Catalyzing Computing - Episode 14 - Interview with Dan Lopresti Part 2

The transcript below is lightly edited for readability. Listen to "Interview with Dan Lopresti Part 2" here.

[Intro - 00:10]

Khari: Hello, I'm your host, Khari Douglas, and welcome to Catalyzing Computing, the official podcast of the Computing Community Consortium. The Computing Community Consortium, or CCC for short, is a programmatic committee of the Computing Research Association. The mission of the CCC is to catalyze the computing research community and enable the pursuit of innovative, high-impact research.

In this episode, I sit down with CCC Council Member Daniel Lopresti. Dr. Lopresti received his PhD in Computer Science from Princeton in 1987. In 2003, Dr. Lopresti joined the Department of Computer Science and Engineering at Lehigh University, whose research examines fundamental algorithmic systems related questions in pattern recognition, bioinformatics and security. In July 2009, he became Chair of the Department. In July 2015, he was the new Director of the Data X Strategic Initiative. In this episode, we discuss a few of the courses he's currently teaching, the Code 8.7 Conference in using A.I. and Computational

Science to End Modern Slavery and the work of the CCC's [Intelligent Infrastructure Task Force](#). This is part two of my interview with Dr. Lopresti. If you haven't heard [part one](#) yet and would like to, catch that and come right back.

Enjoy.

[Women in Computing - 1:20]

Khari: You're listening to Catalyzing Computing here with Dan Lopresti. Dan, how are you doing today?

Dan: Doing good. Thanks, Khari.

Khari: I noticed that you teach a class on women in computing. Obviously, you're not a woman, but how have you felt about that class? What things do you think are necessary for the science community to do to get more women involved in computing?

Dan: Well, I think this is a problem that a lot of us recognize is out there. And I think CCC and CRA have been tremendous in raising attention to these challenges and these issues. In [CRA-W](#), CCC, and CRA there's a lot of discussion of diversity and it's incredibly important. Everyone needs to be part of the team as we address these challenges and I recognize that.

Going back to the imposter syndrome — when I was a student studying in college and thinking, "Well, there's no way I can get a PhD. I'm not smart enough to be a professor. I'm not smart enough to be a researcher." I sort of faced that myself and I know that's a challenge for a lot of people going into computing, especially if they're from an underrepresented group. The fact that they somehow don't feel like they belong there. And of course, that's not at all true. Everyone's got something to contribute. As a result

of that recognition, we were sending our students to [Grace Hopper](#), and I thought I should go see what this is all about. So I've been to the Grace Hopper conference a couple of times and it's spectacular. It's amazing. I think everyone should go and experience it at least once.

I started to think about what we could do at Lehigh to create an awareness amongst the women in computing who, even though our numbers are increasing a little bit, still feel isolated, and they realized they felt isolated. Collaborating with some colleagues at Lehigh, we decided maybe the best thing we could do is create a course where our students could hear directly from leaders, women who are leading. Many in Silicon Valley, but in tech in general. We set up a course where every week guest speakers, many from Silicon Valley, come in and actually speak — using really high quality video conferencing — with our students at Lehigh on the East Coast. It was a tremendous experience for them to hear what it was like to move through the system when women were, you know, even more underrepresented, some of the challenges that they're going to face, and then also the ways of addressing those challenges. It was a very positive course, even though we have to talk about some of the negative aspects of this too.

[AI for Social Good - 3:35]

Khari: Cool. Are there other classes that you've been teaching this semester or in recent years that you think are really interesting and that you're excited about?

Dan: Yeah, I'm lucky, I get to choose a fair number of the things that I teach. So I'm also doing a course this semester on AI for social good. It's a project-based course, and there's a tremendous amount of attention on AI and machine learning right now and all the great things it can do and all the money you can make doing it. There's also, in the past year, some serious negative repercussions as well, and what I wanted the students to understand was it's not all about the money. Yeah, there are negative stories out

there and probably deservedly so, but let's take a look at what actually could be done using machine learning and AI techniques to actually help the world be a better place. That was sort of the mandate for these projects: don't come in with something that is purely designed to make money or something like that, but rather something that you can argue is a way to make the world a better place.

