amazing work with the Department of Defense. Well, thanks so much, Doug for having me. It's been fantastic to listen to your podcast and now to be a part of one. Hey, adaptors Joining me is Deborah Loomis. Dad is the Senior Advisor for climate change to the Secretary of the Navy. Hi, Deb. Welcome to the podcast.

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Deborah Loomis 47:28

Hi, Doug. It's so great to be here.

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Doug Parsons 47:30

I'm talking with someone with the Navy. Can you briefly tell us what you do there as the senior adviser?



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Deborah Loomis 47:35

Yeah, briefly is a good word. So I'm the Senior Advisor for climate change to the Secretary of the Navy. And one thing to clarify right out of the gate is that means that we oversee both the United States Navy and the United States Marine Corps in the Department of the Navy. And as the climate advisor, I advise and champion our efforts across an entire spectrum. You can imagine those two organizations are vast, and it's everything from we have doctors and public health systems to institutions of higher education and how you're integrating climate change into curricula. We have of course, bases all around the country and around the world. And so looking at from an adaptation perspective, how we installation, master planning and facilities and all sorts of things. And then of course, as we have ships, we have aircraft, we have tactical vehicles, and there's so much in between it is broad, and it is a lot of fun and very challenging and a real privilege.

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Doug Parsons 48:40

You alluded to it, but let's dig a little bit deeper there. So how is the Department of Navy working in climate adaptation?

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Deborah Loomis 48:47

Well, we are as a coastal organization, of course, that's what immediately comes to mind is your the Navy and Marine Corps you are on the coast and we certainly are we have installations or bases from Maine to Hawaii to Japan and Korea and Guam. So climate change is on our doorstep in a very real way in those places. And we are implementing all sorts of solutions from the built environment and kind of traditional infrastructure like sea walls, etc. To nature based solutions, living shorelines dune restoration as mangroves you name it and hybrid solutions. What people think about less is that actually some of our largest bases are in the arid west. So we have Marine Corps Air Station Yuma, which is in Yuma, Arizona, and it is very dry there and it's a million acres. Similarly on the Navy side we have Naval Air Weapons Station, China Lake that's the United States Navy's largest base, and it's in a very dry part of California and that is also a million acres. So the challenges and adaptation are very different in Canada. Coastal context versus a desert context, then you've got a whole range of other issues related, of course, to energy resilience, and things like that. So we are really tackling adaptation across a spectrum of different challenges.

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Doug Parsons 50:15

So Kevin hears he's from syrup, and he's part of this episode, he said, he saw your talk and the innovation landscape technical session. And he said, one of the highlights for him was that you challenged everyone to not fear failure, but but to fail forward through action and learning. What did you mean by that?

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Deborah Loomis 50:31

Yeah, that's great. And Kevin has been a wonderful partner to us. So when I as the climate advisor, look at climate change, and sort of what is the most wicked problem that I see for civilization for society going forward, I think about water security. And that document, and what of

civilization for society, going forward, I think about water scarcity. And that downward spiral or when land starts to fail, and it's not supporting crops or it's not providing as much water you get sort of this like death spiral of a ratification, desertification, and water and food insecurity. And we are facing that we see that on our western bases and thinking more geo strategically, as the United States Navy, as an organization whose mission is national security. I think about those problem sets in other parts of the world, from the Middle East, to Central America, to Africa, of course. And so I really wanted to use our installations in the West as a testbed as a, let's figure out how you can take installations that are getting drier and drier. And climate change is putting its finger on the scales of that. What can we do to rehydrate those landscapes make them more resilient, and that has tremendous benefits for us so that we are more resilient. And as a security organization, it can be a demonstration for the world. When you do that, when you're operating in sort of this, like, I won't call it a blank space, because there are people and examples around the world who are doing great things, but it is a less well understood space. So when you're doing that, you're gonna fail. But the objective is to try different things and to see what works. And that is a very uncomfortable place, sometimes in any organization, certainly in the Department of the Navy, where people don't want to take great risks. And don't I've had people say to me, Deb, this could fail. And I said, Yes, great. Let's go. Because the last point I'll make is in in the context of climate change, we know this is the critical decade, we need to move the needle significantly, by 2030. On climate, we cannot just nibble around the edges, we have to make a difference now.

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Doug Parsons 52:46

So you answered I think part of this question, but I want to bring it up in the context of something you and I chatted about before. And so what does it mean to view climate change through the lens of water?

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Deborah Loomis 52:56

Sure. Well, of course, when we think of climate change, we think of greenhouse gases. And they are, of course, what is driving climate change. But when you think about how climate impacts actually manifest, what is it that we are kind of on the receiving end of you think of things like wildfires, sea level rise, drought, flooding, and an extreme precipitation and storms and glaciers melting and temperatures rising? Well, what is the common element in all of those impacts, they stem from the water cycle. And so it's really about an In fact, water vapor is the most abundant greenhouse gas, a lot of people don't know that. And water vapor drives the temperature dynamics on this planet, that is not to discount the role of co2 and the other greenhouse gases, which of course, are what's aggravating the watercycle. Like looking at what we have to contend with climate change, it's too much water, too little water or water that's in the wrong place at the wrong time. And so that's what I mean, if you stand there and look at climate change, now you sort of see different actions to take are additional not different, I want to be clear, because we have to go, we have to electrify we have to get off fossil fuels, as quickly as possible, go pedal to the metal on that. And there's a whole nother suite of actions that we need to take if we really view it through the lens of water.

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Doug Parsons 54:28

Again, you've used a lot of examples here, but I'm just I guess, getting specifically to can you

help my listeners connect nature based resilience and climate adaptation to the Department of Navy's mission and I mean, you've touched upon these things, that nature based approach really is important for you guys,

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Deborah Loomis 54:43

for sure. We are looking at I said our western bases and in places that are very dry and we were trying to organize a workshop recently and I wanted to set up a kind of site visit to this space, and the base was like not really sure We're about water resilience and why it mattered. And they're like, we're kind of busy. And we can't really hope. And oh, by the way, we can't host you right now. Because that hurricane Hillary that came through the West Coast, people thought it wasn't such a big deal. But it took out most of our roadways on our range. They're impassable. So we couldn't bring you out if we wanted to. And I said, well, that's kind of why I'm coming out, actually. Because I really want to look at how can we leverage nature? How can we make those soils deal with an infiltrate more water so that when it comes in these increasingly flashy flood events, an increasing kind of speed and ferocity, your lands are better equipped to deal with it, and it's not washing out your roads? So that's an example of kind of translating it for people have now they see the connection of how you can leverage nature to ameliorate a real problem that they're dealing with?

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Doug Parsons 56:03

How does adaptation fit in with education at the Navy? And I'm just thinking top to bottom how you guys bring that in?

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Deborah Loomis 56:09

I think it's a great question. I mean, climate literacy in general, we could talk about sometimes people don't see how climate connects to them. And I'll make a quick, may be non adaptation, maybe it does fall in the bucket of adaptation. But I was down at Marine Corps Recruit Depot Parris Island, which is in South Carolina, very recently, and I was speaking with a commanding general and I said, what is most important to you? What do you care about with climate change, and he said, as a recruit Center, where we train Marines, we build Marines, as they say, down there, I worry about heat, there's a technology that they're experimenting with, where the Marines will have kind of a device on their chest that kind of like a heart rate monitor, and then the drill sergeant or whatever leader of that unit, will have on their phone, an app that says private, so and so is that 107 degrees, we should go check on him or her. So that's what he was really concerned about heat. And he wanted to make sure I was keeping tabs on this. So then I went back, I came back to the Pentagon, and I asked a Marine Corps headquarters, I said, hey, I'm interested in hearing about this technology. And they say, Why do you care? You're the climate advisor. And then it was a very short conversation to say, well, heat is going up, and I care about the safety of Marines. And heat is relevant to climate. And so they connected the dots. But the first instance was not connecting heat, and the safety of Marines in bootcamp to climate change consideration. So it's an ongoing process of having people sort of see themselves in the climate challenge. And then, of course, in sort of strict adaptation terms, you've got people like Master planners, and facility engineers, and natural resource managers are on the front lines, if we're talking specifically about nature based solutions, I think the

challenge there or the gap we're trying to fill in, it's not a total gap. But I think we need to reinforce this understanding of solution sets. And it's sort of a cross, we had a lot of biologists that are brought here to work on things like endangered species, or complying with environmental laws, like the Clean Water Act and things like that. And then you've got engineers who are there to build buildings. And there's this nexus between the two of adaptation solutions. And I think that is a real growth area that we're trying to get better at and get cross pollinate and get people smarter on.

