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Announcer: This is the ORISE Featurecast, a special edition of Further Together, the ORAU Podcast. Join Michael Holtz for conversations with ORISE experts on STEM workforce development, scientific and technical reviews, and the evaluation of radiation exposure and environmental contamination. You'll also hear from ORISE research program participants and their mentors as they talk about their experiences and how they are helping shape the future of science. Welcome to the ORISE Featurecast.

Michael Holtz: Welcome to the ORISE Featurecast, where we talk about all things ORISE. Today, we are talking to one of our past research program participants, Jonathan Levine, who is going to talk about his experience with the metal program. Jonathan, welcome to the ORISE Featurecast. How are you today?

Jonathan Levine: Very good. Thank you for having me.

Michael Holtz: Absolutely. Tell us a little bit about you and how you found the ORISE fellowship program that you were a part of.

Jonathan Levine: I picked up the phone and I called.

Michael Holtz: Did you really?

Jonathan Levine: So what actually happened was my PhD was in carbon sequestration, and in the last year, we had the BP oil spill, the Deepwater Horizon disaster. So the oil was leaking out. There was this big question: How do you stop it? They put a big box down. The box iced up with a material called clathrate hydrates. So I got a postdoc in Colorado at the premier center for hydrate research. They had been given some money to build a system to study this problem. So my first couple weeks there, I was like, "Well, who are the experts in this? I'm going to look up who already does this kind of work." And I found so many, and I found they had this giant center. They had spent 10 years building something that no one in the world had. And so I was like, "I'm going to give them a call and see what happens." So I gave them a call.

Michael Holtz: I need to be part of this. Yeah.

Jonathan Levine: I gave them a call. I said, "Hey, I'm supposed to build this thing. I just got this new job. I'm supposed to build this thing. You guys have been doing this for 10 years." It was Bob Warzinski and Ron Lynn, and I said, "Hey, Bob, how does this work? Can I come out and check it out?" They said, "Sure, come on out." So I flew out to Pittsburgh. And in classic Pittsburgh style, there was a snowstorm.

Michael Holtz: Of course.

Jonathan Levine: So I'm at the local Applebee's or whatever, and Bob's like, "Oh, you need to get over here. The lab might be closed for a day or two." So I got over there and checked it out. And that turned into a lot of years. Eventually, my working... I flew back and forth for several years. And then I ended up moving to Pittsburgh to work with Bob Warzinski full time.

Michael Holtz: Okay.

Jonathan Levine: And that was the ORISE program.

Michael Holtz: That was the ORISE program in a nutshell, right? So just for clarification for the folks who are watching or listening, you are an alumnus of the National Energy Technology Laboratory postgraduate research program, and essentially, you were investigating solutions to help clean up fossil fuel pollution.

Jonathan Levine: That's correct. Right.

Michael Holtz: How long were you part of that work?

Jonathan Levine: Well, so my PhD was in carbon sequestration. Then I started working with NETL in 2011.

Michael Holtz: Okay.

Jonathan Levine: We were working with one of the large oil companies because they don't like oil leaks either. They don't want that to happen, so they were helping fund that. We were talking to NOAA at the time. They're in charge of oil spill response. The Bureau of Safety and Environmental Enforcement, they were involved. And I think 2016, so five years total. And NETL is the country's fossil energy lab, but the major thrust was, okay, you've got coal, things like that. Well, how do you clean it up? So they were the ones who invented a lot of the coal scrubbing to get rid of industrial pollution. And then now the current problem is CO2 pollution. So how do get rid of greenhouse gas pollution? So NETL is working on that as well.

Michael Holtz: How did this world, I guess, find you? Or how did you, Jonathan, find this world?

Jonathan Levine: I used to be on the advocacy side as an undergrad. You're supposed to protest things when you're 19.

Michael Holtz: Right, right.