Khari: Okay, so you said this just started this semester?

Dan: Yeah, I just started this semester. So the students are kind of in the middle of their projects right now.

Khari: Okay. So have you had a chance to see any particularly interesting projects at this point?

Dan: Yeah. I don't want to comment on work that's in progress, but the students are definitely taking this to heart. In addition to the projects they're doing, we're also pulling news stories and articles from the current press about things that are going on. I've talked to them a bit about this Code 8.7 activity that the CCC has been involved with, which is the application of AI in the fight against human trafficking. So they're certainly aware that we're doing that, and I've talked to them about some of the things that we saw at the conference at the United Nations. It's that kind of stuff.

Khari: Yeah,. For people who don't know, the CCC recently co-sponsored a conference called [Code 8.7: Using Computational Science and Artificial Intelligence to Fight Against Human Trafficking](#). Long title, but there's a [podcast](#) out about that conference, including Dan in it.

Can you give a little bit of a summary about that conference and the next steps that seem like they're cropping up?

Dan: Right. I really want to refer anyone who might be hearing this to the CCC website and to our reports on Code 8.7. Also, if you Google Code 8.7, I'm sure you'll also end up with a link to the conference. This is an intellectual collaboration between CCC, [Alan Turing Institute](#), which is the United Kingdom's National Institute for Data Science; [U.N. University](#), which of course hosted the conference and it's kind of like the overseeing entity for us; University of Nottingham [Rights Lab](#), a group of companies called [Tech Against Trafficking](#); the [Global Security Institute](#) at Arizona State University — [Nadya Bliss](#), who's also CCC Council Member, is the Director of that.

This intellectual collaboration, got together to see what we can do to apply AI and machine learning, both in the near-term and also in the longer term, in terms of research to the fight against modern slavery or human trafficking. Tremendously interdisciplinary. Tremendously international. I think it's exciting along all the dimensions, and it's a huge, very challenging problem. It's a little bit like the voting problem, in the sense that it touches upon society, politics, policy, and social sciences. And where I think computing will really be central to a solution.

Khari: Yeah. So there's video available from that workshop on the [Delta 8.7 Facebook](#) page and the [U.N. Web TV website](#). If you Google this, you can find all those links.

[Cybersecurity and Intelligent Infrastructure - 6:55]

So, on the subject, that conference was, at least from the CCC side, led by the [Cybersecurity and Cybercrime Task Force](#), which you are a member of and you're also a member of the [Intelligence Infrastructure Task Force](#). Can you talk a little bit about projects those two task forces have been involved with? Besides Code 8.7.

Dan: Oh, that's pretty big, actually.

[Laughter]

Dan: So from my perspective, what I've been doing, Code 8.7 is kind of dominating in the cyber crime area, but I know that the task force has also been involved in some other activities, too. The [cybersecurity of embedded systems](#) are incredibly important, medical devices and things like that. You're reading stories everyday about how these systems can be compromised, and now that they're becoming ubiquitous, the dangers that that presents to society. The naive application of computer hardware and computer software can be really dangerous and we really need to open our eyes and open the eyes of those who are applying computing in ways that we would say, "No, no..." It's like the voting system problem, right? It's like, please use computers in the right way, please understand the limitations, and please ask experts when it comes time to actually field these systems so that we can understand the serious issues that might be raised by the application that you're imagining.

In terms of intelligent infrastructure, you might think of this as being, among other things, smart cities, autonomous vehicles, things like that. That's also an incredibly important area where computer scientists and computer research need to play a role, again, because of the tremendous benefits, but also the serious risks that are placed here. Intelligent infrastructure is really interesting because you think about the computing that the vast majority of us have experienced at this point in time: it's computers, desktops, laptops, smartphones, you know, things like that. It's signing up for Facebook or whatever you do online. Those are all decisions that you make. You make an explicit decision to buy that computer or to use that smartphone or to sign up for that account. When intelligence is embedded in the infrastructure and the traffic lights are watching you and the sidewalk is aware of you, you are no longer making that decision. Someone else has made that decision. The public is experiencing it, and all of this data that is collected could be used for tremendous good. For safety, for efficiency, to save energy, and to make the world a better place. But there's also tremendous

potential for violating privacy. This is now a surveillance society. There's no question about it and that cuts both ways. And, again, computer scientists and computing researchers and people who understand policy from our side should be involved in these discussions.