**D** Doug Parsons 58:38

Yeah, I think only recently, people really associating extreme heat is the number one killer were associated with climate change. At the moment, people aren't really dying of sea level rise at the moment. And so yeah, it's getting a lot more attention. So that's great. Okay, can you tell us a little bit about your partnership with syrup? How are you partnering with them? How are they resource with you,

**D** Deborah Loomis 58:57

startup and Kevin Harris, who you mentioned, they have come alongside because as I said, at the outset, I had really picked out the West, as a proving ground that I said, I want to do the hard things, we can figure out how to rehydrate these landscapes and make sort of ecosystems thrive again, we will have moved the needle and we will have done a service not just for ourselves, but I think for humanity. And we wanted to do that at scale, because our largest bases are out there. And so what Kevin hires and the startup team was looking for innovation on landscapes at scale. And so I think those to an end he wants to do the r&d and really trial different approaches, because we both recognized as I said, sort of at the outset, the time for nibbling at the edges and doing like little pilot projects, which you then hope one day someone will pick up and scale we don't have that luxury of time. And so that's the challenge. How do you go big and fast all at once? Why AI doing it smart, and you're gonna make mistakes. And you just have to have a tolerance for that. And people have to be okay with that. But it's not easy. But Kevin has come alongside to provide. So we are serving as his, the Department of the Navy is serving as the head for that Southwestern landscape innovation network. So that's how we're working together. Fantastic.

**D** Doug Parsons 1:00:21

Okay, last question. What's next for you? What's going to be keeping you busy in this climate change space?

**D** Deborah Loomis 1:00:27

As I look to the next year, I'm really focused on institutionalizing an adaptation. I don't know if it's a core but a capability and all the way around from what does that really mean to do an adaptation well, and to have it be just in the fabric of how this organization does business? I mentioned right now, there's a kind of a seam between our environmental staffs, which are there to do compliance and our engineering staff's, which are really more focused traditionally

on kind of cement and steel and building structures. And that is reflected in our trainings in we don't have enough data like to GIS geospatial data, our geospatial data right now is really focused on things like structures and utility lines, and not on that natural environment to know, hey, when we are expecting this sea level rise projection, what does that mean for this base, and different bases have done different assessments and different studies, but as an enterprise, as a department, really understanding what our risks are, what our vulnerabilities are to kind of real loss of property to loss of mission, etc. and then providing people the education and the training on adaptation and adaptation solutions, I'm really focused on solutions. I am not a scientist. And so for better or for worse, that comes with good and bad, but I have like kind of little patience at this stage for another tool that's going to show me my risks. I got it, I can appreciate that we have risks, and we can always refine the risk. What I really more interested in right now is what are we going to do about it? Let's work on solution sets. And so I think getting people familiar with the range of options that are out there, and when What do you care about? What are the important metrics in an adaptation context? And to me, it's, that's right back to water. It's how is your land? Or how is this infrastructure going to deal with water and with heat, etcetera. So that's what I'm trying to do is really institutionalize that adaptation, capability and capacity.

**D** Doug Parsons 1:02:38

Excellent. Well, Deb, thanks for coming on the podcast. And thanks for the work that you're doing there in the Navy.

**D** Deborah Loomis 1:02:43

You're welcome. Thank you so much.

**D** Doug Parsons 1:02:46

Hey, adapters. Joining me is Michelle Michaels. Michelle is the Arctic innovation Portfolio Manager for the Office of the Assistant Secretary of Defense for energy installations and environment. Hi, Michelle, welcome to the podcast.

**M** Michelle Michaels 1:02:58

Hi, Doug. Thanks for having me.

**D** Doug Parsons 1:02:59

That's a really cool title, Arctic innovation Portfolio Manager, give me a little bit of the history of that.

**M** Michelle Michaels 1:03:05

Yeah. So basically, I was brought on to work in this office in the DOD, so that I can really help with bridging the gap between innovation as it's coming out of the research and development program. And getting that into the hands of the end users at the installation level, who could use the innovation and technology that's coming out of our research development program. And so specifically, I'm working with the Arctic landscape, so mostly focused regionally in Alaska, but also trying to scale technology for the greater Arctic region in the north.

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Doug Parsons 1:03:37

That's what I want to talk about here. And I saw one of your presentations, and I want you to tell me just really at the 30,000 foot level, and then we can kind of get into some details. What is the Alaska innovation landscape network,

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Michelle Michaels 1:03:48

the last innovation landscape network is there are two goals that we have. One is to Institute, an agency network of partners at the regional level, to bring together the idea of we want to institute climate adaptation practices at the community and installation level, that are really useful for the climate challenges the Arctic is facing now and in the future, as well. So we want to bring people together researchers and end users as we call them, which would be the installation managers and the community members to really talk about what the climate challenges are that the end users are facing, and how the research and technology that's being developed. And things that are being proposed can really get at what the challenges are at that installation and community level. So there's currently a little bit of a disconnect between the research and technology that's being produced out of our large research programs, and getting that into the hands of people that really use that technology. And so the Alaska innovation landscape network or Eileen for short is what we're establishing to bring To gather a network of people to facilitate that process better. So it's basically starting a deeper conversation and a more fluid conversation between those different groups of people so that we can get this technology moving faster at a quicker pace to really address our climate adaptation challenges.

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Doug Parsons 1:05:19

Okay, I know you can't go into too much detail here. But for the need to do this in the first place, what's happening up there in Alaska, talking about the built infrastructure and the natural infrastructure, what's going on there that there's this need. So

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Michelle Michaels 1:05:31

one of the big issues with Bill infrastructure is that we're seeing a lot of problems with permafrost degradation, specifically in Alaska and other areas, the Arctic, and that affecting the construction considerations needed to build in those locations. So you see a lot of issues. And you can certainly find pictures online everywhere, where the permafrost is subsiding. And you have buildings that are then sat on top of it, that are kind of cracking and crumbling a bit and just not stable at all. And that's due to the layer of permafrost below it that's being degraded by warming temperatures. That's one of the issues we're seeing with Bill infrastructure. With



natural infrastructure, we're having some issues with hydrology and groundwater flow effects. So you'll see a lot of areas where there's maybe a low A shallow groundwater table. And so there's a lot of flooding occurring. And we're seeing that at some of our installations as well.

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Doug Parsons 1:06:33

So you recently had a workshop? Well, maybe not too recent, who was invited? And what was the purpose of that workshop? And I think you were trying to accomplish three things there at that workshop.

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Michelle Michaels 1:06:42

Yep. So the workshop was in late August, when we held that in Fairbanks, Alaska. And we were really trying to accomplish a couple of things. The main thing was just the kicking off of the Alaska innovation landscape network. And that same concept that I introduced the network with was bringing the researchers and end users in the same room. The main point of the workshop was we had those two different groups of people. So researchers, from federal agencies and universities, and we brought them together with our installation managers, our natural resource managers, planners, those kinds of folks. And we really wanted to kickstart the conversation to say, what are your needs as on users from the research and technology that we're developing within our programs? And how can we address those because these ecosystem transformations are happening at a rapid pace. And we really need to accelerate our climate adaptation practices to address them. And we want to make sure that what we're producing what we're working on in the proposals that we're writing, as researchers are addressing those needs, at your level at the installation and the community level. The big, big overarching goal of the workshop was to bring those two communities together, we spent the first half of the day with research presentations from across our different agencies and partners with giving a sort of status of technology and research as this. And then the second half of the afternoon, was a feedback session for mostly aimed at the end users to have their feedback on what they'd seen during the day, and what their needs are and what they need us to facilitate going forward. We kind of split it up that way. But it was a really, really fruitful session. And we had a lot of great feedback. And we started in the morning with a list, we had asked the end users in the room to talk about what were your top climate adaptation priorities. And we just did that for 15 minutes. And then we came back to that list at the end of the day after we'd had all of our research presentations, all of our discussion. And we said, what has changed for you? And we did actually have a lot of new considerations that we added to the list and we said, Okay, this is our overarching list going forward for what we want to tackle and address as a group and as a network. So that was a really great Kickstart to this network and just trying to get folks together to have these kinds of conversations.