Jonathan Levine: [inaudible] and protest things and hold signs. So I used to do that kind of stuff. And I was the president for the students for this and the students for that and that kind of thing. And I kind of got tired of the advocacy thing, and I kind of realized a lot of people do policy work. But back in high school, I actually worked making carbon nanotubes at Rice University for Nobel Prize winner Richard Smalley, not because it was hard, but because nobody told me it was hard. So it was easy. I just did it. They said, "Do this, do that," so I did. So I made carbon nanotubes when I was 17. That was my high school job.

Michael Holtz: Wow!

Jonathan Levine: No one told me it was supposed to be hard, so it wasn't.

Michael Holtz: Right. And you liked it, right?

Jonathan Levine: Well, and then the other thing that happened was there's this thing called the IPCC, the Intergovernmental Panel on Climate Change. And it's one of those... Everybody talks about it. But when I was in college, I was like... This was 2001, 2002. I was like, "Well, I could just download and read it." So I did. I was a college student. I was like, "You could just read this thing." So I did. I read the summary report. I read some of the other reports. And I was like... This was 2002.

Michael Holtz: Right.

Jonathan Levine: You kind of stopped paying attention to what their general news said, and you read the darn report, and you saw that they had thousands and thousands of references, and you went, "We've got a problem. These guys have figured out that there's a problem." This was not a secret. This was the third report. This was the third report in 15, 20 years.

Michael Holtz: Right.

Jonathan Levine: Thousands of people had been working on this for decades by the time 2002 came around, and so all that I did was I listened to them. I said, "These thousands of environmental scientists are saying this is the major problem in the next century. Well, I'm going to go and work on this. I can make a career." I was 20 at the time. And I thought, "This is a good place to make a career."

Michael Holtz: Sure.

Jonathan Levine: Global warming is going to be the problem of the century. So then I went and did science and things, and there were test tubes and buttons and flashing lights and things like that. And then I got to NETL.

Michael Holtz: Gotcha. Wow! So what have you been doing since? I know you've published a number of papers. But what have you been doing since the end of your fellowship?

Jonathan Levine: I was studying CO2 disposal, and given you've got a bunch of general-interest listeners, I think it's worth noting in 2013, 2014, I applied for a stack of faculty jobs, and people said, "Nobody will fund carbon sequestration. So you'll never get tenure because you won't be able to get the million dollars you need to get tenure."

Michael Holtz: Right.

Jonathan Levine: There's $4 billion just for direct air capture sequestration this year, which my boss invented and didn't get a dollar for. There was no money for any of this research. So I didn't get a faculty job because there was no funding for doing carbon sequestration. There was no funding for any of this kind of stuff in academia. People said, "Well, there's just no interest." And now there's billion-dollar prizes and companies left and right, and there's billions of dollars of venture capital and all this other stuff. In parallel, what happened was my wife had invented a kind of paper that does clean drinking water and in 2014, 2015 became world famous as a chemist accidentally.

Michael Holtz: Wow!

Jonathan Levine: So she was on BBC News' most-read articles. She was on CNN. Time magazine invention of the year. So we ended up with a company.

Michael Holtz: Okay. Wow!

Jonathan Levine: So I'm the CEO of Folia Materials for the last six years. We started as Folia Water. And then we realized it's sort of a broader coating technology, and so we do industrial-scale coating at partner firms. And we've got a water purifier. We make antiviral face masks and microwave food packaging.

Michael Holtz: Wow!

Jonathan Levine: All paper and not plastic kind of in these cases.

Michael Holtz: Right. Wow! That's really amazing how you've really taken all of this knowledge and all of this work that you've done to be in a place now where you're the CEO of a company doing great things for health, for the environment, for people in general. I mean, I feel like there's an obvious connection, but how does your work as an ORISE research participant with NETL sort of figure into where you are today?

Jonathan Levine: What I think a lot of people are not nearly... People are not aware enough of the role of the National Labs, the Department of Energy National Labs. And they're a role between the universities and between industry.

