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CoE Catches Up With Alumna Amy Elliott

In May 2013, Tennessee Tech University College of Engineering alumna Amy Elliott was a finalist on The Discovery Channel's reality show "The Big Brain Theory: Pure Genius." In the show, teams of engineers were presented with difficult engineering problems and had to work together to devise solutions around short time frames and tight budgets.

Elliott earned her bachelor's in mechanical engineering at TTU in 2009, then went on to earn a doctoral degree at Virginia Tech. At TTU, Elliott led two teams for the moonbuggy race at Marshall Space Flight Center in Huntsville, Ala. She was on TTU's Baja team for three years and was featured on a Wheaties cereal box promoting the team. She spent three years at NASA in Huntsville, designing and building equipment for testing of bearings.

TEDx Talks are an offshoot of the original TED Talks franchise, and a recent TEDx talk featured Elliott expanding on some of the work habits and principles explored on "The Big Brain Theory."

Recently, TTU took a little time to catch up with Elliott:

CoE: Amy, what are you engaged in these days?

Elliott: I'm at Oak Ridge National Labs in Knoxville, working in advanced manufacturing. We look at ways to apply 3-D printing to actual manufacturing processes. At one point, an engineering team would spend considerable time working up a mockup of a part before sending it off to actually be machined. What we do is to take that step out of the process by manufacturing the final part itself, to be duplicated in production. We can print metals here as well as plastics, and it's so integral to making technology usable and having the flexibility to make changes as needed.

Aerospace is a great application for 3-D printing because they don't make a gazillion copies of a part. Often it's not more than a handful of a part that's needed, and 3-D printing saves a lot of money by not having to invest in tooling for that part. It's also really useful for research if you need custom fixtures or other one-offs.

If you have a 3-D printer, you can make whatever you need, as opposed to traditional manufacturing where you're limited to what you can carve out of a block of material or what you can do with a mold and injection-molded plastic.

CoE: Tying this back in to one your TEDx Talk themes, this is a perfect example of taking engineers out of the theoretical and design realm and putting them back into manufacturing.

Elliott: Yes, absolutely. It's important for engineers to have this kind of hands-on experience.

CoE: In your TEDx Talk, you talked about the power of pure focus. It must be daunting to try to focus in the workplace when you've got a million distractions and pressures on you. How are you able to bring that kind of focus to bear in a real-world environment?

Elliott: I wish I had a good answer to that. It's something I struggle with all the time. On the show we were forced into that, with no cell phones, no social media, zero distractions, but that's practically like an antiseptic, lab environment compared to the real world. I'd say no phones, no Twitter, no Facebook because they're all time-suckers.

CoE: You also touched on the role of failure in innovation in the talk. How does that play out where you are now?



Elliott: Well, it helps me feel confident taking risks and knowing I'm not going to look like a dummy. Failure teaches you so much and you can't be afraid to fail. With high risks come high rewards, and that environment helps you learn more, learn faster and get more done.

CoE: Your time on The Big Brain Theory really gave you the chance to explore the importance of teamwork.

Elliott: Everyone's got a different leadership style, and I have my own ideas on what constitutes a good leader and how to get the most out of a team. In my view, everything needs to be collaborative. On the show, there was always a brainstorming phase and when I was captain, I would try to steer people into brainstorming right.

You have to have an environment where people can brainstorm in a really clear way and don't feel inhibited about bringing ideas forward. Too often there's someone who picks others' ideas apart and looks solely for the negatives, and that's the exact opposite of what you want in a brainstorm session.

I saw my role as more of a facilitator to help people find answers for problems they'd come up with and keep an open mind for any ideas they might bring to the process. It helps a lot in gauging the strengths and weaknesses of each part of your team, then playing to their strong hand and putting them where they can do the most good.

Another thing I want to mention about my leadership style is the need to give your teammates ownership of whatever part of the build they are working. So, instead of saying, "I want you to build this exactly how I've drawn it," say, "You have complete control over the design of this part. These are some of the things you'll need to look out for." This type of leadership style, I believe, gets 100 percent of a person's attention and care. Thus, they will be more apt to find flaws in the design or come up with a new and innovative solution to the problem. When you give someone strict guidelines and control the way they solve a problem, you are making their brains turn off and they don't feel like they own the project.

CoE: Where are you seeing yourself 10 years down the line?

Elliott: Boy, that's a tough question. I'd love to start a company that deals in 3-D printing, almost like a consultancy to figure out ways to improve 3-D printing and selling products for that and continuing to do research here at Oak Ridge. I'm also interested in Maker's Space, which is like a co-op arrangement where you can pay a monthly fee and have access to shop tools like mills, lathes, welders, any kind of fab tools you want. It's a great way for innovators to be able to work on their ideas without the front-end investment in equipment.

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