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Doug Parsons 1:09:20

Okay, so I'm sure the practitioners were like, Okay, fantastic. The researchers are listening to us, and they're taking our ideas. Are you guys in a position where there's actually funding to do that research?



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**Michelle Michaels 1:09:29**

Yes. So specifically Serpenti STCP, are investing funding into this network and into this regional landscape as we're calling it, we're doing so through a couple of different ways. One of those ways is through specific targeted investments and invited proposals, where we've seen a research need or a need to take a research technology and kind of cross it over the finish line over the valley of deaths, so to speak. And to get that into production. So we're there's areas where there's a really promising research technology. And we just need to add, you know, live investment. To get that over the finish line where we're really focused on those. We're really focused on funding research and technology through our open solicitations that come out in cycle usually once a year, or also, we're having some new out of cycle solicitations, to combat this same, the same issues here. So through those open solicitations, we're really trying to have some of them address this need here. And that is our traditional process of funding through the research and development program. We're also trying to gain interest from our partners as well, so that we can leverage some competitive solicitation opportunities with them as well. So we are partnered with USGS as well, United States Geological Survey, and some other interagency partners to try and build upon those open solicitations and get more investment into the program. So I think there's a phase two to this project. Yes. So the next phase of our network development here is to gather a group of folks together that would compose our leadership team. So that would be the folks that are really making the strategic decisions at our higher level here for the network. And we want to develop a strategy and implementation plan. So we know where we're going. And we have a direction for how exactly we want to accomplish this. And then there's the part where this research and technology that we're investing in that we're trying to get transferred and deployed at the installation community level, we can all see that as the possibility to deploy transfer nodes as well. So that concept is where if you have a technology, let's say it's really suitable for climate adaptation in Alaska. Well, it's possible that may also be very well scalable to other regions of the Arctic, as well. So perhaps Greenland or somewhere like that, where we can take this technology that we've demonstrated and evaluated in Alaska. And we can also do that same demonstration evaluation refinement practice in Greenland as well, so that we can really make our technology more scalable. So that would be the idea of having a transfer node to have at a different location in the Arctic. And then another aspect of this another phase in the process here is to establish science translation. So the idea would be, let's say that there's some building standards or practices that are affected by some of this work specifically for building and constructing in the Arctic, once that's instituted into something that's more or less policy, we want to make sure that the communities of practice that work on that, and that are in that field are really there understanding how that is affecting them. So if there's new standards, or new things to operate by, we want to make sure that they know how that affects them and have some sort of investment in adopting those practices so that we're engineering with the best new design standards that are suitable for constructing and building an arctic environment. So that would be an example of trying to translate our science into application.

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**Doug Parsons 1:13:14**

Fantastic, a lot of great information there. Tell me highlight from the conference.

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**Michelle Michaels 1:13:18**

I think one of my biggest takeaways, Highlights from the Conference was not only the breadth of different folks from different from different disciplines and industries and agencies that were

of different folks from different from different disciplines, and industries and agencies that were there, and all of the broad range of topics that were covered, but also just how energetic and engaging the symposium was, everyone seemed to be extremely engaged in the topics that they were talking about, and the research that they were doing. And it really was a very energetic environment. I certainly learned a lot about different fields that I hadn't had that much background in and had some great engagement with folks that I think is going to be really useful moving forward in the sense that we can be more collaborative on our efforts, which is also one of the main pillars of having these different regional landscape networks is trying to help foster research and technology that helps with climate adaptation practices. So getting people together in the same room and having these conversations is an absolutely great step to doing that.

**D** Doug Parsons 1:14:19

Yeah, it was fantastic. Five huge numbers of people and certainly highlight for me where those crabcakes because they had these giant chunks of crab. I probably need to interview the chef who did the keys. You'd never get that sort of crab in a crab cake. So bravo.

**M** Michelle Michaels 1:14:35

The crab cake next time, this

**D** Doug Parsons 1:14:38

huge chunks of blue crab they never do that is usually all bread. So anyway, you know, kudos to the caterer on that is respect, Michelle. It's been a pleasure having you on you're doing some cool work there. And thanks for coming on the podcast. Thanks. Thank you. Hey, adapters joining me is Lisa Miller. Lisa is a senior manager for sustainability. Be at no bliss. Hi, Lisa, welcome to the podcast. Hi, Doug.

**L** Lisa Miller 1:15:03

Thanks for having me.

**D** Doug Parsons 1:15:04

We're gonna start off big picture here. What is Noblis?

**L** Lisa Miller 1:15:07

So Noblis is is a nonprofit science and technology organization, we contract to the federal government. And we focus on providing innovative solutions. And specifically, I work in the defense mission area, in the resilience and sustainability team, where we are experts develop

strategies, and advanced analytical tools that kind of focus on remediation challenges, energy security threats, climate risk, that sort of thing.

**D** Doug Parsons 1:15:34

When I first encountered you guys, I thought you guys were just like conference organizers. But as you just described, there's a lot more to it. And so your team is embedded with some of these agencies, right?

**L** Lisa Miller 1:15:45

Correct. Yeah. So sort of India's TCP is one of the customers that we support. So other than the conference planning, we also provide technical expertise, helping them with their program direction, helping them manage their broad portfolio of research projects, and working to plan and execute the DoD Energy and Environment innovation symposium that you attended with us.

**D** Doug Parsons 1:16:07

Tell me a little bit about your role in the conference, your role and also noblest, his role because there were three tracks. And obviously, I was focused on the resilience track. How did that all come together? Because the resilience track is a relatively new one, right? You guys didn't do that last year?

**L** Lisa Miller 1:16:21

Yeah. So the Climate Resilience Program that was recently developed under startup in STCP, Noblis, actually did a feasibility study with startup to kind of see if there was a need for a program like that. And we helped them stand the program up once we did realize that there was a good space for that. So we created a track for that at this year's symposium, and we're hoping that next year, it's going to grow even more.

**D** Doug Parsons 1:16:49

Tell me a little bit about that. So you've been involved with their conferences in the past? What are some of your observations how they've changed?

**L** Lisa Miller 1:16:55

Yeah, so I've been the lead planner for the event for the past six, seven years. And it's been really great to see how some of the programming has shifted and to new priorities. Pee fast, for example, has become a hot topic, as I'm sure you're well aware, but it's been this year, in particular, there was a record attendance, and we had over 700 posters throughout the event.

We switched them out each night. So we were able to focus on over 700 different projects and technologies, which I thought was really exciting to be able to see that broad range of science and the technology advancements.

**D** Doug Parsons 1:17:33

Yeah, I had never encountered that before, because there was a ton of posters, and I was walking around each night in the second night, I want to go back to one because there was a really interesting poster. And you guys were like changing them out. That's how many people were part of this event. That was actually pretty cool.

**L** Lisa Miller 1:17:48

Yeah, we do that every year. This was the first time we've done three poster days, different days of posters, but we wanted to get all them in so that we could see all their technologies.

**D** Doug Parsons 1:17:57

One of the people that I met works for noblist was Tracy malar, Dr. Tracy mallard. And she is right. Can you tell me some of the work that she's doing with this group?

**L** Lisa Miller 1:18:07

Yeah. Dr. Tracy Mallard has been working closely with Dr. Kevin hires on the startup team on the new initiative that they're calling the National Innovation landscape network, where they're pulling together different installations that experience similar conditions to help implement new technologies on their at their sites.

**D** Doug Parsons 1:18:24

So final question for you any conference highlights that stood out?

**L** Lisa Miller 1:18:28

I was really excited about the plenary session. We had some really great speakers there and to listening to Mr. Magee and his comments about where he thought the programs were headed, and some highlighting a few of the technologies that he was interested in. I thought that was a really great piece of the of the symposium.

**D** Doug Parsons 1:18:45

Great. And if people want to learn more about Noblis, what do you suggest?

**L** Lisa Miller 1:18:49  
noblis.org is the best place to get more information.

**D** Doug Parsons 1:18:52  
Great, Lisa, thanks for coming on. And thanks for all your help at the conference. Your whole team there was fantastic.