So there's technology readiness levels, where you go from bench scale and you've got a handful of people working on something, to teams of people, larger laboratories, multimillion-dollar laboratories with 20 subsystems, 5, 10, 20 people on a project. And then you've got industry, where you have hundreds of thousands of people. That's NETL, right? NETL is that large labs, multimillion-dollar facilities, large complex projects involving a lot of different domain experts, all coming together. External partners from other universities, other government agencies, other industry, working... Industry comes in as well. So you bring them all together. So it's between what you're going to do at a university lab and what you're going to do at industry, is that National Lab. And that's that transition, right?

Michael Holtz: Okay.

Jonathan Levine: You're starting to see systems. You're seeing systems of systems. You're seeing different domains coming together. Rather than one specialization, you'll have five specializations.

Michael Holtz: Sure.

Jonathan Levine: So that's kind of where the National Lab comes in, and that was true in Pittsburgh as well.

Michael Holtz: Does that translate into how your company operates today? Is there that level of partnership or-

Jonathan Levine: Yeah.

Michael Holtz: Is that an aspiration?

Jonathan Levine: Yeah, no, no, no, no. Every startup, but I mean the same is true no matter how big your company is. Companies exist in a value chain, and so you've got different value-chain partners that have domain expertise in their respective areas. And that could mean HR. It could mean accounting. It could mean industrial manufacturing. It could mean regulatory, legal. It could mean any of a bunch of different things. But you basically say, "Okay, you've got these different partners. You've got different technical domains. You've got different sales domains or project management and operational domains."

Michael Holtz: Sure. Okay. That makes perfect sense. For students, graduates, post-grads who might be looking for fellowship opportunities... I mean, obviously, not everyone's going to get to the point of launching a startup, but obviously, it's possible. What would you tell those people who are looking for opportunities? And like you said, they may not be thinking of the National Lab, but...

Jonathan Levine: Yeah. So I actually got... My graduate fellowship mandated that I had exposure. I had to go get an internship or fellowship at a company or a national lab. So I was actually working at Schlumberger-Doll Research. Schlumberger was doing all of the carbon sequestration work for the Department of Energy.

Michael Holtz: Okay.

Jonathan Levine: So I actually got to see Schlumberger as part of my PhD work, and then I got to see the National Lab as part of my postdoc. I think it's absolutely critical if you're in the applied sciences. I think it's really important to see that sciences or engineering or these kinds of things can be done with very different working environments, very different kinds of resource bases, because you go from... Every university professor kind of runs their own mini department, mini company, mini lab.

And the National Lab, you have groups of people, and you've got many labs working together. And hopefully, they show you that, hey, this is part of 10 different labs that are at NETL Pittsburgh and 10 labs in West Virginia. And by the way, there's labs in Oregon. And then they're working with... I've got five publications with Los Alamos National Lab in New Mexico. And then there's the universities they're working with. And then by the way, they're funding the universities. So you start to see that there's actually a system of science that's not from a core lab. So you go from seeing the nail and the hammer of here we are to, oh, this is a collection. And I think that perspective is really important because in the MBA schools, they teach them those things, but they don't teach engineers and chemists those things.

Michael Holtz: Sure. And none of it really happens in a vacuum. I mean, as you've said-

Jonathan Levine: Right, right.

Michael Holtz: Your one lab is part of a system of systems.

Jonathan Levine: Unless you work at JPL, a jet propulsion lab, and then everything's in a vacuum.

Michael Holtz: Right. True that.

Jonathan Levine: And then you've got to build a vacuum system. You've got to figure out how to work on things there. It's kind of tough. It's just a tough world. So I was actually just at American Chemical Society last week on a panel with actually a Nobel Prize winner, and that was cool. They had the students, and these are students who want to go into leadership, entrepreneurship. And the same thing. A bunch of them, I said, "Look, during your PhD program, go and see other labs. Go and see other labs. Just go see how somebody else does the same exact thing and how the world is different in wherever they are, wherever they are."