Khari: Yeah. So two years ago, the taskforce put together a [white paper series](#) around intelligent infrastructure. I think there are nine of them. Which of those papers do you think were the most interesting to write?

Dan: So the great thing about CCC is, when we are asked or when we see an opportunity we act very, very quickly on it. There've been a number of cases where something comes up and the CCC gets together, organizes, and says we need to offer our opinion on this. Intelligent infrastructure came up a couple of years ago when it appeared that the federal government would make a very large investment in infrastructure, and we were making a case that we shouldn't just invest in concrete — that's very important, but we don't want to be building something now for 50 years, that's not really ready for 50 years into the future, and infrastructure has got to be "intelligent."

There needs to be an embedding of intelligence in the infrastructure as well as the physical infrastructure. So we started to lay out some of our thoughts on what needs to be done in that regard. That's what we started doing a couple of years ago. Of course, the situation with respect to funding activities, especially in Washington, tends to ebb and flow based on the political winds. So we sort of are waiting to see what might happen in that regard. It looks like there might be some bipartisan agreement about investment in infrastructure. In the meantime, some of this technology is actually being rolled out already. I wouldn't be surprised if very soon, the CCC comes together again to renew the discussion and make sure that the right voices are at the table and the right work gets done. Otherwise, yet again, we'll do something that we think might benefit society, but that actually ends up hurting society.

Khari: Right. So you mentioned some applications have already started to be rolled out. What kind of things have you seen that are being used today? And are there any potential flaws that you see?

Dan: Well, autonomous vehicles are clearly a massive subject of attention from a commercial perspective. You pick up the paper and basically every day you're finding out details about autonomous vehicles, whether they are vehicles that drive or vehicles that float or vehicles that fly, and a lot of those are going to be enabled by infrastructure that has intelligence embedded as well. Those are the stories that you're starting to hear about and that people are paying a lot of attention to, so I think that's what I would point to at this point in time.

[Experience with the CCC -

Khari: Yeah, definitely check out the [intelligence infrastructure white papers](#) on the CCC website. How did you initially get involved with the CCC? You've been a council member now for how long?

Dan: I think it's four or five years something like that. This is my second, three-year term. The CCC is a relatively small group. I think it's about 20 council members, and they try to be representative of the range of institutions, mostly universities, but also some research labs in North America that do computing research. And there are the big names you think about when you think about computing all the time, but then some of the smaller places also need to be represented as well. Lehigh is an example of one of those smaller places. So I'm thankful that we're given a seat at the table so that some of the smaller places can play a role in these discussions. I think that's why I was identified and selected to serve on the CCC. And then when I was asked, I was very happy to do it. So, yeah.

Khari: So has the CCC been what you expected it to be or how has it been?

Dan: Great, I think it's been tremendous. As I said, we tend to jump on things when they arise, so it's not the kind of thing where we can lay out a plan at the start of the year and say, "This is what the plan is going to be for the year." So you need people who are very adept at changing and adapting and being resilient and rising to the occasion. That's exciting and exhilarating to me. I think that's been tremendous. It gives you an opportunity to poke your nose in stuff you wouldn't otherwise get involved in too, because someone needs to help out with this or someone needs to help out with that and you think, "Well, I'm not an expert in this," but you've got a reasonable amount of expertise so you can get involved and you can make a contribution. I think that's one of the great things about the CCC.

Khari: Are there any other professional or community organizations that you're involved with? Or that you want to discuss?