**L** Lisa Miller 1:18:57  
And find you had a good time. And I hope to see you next year at the next one.

**D** Doug Parsons 1:19:03  
Hey, adapters joining me is John Conger. John is the president of Conger strategies and solutions. Hi, John. Welcome back to the podcast. Happy to be here.

**J** John Conger 1:19:11  
Thanks for having me,

**D** Doug Parsons 1:19:12  
John. Let's give people a little bit of background you've been on before, but it's been a little while. So what is Conger strategies and solutions,

**J** John Conger 1:19:18  
Conger strategies is just my consulting hat. I am also the Director Emeritus for the Center of Climate and Security. And, frankly, I do a lot of thinking in this space as the former assistant secretary of defense for energy installations and environment. So this used to be my world.

**D** Doug Parsons 1:19:36  
On that note, can you give us a bit more of that history within the Department of Defense? I mean, it's extensive. And you also have Capitol Hill experience too, right?

**J** John Conger 1:19:44  
Absolutely. I spent a dozen years on Capitol Hill. So I understand the sausage making of how

absolutely. I spent a dozen years on Capitol Hill, so I understand the sausage making of how legislation is made and how the federal government is funded, but the building the Pentagon was really a learning experience and I got to take some quality time, both as the deputy running the installations and Environment Office and then running it for three years in OSD. So I had about a trillion dollars worth of real estate I was responsible for. And at the same time I was DoD climate guy, the person that DOD would send over to the White House for, you know, the to represent DOD for all federal meetings and stuff.

**D** Doug Parsons 1:20:21

I'm sure a lot has changed since you were actually within working within government not doing what you're doing, right?

**J** John Conger 1:20:27

Well, some things have changed. And some things haven't. The government is slow. It's like, as they say, steering the aircraft carrier. So as you turn the ship, it is not exactly turning on a dime. And so some things are very similar to the way they were even 10 years ago.

**D** Doug Parsons 1:20:44

So we were both at this conference, and we're recording this after the fact. But you gave a presentation that I thought was fantastic. Do you remember the title of your presentation,

**J** John Conger 1:20:53

I don't think I had a title. My goal was to get the people's juices flowing, and to give them a few challenges to think about as they work through how they're going to integrate innovation into their r&d processes. And specifically focusing on the National Innovation landscape network.

**D** Doug Parsons 1:21:12

We're going to dig into that a bit. But just starting off, and I don't know if this was your quote, or just a quote that you'd like but you had strategy without money is hallucination. Did I get that right? What did you mean?

**J** John Conger 1:21:25

Yeah, that means that you can make all the plans you want. But if you don't fund any of the activities that you are talking about, then it's just words, I can't pretend to have made that up. I've heard it many, many times repeated in many, many ways. And it's just one of those old things that you hear bouncing around the frankly, not just the federal government, but certainly oftentimes, they're the

D

Doug Parsons 1:21:45

points that you were trying to make it obviously relevant to set up their funding research out there. And you talked about timescales are different for what startup is doing. They're out there funding all these innovative ideas. But then those are different timescales than policymakers and the public at large. What did you mean?

J

John Conger 1:22:03

So I used to run the installations and Environment Office at DOD. And the challenge you have is that when you have problems presented, you need answers moderately quickly. And if the cert process, the research process that they have, takes two years to, from idea and notice to submissions coming in going through multiple rounds of review, finally getting an award finally getting their money, and then taking three to five years to execute. That gets me an answer in six years, but I'm gone by that somehow, they need a layer added to the research and development enterprise at the Department of Defense, where you can get an answer in six months, not six years, something has to be done quicker. And that really brings you to the need for a different way of doing business.

D

Doug Parsons 1:22:57

Can you elaborate and use that example of what they're trying to do at sort of now with what how's that going to change that approach.

J

John Conger 1:23:02

So they're going to go through some processes to try and figure out exactly what they're going to change. But as we think about innovation, as we think about catalyzing processes, and getting ourselves out of the old mindset that I have to follow all the steps, sometimes you can circumvent the proposal process and do much quicker awards. Sometimes you can have people who've already done the work, figure out how it applies to a specific problem. So if I have a question, and there's people out there who have the knowledge, I want to be able to leverage them immediately. And get my answer in a timescale where it's relevant, doesn't come overcome by events, right. And so in that context, what they're looking to do is set up a network where the scientists in the users, the operators, and the policymakers are all talking together, and they all know each other, because they don't talk to each other today, then the users and the operators, the people at the base is can say, here's the actual problem I'm running into not have scientists guess at it, those scientists can say, well, here's the knowledge we already have here are models we already have. And we can apply them to your problems and get them answers much more quickly. Rather than going through that process that longer, multiple year process. You want to be able to have people talking to each other.

D

Doug Parsons 1:24:30

I'll have my own experience in the federal government. And I'm thinking of how you bridge this gap. And sometimes even people with the best intentions want to do things more quickly.



Sometimes things are intractable, but maybe there's legislative reportings that's necessary that just feeds into this idea of lengthy me who's responsible. Is it just are these policy decisions, let's say at the startup level, or is Congress going to have to get involved to free up the ability to make these I guess be more nimble? Because you know what I'm talking about that there's Yeah, different layers to people kind of making things take longer. But let's say legislatively, if you're just working within startup, you're just alright. Well, I'm required by law to do this.

**J** John Conger 1:25:11

So the rules are set up to reduce risk, there's rules are set up, usually to say, Well, we, the here was a problem we had in the past, we're gonna set up a new rule, and it lengthens the process. And I'm not saying that the process they go through today is wrong. I'm saying it needs a new layer, you can, in today's process, have short term proposals and short term responses and get money out maybe have some flexible funds that aren't necessarily designated for these longer term projects. And so what I mean by that is, let's say I'm a policymaker, and I have a question. And let's say I want or even better, let's say, I'm an operator at a base in Alaska, and I have a permafrost problem. And I need somebody who has the tools and the models to assess how I'm going to deal with permafrost under my base. Rather than go through a long process. Maybe I have a shorter trip, maybe I already have a list of approved individuals who can answer my questions that are on some sort of a multiple award task order contract with no money against it yet, until I asked my question, and then they can go out and do a quick analysis because they're pre approved, and I've already worked with them. And then they can get me my answer for a really modest amount of money rather than than a multiple year project, that kind of thing. That's an example of what can be done today, and doesn't necessarily circumvent any of the rules. I'll give you one other example. And it's outside the climate space. But it's something that startup is doing. They have some folks that are working on how to destroy pee fast, so the Forever chemicals. And they teamed with the Defense Innovation Unit, which is a different organization within the Department of Defense, which has some enhanced authorities to go more quickly through the acquisition process. And so they brought startup brought their money to diu, to use their authorities to do a very quick test of a wide range of technologies and entities who had technologies ready to perform this mission. And they're going to test them all at the same time as sort of like a they call it a bake off, where they're all going to destroy pee fast and see who does it better. The point being that there are ways to do it with him within current authorities, but people have to get their brains out of the same old, same old out of this is the way it's always been done.

**D** Doug Parsons 1:27:39

Things are kind of moving in that direction, though, because even at the conference than the sum of those discussions, and I witnessed this at a dinner with you and some of the gang there, that there's efforts to simplify this process, or at least make it more relevant to what the research and the policymaker needs are right?

**J** John Conger 1:27:56

Yeah, there they are looking for the ways to do this. I think that the sort of leadership is very comfortable with setting up this additional layer, which is why you have the National Innovation landscape network in the first place, it got created. I talked to the program manager within the

organization, maybe a year ago complaining about the timescale problem. And lo and behold, he acted so quickly and created this network within what he's currently authorized to do. And so that's responsiveness. That's energy. And that's innovation.

**D** Doug Parsons 1:28:31

John, you are at the Climate Resilience conference that the department defense put on in St. Louis earlier this year. And the whole thing was focused on resilience, any insights, there was a tract of resilience at this one versus that any thoughts kind of comparisons? So

**J** John Conger 1:28:46

there were different conferences for different purposes. I would say that the startup conference included a lot more. The sort of conference included many more researchers actually delving into the their work that they've done, they've had funded to attack specific problems. There was more policymaking. There was broader conversations at the Climate Resilience conference. So that's one piece of it. I thought that there was a focus on landscape natural systems types of things at the Climate Resilience conference this summer. That's that's who they had their this was a more diverse problem set, not just on climate at this sort of conference.