So ORISE is a natural way to do that and get paid to live in Tennessee, Oak Ridge in Tennessee or somewhere for the summer or for a year, and get to see some other physical place that you wouldn't think to live. And you can see how another lab works, and you can usually justify it to your PhD advisor, because what a lot of grad students and postdocs who might be listening to this won't realize is that their being present in a different lab builds a working network for their boss. So they may think, "My boss doesn't want me to go to another lab in Pittsburgh or in Tennessee or wherever," but in fact, you're building an alliance for your boss with a different lab.

And by the way, NETL is where all the funding comes from, the Department of Energy. So your boss might not be too upset if you go to Pittsburgh and West Virginia, where the funding comes from. They might be perfectly happy to send you there for three months, and then they get an alliance. They get a collaborator, and they end up with something else happening in the future.

Michael Holtz: Sure. And you get a mentor, and then you build relationships with other scientists as well. So everybody wins, right?

Jonathan Levine: Well, and in the sciences and in engineering, we don't teach the soft skills.

Michael Holtz: Right.

Jonathan Levine: So this ACS LEADS conference, they had a whole session on here's how you network. None of it's rocket science. It's all one of those, like, say what you do. Ask people how they got in the room. What are you here to do? What kind of stuff do you work on? Where do you see this all going? All that stuff. And then the other one is build friendships. Go eat dinner. Go and have a beer with them.

Michael Holtz: Yeah, yeah.

Jonathan Levine: But all of those things are really important and we know... The MBA and the businessy people are really big into doing this. Every Thursday night, they have a kegger at the business school as we're walking to the laboratory in the engineering school to go get work done. Well, they're doing work too. They're just swapping names and having a beer while doing it. But we're busy going to the labs and not talk to anybody.

Michael Holtz: Right, right.

Jonathan Levine: But that's actually... You get the interview based on technical competency, and sort of we get the job based on both.

Michael Holtz: Yep. It makes perfect sense.

Jonathan Levine: In fact, you may not have gotten into the interview without having a warm introduction through a network. And then you got through the screening process because you were technically competent and capable, and then you got the job because of both.

Michael Holtz: Right, right. And now you've got to sell it. You've got to sell your skills.

Jonathan Levine: You've got to sell it, and selling it... The other thing that the perspective gives you is... I talk to a lot of engineers and chemists, and they say, "I do this narrow thing over here." And you go, "Well, it sounds like you built a system combining software, hardware, and 20 other components, and you did all of that with a project budget that looked like that, working with five peers and three bosses. And you did all of that and wrote all the reports, right?" "Right." "Oh, well, in that case, that's a lot of transferable skills." Right.

Michael Holtz: Right. So soft skills are critical.

Jonathan Levine: Soft skills are critical and then understanding how what you do also maps to other things.

Michael Holtz: Absolutely.

Jonathan Levine: Your technical skill is not a one of a kind. That's sort of a generic example of something bigger, or it's a specific example of something more general.

Michael Holtz: Right, right. And to get all of that, it helps to get those fellowship and internship opportunities.

Jonathan Levine: Perspective by being somewhere else and hearing some other people and how they think.

Michael Holtz: Yep, absolutely.

Jonathan Levine: Yep.

Michael Holtz: Jonathan, thank you so much for your time. Is there anything you want to make sure we cover that we haven't talked about?

Jonathan Levine: No, I think it's fabulous that you're doing this.

Michael Holtz: Awesome. Well, thank you so much for being a guest. Thank you for representing ORISE and NETL so well. And congratulations on the startup, and I look forward to hearing more about what you all do in the future.

Jonathan Levine: All right, bye.

Announcer: Thank you for listening to the ORISE Featurecast. To learn more about the Oak Ridge Institute for Science and Education, visit orise.orau.gov or find us on Facebook, Twitter, and Instagram @ORISEconnect.