ISB Systems Education Experiences

BOEING

SYSTEMS THINKERS IN STEM

A CONVERSATION WITH:

NYASHA CHAMBWE

RESEARCH SCIENTIST AT THE INSTITUTE FOR SYSTEMS BIOLOGY

WATCH NYASHA'S VIDEO AT bit.ly/STIS_nc

Which systems thinking skills do you use?

#7: Maintain Boundaries
I have to figure out which genes are involved in cancer and which are not in order to define the boundary of the cancer system.

#10: Characterize Relationships
Genes interact with each other. Learning how they interact can make it easier to understand that they function together as a co-ordinated system.

#15: Respond to Changes Over Time The pace of innovation and discovery in my field is very fast, so I must continually read and learn from colleagues to stay up to date with the latest techniques.

1. **What is your role within the STEM community?**
   I work for the Institute for Systems Biology, where our mission is to ask questions about biological complexity and how it relates to human health and the environment. As a research scientist, my specific field is computational biology. My interest is in genetics and how new technologies allow us to examine the sequence of the human genome. I write computer programs to crunch the data and generate insights about what is happening with the genes. I am also passionate about communicating the findings of scientific research to the general population in an easily understandable and accessible way.
2. **What complex problem do you address in your work?**
   I study the genetic aspects of cancer. I write computer programs that process genetic data to figure out how genes interact with one another, how they're different when someone is sick, and how that impacts treatment for them.
3. **What elements do you need to consider when addressing this problem?**
   The human genome is very large (~3 billion letters!), so I have to use computers to analyze all of that information. This means that I must use a combination of computer science and biology to answer questions about cancer. Every person is different, so their disease and response to treatment will be unique.
4. **How did you get to where you are today?**
   I didn't always picture myself as a scientist. I liked many subjects when I was young, but my main passion was sports. I went to college on a basketball scholarship, but I decided it wasn't a practical career choice for me so I started exploring different careers. My passion for science was ignited when I had great mentors that gave me hands-on research experience. Cancer research is especially important to me because I have family members who have been affected by the disease.
5. **What advice do you have for becoming a systems thinker?**
   My advice to students entering the field of computational biology is to have a solid foundation in coding, math (such as statistics), and biology (especially DNA, RNA, and protein).