**D** Doug Parsons 1:29:26

All right, so any particular highlight for you at this conference? At this one?

**J** John Conger 1:29:31

While my highlight was the conversations on innovation, no question about it. I am very impressed with how many people were there. I'm very impressed with the breadth of the research. But I'm more excited about looking for new ways to the innovation theme that I remember back when I worked for Ash Carter, and I was the deputy comptroller at the time, actually, after I was doing the installations work. And he said in that year's budget and it was in 2016. So it was the Why 2017 budget he said that the one program he wanted to make sure we got funded above all else was the beginnings of the Defense Innovation Unit. It was diu X at the time. And the fact of the matter is, is that this kind of innovation, this kind of doing things differently is what he was trying to capture then and I think it's really caught in hold and gotten a little bit of momentum. So I think that's very exciting.

**D** Doug Parsons 1:30:24

John, thanks for coming on the podcast. My pleasure. Hey, doctors, I'm here with Abby rice. All right, Abby, who are you with?

**A** Abigail Rice 1:30:34

I'm with a construction engineering research laboratory located in Champaign, Illinois, that's part of the engineer Research Development Center or attic. Okay, Erlich, what's that? We like to describe ourselves as like the research arm of the Corps of Engineers. Most people are familiar with the US Army Corps of Engineers, they think things like locks and dams, levees, those kind of mission sets. And what we really focus on is the research and development that can propel those efforts, but also supports the army, its mission and the broader DOD. What is your specific role with them? So I'm a Research environmental engineer largely focused on solid waste. So I am the technical program lead for the source reduction and resource Resilience Program. So I focus largely on solid waste. But waste is in everything, right? It's in what we touch. It's in our from our heat waste from energy systems, it can be wastewater, it can be hazardous waste. And I try and reimagine that waste as a resource. So we think how we can just throw that away, discard it later, forget about it until it becomes a problem. I think, every piece of waste in any system that you're looking at, whether it's energy systems, water systems, infrastructure systems, we can reimagine that with a little bit of innovation as a resource that we can use to our benefit for resilience. You gave

**D** Doug Parsons 1:31:52  
a presentation that I saw, what was the title of that presentation,

**A** Abigail Rice 1:31:55  
integrated installation, resilience policy,

**D** Doug Parsons 1:31:58  
give us that 30,000 foot view level, and then we'll dig into your presentation a little bit?

**A** Abigail Rice 1:32:02  
Sure. So 30,000 foot level is that we can do better at reducing redundancies and being more strategic and say the planning, programming and resourcing that we do around resilience. So for example, you have energy resilience, you have water resilience, you have waist resilience, you have community resilience, we tend to get in those foxholes kind of put our blinders on, right, everything is very stove piped. And the idea is that we can be more resilient if we integrate across those systems and leverage them to the benefit of everyone. I'm a firm believer that you can find research, development, planning innovative solutions that will touch more than one of those buckets. But it requires collaboration, it requires integration, and it requires people to talk to each other.

**D** Doug Parsons 1:32:50  
Okay, so part of that resilience, too, is resilience to climate impacts. Right?

A

Abigail Rice 1:32:54

Absolutely. Climate Resilience is a piece of that. And I think we're seeing more and more now when we start focusing on mitigation and adaptation, really adaptation, integrating climate into say how we build our infrastructure. That is integration, right? It requires climate scientists, and climate policy makers and decision makers within DOD, to talk to the people who are building infrastructure, say, within the Corps of Engineers, or some other organization, right. Climate can be integrated into water resilience, and to enter it can be integrated and should be integrated into any decision that we're making. So when we're thinking about adapting infrastructure for climate, that's the type of integration we're talking about in the collaboration that's needed in order to do that efficiently and effectively.

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Doug Parsons 1:33:38

bases have a lot of responsibilities, and they have to do a lot of planning. Part of the slides that you should do you had all these other responsibilities, these are these planning efforts that bases have to consider. And you are looking at how that's integrating with the resilience plans. Did I get that right?

A

Abigail Rice 1:33:54

So when you say resilience plans, I think what people are thinking about is the newly established installation climate resilience plants. And so what that's done that came out of a statutory requirement, it was written into a National Defense Authorization Act, and that came out of title 10. United States Code 2016. It's a new requirement that you also consider climate as well as I believe transportation was thrown in there as well to those installation masterplan required plants. So when you think about the climate resilience piece, that's a new plan, it's written into unified facility criteria to dash 100 Dascha. One, and that requires installations to now develop installation climate resilience plans. It's another plan. It's another separate plan on top of the other 2030 however many other planning requirements there are. There's going to be redundancy in that right. It takes more resourcing it takes more staff. It takes time away from other things, especially at an installation level where a lot of those installation staff are already overburdened, wearing five hats. It's hard not to just check the box and move on until the next thing when you have 50 priorities on your plate for any given day. And so to the extent that we can look at how we can integrate across those plans and leverage them, to create them, I think that's important. Just from a personal standpoint, I think we could also reduce planning requirements if we integrate them. And I'll give an example to that there's a requirement for installation masterplanning, that it requires all installations or certain installations to have installation energy plans. And I can really only speak to army and probably the other military departments do this as well. I'm just most familiar with Army through the Corps of Engineers, and they don't do IEP s or installation energy plans. They do ie WPS installation, energy and water plans. That's just one very small example. And I think we could get even broader than that to include climate in those plans. So it becomes an installation water and energy plan, with climate included, maybe include some other aspects as well. And the more you can integrate and get people talking to each other, I think you'll see projects that come out of those plans, best practices, or recommendations that can touch all of these places,

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Doug Parsons 1:36:00

 Doug Parsons 1:36:09

I can't believe you're remembering these planning numbers off the top of your head, I don't think I remembered a single government executive order number when I worked for the federal government. So that's pretty amazing. I guess that's how it's important for you. So you talked about the climate resilience planning part of this and how it's aligning with all the other planning requirements? Are there gaps that you guys are seeing now that as you are bringing on this new climbing effort,

 Abigail Rice 1:36:31

I would say the installation climate resilience plans while they've developed some they're continuing to evolve, right? There's no set standard yet, at least again, I can only speak to the army perspective. I don't think there's a complete standard or framework, I think some of that will evolve over time, it was a congressional requirement to develop a certain number per year per, I believe, major military installations. And I could be misquoting the directive there. But I think it will continue to change as we learn more, and I'm sure that there are gaps hindsight is always 2020. Right?

 Doug Parsons 1:37:04

Well, yeah, let's talk about this conference. There's a lot of resilience experts here and the whole notion of adaptation, resilience, have you been learning anything, anything that's gonna help you go back and do what you're doing?

 Abigail Rice 1:37:13

I have actually sat on a really interesting talk today, it was in the sea level rise session. And they were talking about how we do a lot of planning. And we look historically backwards, right? That's not going to get us anywhere, when we're talking about developing things, adaptation measures, infrastructure that's supposed to last 2030 5080 years from now. And I think, to the degree that we can use data to our advantage, and we can only make the best decisions with the information that we have, but to the extent that we can learn from the past, but not use it as the standard, because things are going to continue to change. What some of that gets that is we have to be planning for the future. And that timescale really matters, right? If we're building something that's supposed to last beyond 50 years, maybe we don't have to adapt right now. Because things will change. But we should be building an adaptation into whatever we're creating today. So that when things do change in 10 years that were unexpected to us, we have the agility to be able to adapt in the future. I think that's really important. Another thing that we talk about a lot. And what this kind of sparked and reinforced in my mind was mitigation trigger measures, right? I think we can add into whatever we're planning for adapting to creating resilience around today, if we have things that we're monitoring for and measuring for, and we know what that trigger is, that will tell us, okay, now we need to adapt, or you've reached this thresholds that we didn't expect this year. But it happened because we're monitoring for it. Well, that gives us the agility and flexibility to say start programming and planning and resourcing for that because we thought it was 20 years off. Now it's 10,

because climate is constantly changing. And we can start resourcing for it now. So that we can adapt for it before we overcome that threshold and 10 years that we thought was going to be 20. And I think that that's really key.

**D** Doug Parsons 1:39:21

Okay, so single highlight from the conference.

