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An interview with Laura A. McLay, PhD

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Laura A. McLay, PhD
by Willa Kerkhoff

Laura A. McLlay is an associate professor of industrial and systems engineering at the University of Wisconsin, Madison. McLay received her B.S. in 2000, her M.S. in 2001, and her PhD in 2006, all of which were in engineering and computer science and from the University of Illinois at Urbana-Champaign.

In addition to her work as a professor, McLay is a senior analyst with Innovative Decisions, Inc., has been published in over 50 articles, has contributed to texts on risk assessment and medical service system. Furthermore, McLay is a frequent guest lecturer for many institutions, including Oberlin, where she was recently invited as part of the Math department's Fuzzy Vance Lecture series.

McLay is also an avid blogger. Her blog, titled "Punk Rock Operations Research", received 84,600 hits in 2013 alone.

So to start out, could you give us just a brief description of the kind of work that you do? Also, what interested you initially and why do you consider it important?

So, first of all, I should confess that I'm an industrial engineer and my mathy interests are in discrete optimization. My interests are in applying optimization to interesting real-world problems, so most of the time I've focused on homeland security and emergency response type problems.

Yes, I saw on your blog that you've recently posted a few times about airport security. You did your dissertation of that topic, correct?

Yes.

In that case, my question for you is what drew you to working on that topic specifically, and have you reached any conclusions about our current system or how to improve it?

Oh, yeah. So a lot of professional successes in research and such start out with a little bit of luck, and this was definitely the case with me. So, in September of 2001, I started a PhD and I was taking this class with Sheldon Jacobson who turned out to be my advisor. He was the only person in the country researching aviation security before 9/11, and he was lucky to get involved with the federal aviation administration, which at that time was in charge of security. Al Gore was actually making some changes to security, which was not very popular at that time because people didn't think we had a problem. Then September 11th happened, and the project just became something I was interested in. I feel like I should point out that everything in my research really has this public sector application and tries to contribute to the world. I guess that really ties in with my blog—Punk Rock Operations Research—which is very socially aware.

Yeah, so I got involved in this research, which was a great opportunity. I knew that I wanted to get involved in other things someday down the road, too. I managed

that during my PhD, but not everything made it into my dissertation. The main problem ended up being really interesting, and mostly we looked at risk-based screening. My field, optimization, is really good at figuring out "how do we get the most bang for our buck?". How do we use our limited resources to do as much as we possibly can? We live in a world of limited resources, whether its personnel or screening devices. In security you can only ask people to wait in so long of a line, or else everything is going to fall apart. So a lot of our work was focusing the screening on the people who appeared to be risky, which mainly means that they can't really be cleared of being threats. With some passengers there's more of a risk than with others. And so we wrote a lot of papers in this area, and at that time it was thought that we should do random screening because anybody could be a risk; we should just kind of increase the security for everyone. Now that sounds good, but if you actually start crunching the numbers you realize that's not a good option. Basically they end up saying that they need more resources, and that's just not one of our options. We need to do the best with what we have.

So actually it's been interesting. I finished my dissertation in 2006, and then years later it's like "Oh, that's actually a great idea". The TSA [Transportation Security Administration] are actually really intelligent, and they've read our papers, so at this point TSA pre-check is actually really close to the models I was advocating in my research. It's just great to see, the way you can make an impact. You just have to be patient.

Absolutely. Really quickly, I was wondering, why is it Punk Rock Operations?

Well, I didn't want to have "Laura McLay's Blog", I wanted a catchy title. I also think part of me is a little rebellious and socially aware and I just wanted the name to reflect that. I have no tattoos or anything, but almost no one in math and engineering calls me out on that. But yeah, part of me really just needs to be who I am and do my own thing, if that makes sense. Most people would say don't start a blog before you get tenure but whatever. It's opened a lot of doors for me.

So this is a question I ask of a lot of female academics. I know that, especially in math and sciences, there is a difference in experience between the genders. I'm wondering how you've navigated that as it has changed over your career, and what specific things have you done to deal with that culture.

Yeah, so I was very aware of that culture, especially growing up. I'm very stereotypically female and I just felt like a fraud all the time, which was really tough. I'm actually a huge advocate of women for STEM, big time, and actually all underrepresented groups because once you begin working for women you start to realize that we need everybody to be welcome at the table. That's my guiding philosophy. I guess I just never felt welcome at the table *per se*, and some of that was just because of internal barriers.

I think one of the biggest challenges I had was just not having ANY role models. I had one course as an undergrad that was taught by a woman – one. And I don't think that's the experience students have today. So I think that just that one thing, just seeing people like you up there in the positions you want to be in, is huge. I think I have a lot to learn from really amazing women and I try to just take it all in, to be sure. But yeah, I was always aware of it. I always felt like a woman in engineering, not just an engineer, and that makes me a little sad. But it's great to have such amazing role models in my department; I've learned so much from them.

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