Dan: Yeah. At the same time I'm doing the CCC, which is largely U.S. based, I mentioned the Code 8.7 activity that we're doing, which is really international and I think is really exciting, because, while CCC really should be about the North American computing research community, the whole world is doing this stuff and we're affecting the whole world and they're affecting us. There are a lot of people in the U.S. now who have their roots overseas and vice versa. That's tremendous, I think.

The international aspects, I think, are really cool. My research community right now is actually very international, even more international than it is based in the U.S. So I spend a fair amount of time interacting with and participating in international events, which makes for a lot of crazy travel sometimes, but it's very exciting.

[International Impact of AI and Intelligent Infrastructure - 14:04]

Khari: How do you see these kinds of problems we've brought up — in terms of machine learning, cyber security or intelligent infrastructure — playing out in different countries like in the EU or in Asia?

Dan: Well, I think we'd be surprised about how advanced some of their technology is. We tend to be a little myopic in the U.S. and think, "Well, it's always invented here first." I'm not saying that everyone's like this, but we can have that attitude, right? And we do really well here. A lot of the industry, a lot of the ideas flow from the U.S., but there's tremendous people all over the world doing really great work and we shouldn't be oblivious to that. I was actually in Beijing this past August for the big pattern recognition conference. I was one of the organizers there, amongst the organizing community for that conference, and you saw a lot of the Chinese companies who were recruiting, because there were a lot of PhD students there as well. And seeing some of the technologies that are being developed is just tremendous. Then, of course, you hear the stories about the big investments that China is making in AI and machine learning. You see that there is tremendously good work that's being done all over. We no longer have the lock on this, here in the US and we need to be aware of that. So I think the more we are aware of that, the better everyone will be.

Khari: Yeah. So I guess one of the big reasons for the push for the [AI Roadmap](#) is to really push U.S. leadership in AI over the next 20 years. Be sure to check that out online.

[Time Management Advice - 15:27]

I just want to backtrack to something you said at the very beginning in terms of stress that happened when you were sort of transitioning from your PhD to being a professor. What advice would you give people that are in that stage of their career in terms of handling the interaction between their personal lives and their

professional lives? And what strategies worked for you like time management and stuff?

Dan: Well, I think the good news is that we've changed. The field has changed quite a bit since those early days, I called that ancient history. We have family medical leave. I think most institutions offer a really good, responsible response to when a member of the faculty has a life event, like having a child, both for the women and for the men who are involved. Those kinds of things, you know, tenure, clock delays, extensions. And companies are doing this too, not just universities of course. Those kinds of things, I think, are really, really important because someone shouldn't have to make a choice between having a family and a professional career.

I think those things that are in place now over the past few years, and more and more. are one way of addressing some of that extra additional stress and concern that arises in young people when they're in a situation like that. The other thing is just to seek out counsel from mentors and other people who maybe have been through it who can help you. You know, if you're shy, you might be reluctant to do that, but I think it's very important. The CCC and CRA do some things as well. We do these activities for young up-and-coming scholars. Those are activities where, as I recall, we cover a wide range of topics, including work-life balance. I remember the symposium we did last year, we had the early career research symposium. One of the panels was on [balancing work and life](#) and some council members made really great observations there about how to do this.

Khari: Yeah. And those videos are available on the [CRA YouTube](#) channel and on the CCC website. So if you want to hear those recommendations, you can certainly find them. That's pretty much all the specific questions I had. Anything else we can talk about that you want to mention or research you want to plug or shout out?

Dan: Well, CCC is a community organization. We depend so much on community input, so we just encourage anyone who's listening to this to go to the CCC website. Take a look at what we're doing with the white papers, the events, the workshops, and then if something strikes your fancy, just reach out to us and we'll make a connection. There's no question about that. We've got a lot of connections and we would love to have even more. And I would just encourage the community to make use of us and to learn about us.

Khari: Yeah. Sounds great. Thanks for being here, Dan.

Dan: Thanks, Khari.

[Outro - 17:58]

Khari: That's it for the podcast. We'll be back soon with new episodes. Until then, remember to like, subscribe, and rate us five stars on iTunes. Peace.