**A** Abigail Rice 1:39:24

I think the highlight for me was networking with people at the poster session. I've been to conferences and symposiums and other types of events where you might stand out a poster and nobody really comes by. There's over two posters. I can't recall exactly how many people were here. But I had a handful stopped by and I had two posters. In fact, just the way that people have been able to find me throughout the symposium. It speaks to how well it's been put on, where you have maybe upwards of 1000 people here, but yet I've been able to make those connections on a one to one level many times throughout the symposium and that's one of the things you're always going to find is that the networking is most valuable the connections that you can make after the fact. And I'm always learning in those conversations. I've had some really challenging discussions with folks that I want to go back now to policy I'm developing or helping to develop, or projects that I have on my plate, and think, Well, how might I take that lesson learned that challenge that that challenging question I got that was really food for thought? And how am I going to use that to the advantage of climate resilience in these projects that I have? Because they're from people who are outside of maybe my subject matter expertise as an environmental engineer, and things that I wouldn't have considered otherwise without meeting those folks?

**D** Doug Parsons 1:40:45

I heard a number today that was 1500 that are at the event. So that's pretty impressive. That's that's a great number for resilience being a big part of this. Okay. Thank you so much for coming on the podcast. Yeah. Thank you so much. Hate actors. Joining me is Dr. Janelle Sperry. Janelle is a wildlife biologist with the US Army and an adjunct professor at the University of Illinois, Urbana. Hi, Janelle, welcome to the podcast.

**D** Dr. Janelle Sperry 1:41:08

Hi, Doug. Thanks for having me.

**D** Doug Parsons 1:41:09

Could you just briefly tell us what you do with those two different institutions?

**D** Dr. Janelle Sperry 1:41:12

 Dr. Janelle Sperry 1:41:12

Yeah. So a lot of people ask, why does the army have wildlife biologists? Well, it's because the army is a land manager, they manage millions of acres of land. And on that land, there are a lot of threatened endangered species. In fact, the Army has the highest density of threatened endangered species of any other federal land agency. And so they're required because of the Endangered Species Act to manage and conserve those species. And so my work is aimed at improving management and conservation of threatened endangered species on military lands throughout the world. But then I'm also at the University of Illinois, the laboratory that I work at for the army, which is the Engineering Research and Development Center, Construction Engineering Research Laboratory, actually is co located on the University of Illinois campus. And so I serve as faculty here where I advise graduate students and collaborate on a lot of the research that I do on the military. Lance,

 Doug Parsons 1:42:10

I wanted you to come on because the DoD symposium had so many different interesting research things going on. And some of them ultimately are going to be applied to adaptation. And what I wanted to talk with you about is you did a presentation on E DNA as part of a bigger panel, but you could you give us some background, what is e DNA? And what are some of the applications for that?

 Dr. Janelle Sperry 1:42:32

Yes, of course, I love this topic. So Edna stands for environmental DNA. So instead of sampling for animals directly, so instead of putting out traps or using binoculars to look for birds, or fishing to look for fish, instead, we can just collect environmental samples where species occur and know what occurs there. And so all of us, you and I are sloughing DNA into our environments as we're going about our lives. And we can collect those samples and look at what species are there. And so some examples of this are collecting water and looking at all of the aquatic species that are present in that water or collecting soil, or even collecting air. And so a lot of the techniques that we use are actually very familiar to many of us now, because of COVID, we use PCR. So I think a lot of people are familiar, it's just kind of in our vernacular now about detecting COVID via DNA. But instead of swabbing your nose and looking for COVID DNA, instead, I collect water, and look for alligator snapping turtle DNA. And it can be incredibly cost effective compared to traditional sampling methods.

 Doug Parsons 1:43:39

Okay, so tell me about some applications. You're out there doing the sampling. And I think in the presentation that you shared with me that there's some work being done in Hawaii, what's going on there?

 Dr. Janelle Sperry 1:43:49

Yeah. So Hawaii, I think a lot of people are familiar is known as both the invasion and extinction capital of the world. We've had a very large number of extinctions and then concurrently, we've had a large number of invasions. And so many of the species that are currently there, many of

the native species are threatened with extinction. And so one of the particularly vulnerable group plants, almost all of the plants out there are adapted for these pollinators that are now extinct. On the island of Oahu, for example, there's only a couple of pollinating bird species that remain on the island. And so our goal is to try to better understand what animals both insects and birds are visiting these plants to try to understand what species are potentially pollinating and serving this very important ecological function. The traditional way to do that would be to sit at a plant with my binoculars and try to detect what species are visiting that plant. Or instead we can collect the flowers, extract the DNA that's present on the flower and be able to determine what insect and bird species were visiting that flower. So We were just out in Hawaii in May. And we visited a large number of endangered plants, including critically endangered plants, as well as invasive, we collected from 88 different plant species. And we were able to identify 180 species of arthropods that were using those flowers. And this was just in the sampling period took place over a couple of weeks. So instead of sitting at those flowers for hours and hours and hours and trying to identify species, we could instead do this very concerted effort in the field and identify a very large number of species that are utilizing those flowers.

D

Doug Parsons 1:45:35

Tell me why that so this is a setup hosted conference, why are they interested in this kind of research?

D

Dr. Jinelle Sperry 1:45:41

Because many of those plants are endangered? Yeah, so the US Army Garrison Hawaii, on a wahoo. They have a very extensive conservation program for the endangered species that occur on army lands, there are actually 78 endangered plants on Oahu alone that the army is managing. And so it's really important to understand how those plants are doing. And in this context, those critical mutualisms are just really important for sustaining those populations. The Army does a lot of work on propagating seeds, and doing out plantings and encouraging restoration of these plants. But those restoration sites will not be successful unless we can actually have pollination and seed dispersal. And so this work in a very time efficient way, can actually look at all of the species that are serving that function by pollinating these critically endangered plants with the idea that this would improve management and improve conservation, and then ultimately allow more flexibility in military training, because we wouldn't have restrictions that can be imposed by the presence of those endangered species on military lands.

D

Doug Parsons 1:46:51

When I saw you at the conference, and we're recording this after the conference, if it's not obvious already, is that I was kind of pressing you about the adaptation at planning implications of this. I'm starting to visualize more of those. And you think about, let's say, wildlife biologists, there's all this speculation that species are going to be on the move, they're going to migrate north or the different temperatures. How do you think it DNA could play into some of that core



adaptation research that would ultimately lead to adaptation? I mean, I'm just even speculating like, oh, well, we're not necessarily seeing any species. But when you're sampling, you get a lot more information. Exactly.

D

Dr. Jinelle Sperry 1:47:28

No, it's a great question. And we're in a biodiversity crisis, we're in this mass extinction. And to be able to understand, climate change is one of the factors that's influencing that. But to be able to actually understand the potential for adaptation in these species, we first need to understand what are the kind of climactic variables that they're currently experiencing? And what is any potential for them to be able to adapt or move, for example, in the face of climate change? And that seems like a question that could be addressed. But in many cases, we don't even know the current distribution module is understanding what potential future distribution is, when we think about some of these large charismatic species like grizzly bears, or tigers, we have an idea of where they occur. But there's 1000s of species that we don't, for example, a lot of these arthropods, we don't even know their current distribution. And so they're cryptic, they're very difficult to survey for. So Edna allows us to be able to survey a very large area and get a very large number of species in a relatively small amount of time. And for relatively little money. On conservation dollars, it's limited, we only have so much money to be able to address a very large number of species. So being able to use these novel and emerging tools to be able to improve survey efforts can really go a long way for being able to then predict impacts of climate change, and being able to manage these species more effectively, in a changing climate.

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Doug Parsons 1:48:53

Okay, I'm gonna put you on the spot here. When we spoke, you talked about there was some sampling going on, that a species showed up in the E DNA samples, but someone was arguing that there's no possible way that this could be here. Do you remember what I'm talking about?

D

Dr. Jinelle Sperry 1:49:08

Yeah, yeah. So we do get the potential. So eDNA has the potential for false negatives, just like any other sampling method, the species really is there. But because of where or when we sampled, we don't detect it. And so Edna is the same. It could be that we just happen to sample just slightly off from where that species was in we don't detect the DNA. But it's rare that we get false positives, in that we say that there's a species there even though it wasn't except for contamination. So there's that I like to think of DNA is like glitter. It's everywhere, if you have kids, what it's like to have glitter all over your house. And so it's very difficult to make sure that you have contamination procedures, so that you don't get that glitter from one sample to another and end up with a false positive. In one case, we actually got the DNA from a particular species, in this case a fish species in a site that this fish species had never been detected there previously. And so there was concern that that was a false positive and we could not figure out why we would be getting DNA of this species. It turned out later, we found out that there had been a hatchery reintroduction at this site where that particular species was found in that

hatchery, we're able to detect not only the DNA of species that occur there, but DNA just from the water of a hatchery reintroduction. So it's incredibly sensitive, maybe too sensitive for detecting any indication that a species has been in that site.

