

Derek Braun's SWS Transcript

Stephanie Hakulin [00.13]:

Hi, I'm Stephanie Hakulin. Welcome to STEM Workforce Stories. On today's episode, we'll meet Derek Braun, a self-proclaimed "science geek" as a kid – whose interest in STEM led him to become the Director of Gallaudet University's very first biological research laboratory!

Derek Braun [00.54]:

I became fascinated with science while growing up. I was always a science nerd, a science geek. I was often doing science or fantasy-related things with my brothers. We talked a lot about science. We watched movies about science. Back then closed captioning had recently been released, so there were some things I could watch, now and then. By science I don't mean biology. I was fascinated with physics, NASA, the space shuttle, and different topics. While I was growing up, my stepfather purchased a personal computer. Back then, personal computers were not that common. I'm old enough to remember back when not everyone had a computer. He bought the computer for his own use, but while he was at work, we were allowed to use it and we wrote programs on it. When I entered college, I thought I would go into computers. I was a computer science major at Gallaudet, with a minor in mathematics. As I approached graduating from Gallaudet, I decided to shift my trajectory and ended up in the microbiology program at the University of Maryland where I got my Ph.D. But now, at this point in my life, I want to join my computer science background from back then, with what I now know about biology and try to merge the two fields together. I just published a paper which combines them together and that project was really fun.

Michael [02.32]:

I think to begin with I'd like to ask you tell us a little bit about your background. About your experiences as a deaf and hard of hearing person, what your family life and upbringing were like, and a little bit about how you communicate using ASL or any other means.

Derek Braun [02.48]:

I'm Deaf, yes. I was born hearing. I became deaf when I was three. Back then we thought this was because of medicine. We didn't know, and I discovered recently through 23 and Me, the real reason why [I'm deaf] is that I'm missing one copy of the connexin 26 gene.

I learned ASL about the time I was in high school. I learned some ASL then, but I picked up the most ASL at Gallaudet, when I was there for college. That was a wonderful experience for me. At home with family, in my daily life growing up, I spoke for myself, but I struggled with lipreading. I could speak well enough but lipreading was a struggle for me. These days, I work mostly with deaf people or I work with people who already sign, meaning that I need to speak much less, and I appreciate that.

Michael [03.49]:

Got it! Alright, maybe we'll take the opportunity to take a look at your equipment in the lab.

Derek Braun [03.56]:

Sure! This is the dim room. We call this the dim room and not a darkroom because it's not 100% dark. It is still very dark, but a darkroom requires a special kind of turning door and we don't have that kind of door. But we do have this trim on our door, and if you close it, it seals out the light. The equipment here is not old-fashioned film requiring developing. Not anymore. It's digital, and that can tolerate some light.

Michael [04.33]:

This lab was your design, right? Can you tell us how you made use of Deaf Space design principles, in a way that benefits hearing visitors as well?

Derek Braun [04.46]:

Yes! Deaf Space is about universal design and we should see it that way. What benefits and gives access to certain groups of people always benefits the general community. Deaf Space designs are much more open, allowing for better interaction between people and better flow of people and enhance conversation and communication. So, yes.

Derek Braun [05:14]:

Electrophoresis is where we study DNA. It will show different sizes of DNA. We can measure the bands and use that for genetics experiments, especially for genetic engineering. If we rearrange DNA we can create something new. We used to do that often here.

All of the equipment here requires a connected computer to run. With all of the equipment you will always see a connected computer. In some cases, two or three pieces of equipment are connected to one computer.

Michael [05.59]:

And could you tell us a little bit about what a typical workday is like for you?

Derek Braun [06.05]:

When I worked in this lab during the week, back then before the pandemic, I had a lab assistant, a technician who worked here and actually sat at this very bench. During the day I did some teaching of classes and spent a lot of time on research.

During the school year my day centered most heavily on teaching and course preparation. On paper our jobs are 1/3 teaching, 1/3 service meaning service on committees and different projects, such as working with students or with the university, that's service, and 1/3 research. But in reality, during the school year we do focus heavily on teaching. I could do maybe one day of research every week, if I'm lucky. During the summer, I focused more on research, much more. Summer is my time where I'm free to do research.

Michael [07.06]:

Sounds fun! Speaking of your research, why don't you finish showing us your equipment?

Derek Braun [07.15]:

These are PCR [polymerase chain reaction machines]. Both machines have a battery backup. If the power goes out during the night, these machines will stop running and it will cost us a lot of money because PCR reagents are expensive. That's why we have a battery backup.

This is called a 96-well plate. It can hold 96 different samples. The machine can read all of these samples at the same time. It's pretty fast. It will read whatever changes in color in the plates.

Why a change in color? Many assays used in chemistry and in biochemistry were purposely designed to cause a little color change. The computer can read these quickly and translate them into numbers and data.

This is a fluorescent microscope. Other people work in this lab, too. Dr. Solomon, uses this microscope for her research. Fluorescence can be used to identify different types of phytoplankton. We can do other experiments, too.

Michael [08.24]:

And so with the current pandemic and the times that we're in people staying at home, how does that impact your research?

Derek Braun [08.32]:

How did the pandemic affect my research? I found a nice marriage between computer science and biology. I said before that all of my biology research has been in genetics. Genetics, over the last twenty years, has become more and more automated. It's gotten to the point now where we

will get a DNA sample, for example from spit or from a buccal swab, and we will send it out to a commercial lab. The lab is really a big factory that processes samples, and they will do whole genome sequencing, and then send back it to us as a computer file over the Internet. We get it through the cloud. We've gotten to the point where we get massive quantities of DNA data. That's less need for hands-on in the lab.

One of the things that this has shown is it's perfectly viable to work from home. What's important is that we must have good computers. And that's beautiful.

Science is really resource driven. It requires good resources to do good science. That's historically been true. That means institutions with more resources, people, and scientists, will publish and accomplish more. That's been true up until now. But now we are seeing some change. We are at the point where a really bright person, working alone, with a laptop could potentially make a discovery and change the world. And I think that's amazing because of what that means for the diversity of scientists now. Opportunities that weren't available historically are now becoming available.

Michael [10:35]:

And talking about new opportunities, what advice would you give to the younger Deaf or hard-of-hearing students who are interested in pursuing a career in the sciences?

Derek Braun [10:46]:

Well... When considering graduate school or medical school I think the most important thing is to shop around, meaning, look at different programs and meet different potential advisors. Your advisor, for graduate school in science, is your most important person. This person will decide your research direction. That person will support you and will provide accessibility for you as well. They are the most important person. I suggest meeting a few and don't automatically pick the first person you meet. Meet a few, and look for someone who is in your corner, who is your ally, and who will support you to the end. That's who you want. The most important thing is if you are working with someone like that, who is in your corner, you will graduate and you will get your Ph.D.

I think the biggest lesson that I've learned over my career as a deaf person - and I think this advice applies to everyone - it is important to work with, and to be with people who want you. It's important for me to work with people who want me there. This theme comes up a lot for Deaf people because some institutions, some labs, and some faculty want Deaf students and are actively trying to recruit us. They are willing to accommodate and meet us halfway.

Michael [12.19]:

Wonderful. Well, thank you, Dr. Braun. Thank you so much for sharing your time with us and letting us have a glimpse into your lab and telling us about your history. Thank you so much.

Derek Braun [12.32]:

Great! Thank you for this opportunity.

Stephanie Hakulin [12.37]:

Hi, it's Stephanie, again Thanks for joining us, today. It's exciting to think about what Derek Braun said - that one scientist and a laptop, might change the world. Derek's story is just one of **many** amazing science journeys. Check more of them out on STEM Workforce Stories.