

# SYSTEMS THINKERS IN STEM



**A CONVERSATION WITH:**

## MARY TEDD ALLEN

**SENIOR VICE PRESIDENT OF OPERATIONS AT NANOSTRING TECHNOLOGIES**



**Which systems thinking skills do you use?**

**#3: Effectively Respond to Uncertainty and Ambiguity**

My team designed a new system to process and manage a large inventory of DNA. This project was challenging and unprecedented, but they now have a robust system in place that continues to perform well.

**#6: Recognize Systems**

Everyone on my team must recognize that manufacturing is a system. It is important that team members speak up when they make a mistake because it will be harder to fix the problem further down the production line, affecting the whole system.

**#8: Differentiate and Quantify Elements**

I have to think about all the parts it takes to build a product, keeping track of the parts I already have (stocks) as well as those that are being purchased in and used up (flows).

**about my systems thinking**

I am the Senior Vice President of Operations at Nanostring Technologies. I make and track products that help advance medicine.

Q. What complex problem do you address in your work?  
 Nanostring's mission is to make tools for genomics and proteomics researchers. My work involves mostly manufacturing, but also includes cost reductions, process improvements, and transitioning newly researched products into the manufacturing process.

Q. What elements do you need to consider when addressing this

The products I help to produce require many parts and new, creative ideas. The first product launched at NanoString was a highly multiplexed gene expression assay, which is essentially a big library of DNA. This required the company to purchase 20 thousand oligotides (short sequences of DNA) for every species their clients wanted to study. That's a lot of DNA! Since it was such a large inventory, we had to figure out how to make a new system to organize and process all of it, similar to creating an online catalog for a huge library of books.

4. How did you get to where you are today

I was initially interested in medicine, but when I was in college I realized what I really loved was chemistry, and went on to earn a PhD. I was also always interested in the application of science, so I naturally migrated to product development and eventually to manufacturing. I was especially attracted to it because of the systems thinking required in the field. The cancer diagnostic research at Nanostring is personally relevant to me because the BRCA 1 and BRCA 2 gene mutations run in my family, which increase their risk of developing breast cancer. Many of my loved ones have passed away from the disease, including my father, grandmother, and sister. In addition to my contributions through my work, I support organizations that fight breast cancer via walkathons and other fundraising events.

Q. What advice do you have for becoming a systems thinker

Medical manufacturing typically requires someone with a 4 year biology, biochemistry, or chemistry degree. It is a good fit for someone who can write well, is a systems thinker, can manage data, is open to feedback, and is willing to admit when they've made an error.