**D** Doug Parsons 1:50:40

Just really ground truthing. That's really interesting to wrap up here. Can you give me some highlights from the conference? What were some highlights for you?

**D** Dr. Jinelle Sperry 1:50:47

I absolutely thought the conference was phenomenal for being able to network with other scientists and practitioners in the field. I mean, a lot of us are kind of working somewhat in isolation with our individual teams or in our individual labs or in our individual universities. And so having the opportunity to be able to interact with people that are addressing all sorts of challenges throughout DoD throughout the US was helpful both in being able to think about how it impacts our own research, but also in kind of framing what we're doing in this in this larger picture. So I thought I thought that was probably the most valuable aspect. It was a really amazing group of people all in one hotel for the week.

**D** Doug Parsons 1:51:35

And people want to learn more about your research. Is it somewhat available? Can people dig into this more? Yep.

**D** Dr. Jinelle Sperry 1:51:40

So if you just Google Sperry lab at University of Illinois, you'll see our website and all of our contact information is on there and information about the research that we're doing.

**D** Doug Parsons 1:51:50

Fantastic. Janelle, thank you so much for coming on the podcast.

**D** Dr. Jinelle Sperry 1:51:53

Thanks so much done.

**D** Doug Parsons 1:51:57

Hit actors. I'm back with Dr. Kimberly Spangler, who you heard at the beginning of the episode. Hi, Kim, welcome back.

D

Dr. Kimberley Spangler 1:52:02

Thanks for having me. What a great week.

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Doug Parsons 1:52:04

That was, yes, it was fantastic. I got to meet a ton of people. It was huge. And I'm bringing you back on and we're gonna dig in a bit further into your programs there. But also talk about what happened at the conference. But first off first impressions. I mean, do you have I think close to 1500 people there, it was huge.

D

Dr. Kimberley Spangler 1:52:19

We did it was record breaking, bringing across folks from across the United States across the globe, students, professors, industry, thought leaders, former senior level folks within the department, currency new level folks, the interagency it was really a who's who of the environment and energy innovation space.

D

Doug Parsons 1:52:41

But it's a challenge for me, I go to these conferences, and I want to meet as many people as possible. And this was very difficult, I really had to go to my I'm Doug Parsons, and with America that there were so many people there. But that's a good thing to have. And all the sessions and coffee breaks, were great to kind of connect with folks. But I want to go over some of the things. But what really stood out for me and this was really an interesting thing, because you had so many people, there's your poster presentations, I went to the poster presentations every night and I saw some stuff that was really cool, the diversity of what you guys are doing. But then I was going to go back the next night to talk to someone. And there was a whole new set of posters, there were that many people doing poster presentations, right?

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Dr. Kimberley Spangler 1:53:17

There were so many poster presentations. And what we really tried to do at those evening sessions was make it so folks could interact. We're really mindful that when we have in person events, that we make those value add events, we really try to keep our carbon footprint down the rest of the year. But we know that there's value to those in person events. And we wanted to bring that we did a survey that we just got back the results from and the number one aspect that our attendees most enjoyed of the conference was being able to network with their fellow colleagues. But yes, complete turnover posters every evening. For three evenings. It was a tremendous response.

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Doug Parsons 1:54:00

I was wandering around the diversity of projects was quite amazing. I want to talk a bit about

so the resilience was a big focus there. And I learned a ton about some of the really cool work that you guys are doing. I want to just put you thinking about this and adaptation, resilience sector. It's still relatively new. A lot of people think it's been around for awhile, it actually hasn't. And there's a lot of confusion on what climate resilience is. And I think people are confusing it with ESG or the sustainability sector. So how does your office acknowledge that? I mean, when I went to your resilience team, it was pretty obvious that you guys were doing adaptation where but do you hear that from attendees or when you're out there because people are trying to make it one thing or the other? And it really isn't?

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Dr. Kimberley Spangler 1:54:37

I think what's really unique about the Department of Defense is we are both the supply and demand. At the end of the day we are focused on mission and it is very very clear how resilience of our installations of our power projection platforms. Our force projection platforms is tied to the mission. We are mindful of the vernacular and you saying that appropriately. But at the end of the day, we all know that we need our forces to be able to deter conflict and fight when necessary. And in order to do that, we need to have our installations ready, be available for training, and not be impacted by extreme weather events.

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Doug Parsons 1:55:18

You touched upon this at the very beginning explaining what your office does, but maybe you could give us a bit more detail is, and we saw these in these presentations. But how does your office actually help with the transfer of technology and research developed or these programs to those relevant users out there? I mean, how does that literally kind of happen?

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Dr. Kimberley Spangler 1:55:34

So it's interesting. So I would say most rd to research development test and evaluation programs will frequently discuss the challenges of what they call the valley of death for tech transition, and it is real, you have to develop technology, and then you need to be able to get that technology out into the field. And so we work very hard with insert, but also in my counterpart programs, the operational energy programs to ensure that we bridge that valley of death. Two key ways that we do that is that one, when we have projects that we fund in startup in ES TCP, those projects are not just monitored, but they are guided, and they are shaped through frequent and mentoring type interactions with folks that are in the services, technical experts in the inner agency, people from the EPA, people from the if a technology or a capability is successful out of syrup, and ESGs. It's not a surprise to anyone, by the time it has matured, we work very closely with folks, we have several examples of people that we have these things called technical committees that are really really impactful groups of folks that help shepherd these projects through they will work with installation managers, they will have relationships with the EPA, we need to have all that infrastructure in place. The other thing I'll add, which I would say is relatively new in terms of its enhancement with syrup, and ESCP over the last two years is our relationship with DOD and interagency policy. Many folks in the innovation space, I would offer, don't even really know what policy is or policy does. And while that might seem surprising, it's really just not something that's within the same space, because of where we sit with our programs at the assistant secretary level. I have, personally, I think

seven, six or seven counterparts that are policy directors who I speak with every single day. And we are very mindful of the impact that we have of innovation to both support policy, but then also inform policy envision that a technology is developed, that technology is amazing. We get an installation to pick it up. It gets implemented there. That's great. Now how do you get implemented across the broad scope of DOD installations? You write that into policy? And so that's been a really amazing relationship that we have with the policy folks at this point?

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Doug Parsons 1:58:19

I think you've sort of answered this. But I do want to bring up specifically in one of the presentations, and he's actually on this episode of John Conga. And I think you were there for his presentation. And there is this. I mean, I think that the valley deaf I love these expressions, but the idea of like, there's an idea, and this notion of how long it takes from being just a kernel of an idea to getting it funded as research to the point where it's actually useful to like, let's say, a policy maker that might have requested in the first place. And he was throwing out numbers like six years. And there are efforts underway right now to quicken that pace, right?

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Dr. Kimberley Spangler 1:58:50

Yes. And so I would say, having done research and development, my entire career for the Department of Defense, six years is a great, it's a great achievement. But it's not great enough for how we need to be able to respond to what climate change means to our mission. And so what we've been working on, it's a very new initiative, is this national innovation landscape network. Actually, John Congre, challenged us with the idea of you need to get your technologies out faster. Typically, you have a two year cycle, at a minimum from the time you come up with a request for proposals to the time that you'll actually get funding out to anyone. He's like, too slow. We agree with that. There's there are reasons that we do things that way, so that there's a two year cycle. But when you look at good portfolio management, we don't need to do that across the entirety of the portfolio. And so one way that we are doing that, and we're taking a little bit more risk, but it's a calculated risk is with these national innovation landscape networks. And so it's a regional approach. And what's really key about it is that the innovators are working hand in hand with the user community. So the folks that are on The installations, they are out there solving problems in real time exchanging information in real time. And that is allowing the research and development projects that we're working on to evolve to best meet the user needs in real time. So normally, it's a two year cycle for us to put a proposal together and get it out. We came up with this idea. I think it was in June, by August, we had released a solicitation and we have already accepted proposals on it now in December. So orders of magnitude improvements on our timing, just on the selection process. And then we're expecting to see real transitions within the next year or two.

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Doug Parsons 2:00:42

I think it's because it's the orbits that I run in. But as I was walking around seeing the different poster presentations, you guys partner, and it was fun, so many academics, graduate students, private companies, doing an incredibly diverse amount of work out there. Are there opportunities for external organizations or researchers to collaborate with your offices? I mean, how does that process work?

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Dr. Kimberley Spangler 2:01:03

Yes, and that is why we are successful is based on the folks that we work with. So quite truly, America is a nation of innovators, people like innovation, innovation is fun. Innovation gives people hope. These are really what could be intractable problems. And we need the innovators of this country, and also globally to help us solve these challenges. And so we put out calls for proposals not just annually, but now at different time frames throughout the year. And we have the ability to fund industry, academia, federal labs, DOD labs, there's very few constraints on who we can fund. And I'll add, when we fund folks, we're not just sending money out, hoping for the best and hoping that at the end of the project, we'll get a product. The folks that are funded on our programs get to work hand in hand with the nation's experts from both the innovation side and the user community to shape their projects as it goes through. So it is a really unique process, something that startup in ESCP have been doing for about three decades. And I would offer that these two programs have one of the best track records of s&t technology development. And it's because of the processes that we have in place by working with these different folks.

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Doug Parsons 2:02:28

I keep going back to all these projects that you guys have funded or funding are going to fund in for you even at the head of the the offices, they're keeping track of these things. Is there like a database and I realized this department offense, I'm sure some things are just considered secret information or national security information. But are there ways for external partners should say, Well, gosh, there's all this great research out there that our local communities might be able to benefit from kind of secondhand, is that something that happens?

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Dr. Kimberley Spangler 2:02:54

Correct. So one way that's very easy, as long as you have a computer or smartphone is go to startup dash es tcp.mil. That is our website, our website has is actually built on a database framework. And you can see all of the projects that we have funded for at least the last 10 years. And when you click on each of those projects, which is very searchable, with a Google search function, we have final reports that are published there, we have links to publications, we have links to interim reports, it's a very passive way to get information beyond that I would I always offer to folks that the best way to meet people within the program that are funded by the program is to actually attend the symposium. And we also have opportunities throughout the year where we have strategic workshops, we go out to the field, we have a huge network. And so it's pretty easy within one or two degrees of separation, I would say in this research and innovation space that you would end up with no one someone that's either currently or formerly funded by sort of any SCCP.

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Doug Parsons 2:03:55

Well, I would love to encourage you to send someone from your office to the National Adaptation forum. It happens every two years. And it's obviously this big adaptation themed conference. And I think they'd really benefit. Because what's really not happening out there

very well. And it's, it's no one's fault, but you think of a local community, they don't actually have the luxury of saying what our research needs. So they might do a vulnerability assessment, and they think, Oh, wait, we need to adapt extreme heat. But that sort of process of really understanding what their adaptation research needs are, they just don't have the luxury of it. And just looking even at that model, I think would be useful. What you guys have come up with and so anyway, I just encourage you guys to get out there where you can be on people coming to your events, too, because that aspect of it is really missing right now and that adaptation planning.

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Dr. Kimberley Spangler 2:04:39

Yes, we'll definitely take that recommendation.

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Doug Parsons 2:04:42

Can you give me some of your own personal Highlights from the Conference?

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Dr. Kimberley Spangler 2:04:45

The things that I was most excited about seeing at the conference was the innovative network of diverse folks that we have working on DOD, like I had mentioned before, folks from all different aspects of their or schooling or their career, early career, mid career, late career, the act of mentorship that was happening at that conference, just the exchange of ideas. So that to me was most inspiring. I was also thrilled to see that we had interest from members of the media, we think it's very critical that we share the amazing work that we're doing within the DOD to take on these challenges. Information is power. And we'd love to get that out there, again, so we can make sure that we're working with our best innovators, and also certainly understand the challenges that folks are facing. And I really did love seeing our morning breakfast plenary sessions where we saw just a diverse swath of work that we're funding with startup escc and the operational energy programs get to brief their work and just have folks be excited about it.

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Doug Parsons 2:05:54

Fantastic in so can you give us a preview of next year, this is a symposium that you do every year, I'm assuming that resilience and adaptation will continue to be on a theme for you guys.

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Dr. Kimberley Spangler 2:06:05

It'll continue to be a theme for us. We will have this conference next year, we will be partnering with our operational energy counterparts. Again, we'll be in a larger space in downtown DC. And you certainly just encourage as many folks to come as possible. We love tapping everyone there.

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Doug Parsons 2:06:22

All right, fantastic. Kim, thanks for coming on the podcast and thanks for partnering with America DevOps,

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Dr. Kimberley Spangler 2:06:27

it is our greatest pleasure and can't wait for the episode.

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Doug Parsons 2:06:35

Okay, adapters, that is a wrap. First of all, thanks to Kim for inviting me to cover the symposium. It was eye opening and certainly an honor to cover one of the premier climate resilience events in the country. And as you heard, it will be an annual occurrence. As my regular listeners know, I'm a strong advocate for fostering the growth of the adaptation sector. I encourage my listeners who are interested in learning what resilience research is underway, attend the next 2024 symposium, you might not be partnering directly with the DoD but there's much to learn. As you heard over and over again, in this episode, the poster presentations covered a ton of ground. And the DoD is also interested in funding innovative projects that will obviously enhance their mission. But as you learn, there are many civilian applications to the work they do very exciting times in the adaptation space. And thanks to all the experts who participated in this episode, I have links in my show notes to them and many of the programs definitely check them out. And it was very cool to reconnect with my old graduate school colleague Kevin hires. As you can see, he's out there doing great things I hope to cover next year's conference. And maybe I'll see you guys there. Lastly, I want to express my gratitude to the US Department of Defense and Kimberly's team for extending an invitation and facilitating my participation in the symposium. It was a fantastic opportunity, and it's a privilege to be working with the US Department of Defense. Okay, so as I mentioned in the introduction, this is my 200th episode of America Adapts. I started this podcast seven years ago to keep my mind sharp on adaptation as I was between jobs, but it quickly turned into something much bigger for me, I've been able to interview some of the most interesting, accomplished and inspirational people in the world on the podcast. It has taken me all over the world and I've learned what adaptation means outside the United States. I've been doing adaptation for 20 years, but it's truly astonishing to see how the field has grown and evolved in the last seven years that I've been doing the podcast I've been committed to focusing on the adaptation sector, but I do enjoy on occasion covering other topics like climate fiction, the media, and occasionally cool climate books. I do like to mix things up a bit. But I am committed to this topic. And I guess unfortunately, it will only become more important in the years ahead. And there are many lessons and stories to be shared. We'll be doing climate adaptation for generations, and I feel privileged to be able to share the work of some of the leading thinkers in this emerging field. For those who are interested in getting into the adaptation space. Take a dive into my episode archive, we've covered a lot of ground, please reach out if you have ideas for content, our guests and also just to let me know your role in the adaptation universe. I also want to thank some of my early supporters, the podcast wouldn't exist if they weren't providing encouragement and support. Special thanks to Dr. Jesse Keenan who's been there listening and contributing since the very beginning thanks to Sean Martin and Anita van Breda at World Wildlife Fund for their ongoing sponsorship of the podcast and their friendship and their blunt advice thanks to Dan Christina and all his writing input thanks to Lindsey Parsons for supporting the family during the very lean years and thanks to Lisa Craig and her partnerships, thanks to



Rob Moore at NRDC for being a regular sponsor and an avid cheerleader of the pod thanks to Dr. Carolyn Kooskia of Environmental Defense Fund for also having the imagination to use a podcast to share adaptation content. Special shout out to Don in Canada who has been a regular listener and regular cheerleader and a deep thank you to all of you who donate to American apps, your financial support is critical. Thank you for making that effort. And finally, thanks to all my listeners have heard from many of you over the years and is always a treat to hear from you and learn what your favorite episodes are. What episodes frustrated you what you do for a living. It's all gold. Please do keep reaching out. Okay, here's to the next 100 Episodes okay adaptors Keep up the great work I'll see you next time