Sue Nelson
Hello, I'm Sue Nelson and welcome to the Create the Future podcast brought to you by the Queen Elizabeth Prize for Engineering, celebrating engineering visionaries, and inspiring creative minds.
[Music]
US born Leslie Gaston-Bird is an award-winning sound engineer, an electric bass guitar player, a classically trained pianist, and she's a member of the Recording Academy. In fact, she's a judge for its Annual Grammy Awards. She's worked for US National Public Radio, the Colorado symphony orchestra, and as a professor in academia on both sides of the Atlantic. If that's not impressive enough, Leslie runs Mix Messiah Productions in the UK. And she's written the Math Fundamentals for Audio textbook, and her Women In Audio book celebrates almost 100 female pioneers in the recording industry. As a former sound engineer myself, I wanted to begin by finding out more about how the profession of audio engineering began.

Leslie Gaston-Bird
There's a couple different audio engineering trades. I mean, there's sound for picture, there's sound music recording, there's acoustics, so there's different disciplines or sub disciplines of audio. Thomas Edison, I think people will acknowledge that he invented the phonograph. But even before that, there were people using telephone lines to transmit music, we were using the radio, around 1918, I believe, is when we started to get wireless transmission of radio and 1926, we started getting Vitaphone records, there were ways early on to try and sync these records with pictures. So, between I'd say, 1912 to 1926 was really a golden age of being able to transmit and record and reproduce sound.

Sue Nelson
What for you is the greatest or the most useful skill to have? Is it a technical engineering knowledge, a good knowledge of maths, called it a trade there as well because it's a skill that you can learn? Or do you consider it more an academic discipline, particularly as you've come from the musical end of the spectrum, with your music background and the audio engineering, the sort of academic background as well.

Leslie Gaston-Bird
Oh, that's a very good question. I think it's different for every audio engineer. But certainly, there must be some sort of thread that connects us all together. I would say it's a way of communicating, because I'm thinking something and the thing I'm thinking or hearing is something I want to share with you. So, I have to figure out how to get that to you. So, before all these electronics got in the way, we had speech, and we had musical performances that didn't rely on recording, they were live events that happened. So, I could transmit an emotion to you through the air with a musical instrument. And I think what audio seeks to do is, to do that electronically. So, it's still the same basic premise is, I want to get something that's over here, over there. And I want to do it in a way that respects the quality of what I'm hearing so that you can hear the same quality. Any audio engineer, rather than complicated math and science and troubleshooting, I think you just need a desire to communicate in a way that your intended message is received in the way you want it to be received by the listener. But now the trick is, you know, nobody can ever guarantee that that's going to happen, but in audio, at least we can try.

Sue Nelson
There's also a certain amount of creativity involved, though, isn't there as well? I say this because I remember going to the Motown Museum in Detroit, and seeing that how they got this lovely reverberation echo sound was to put the singer beneath the attic door and open it so that the recording of the voice reverberated around in the attic before it came down. So that sort of quite simple but creative solution to something that's far more, I used to call it you know, the knobs and switches, which is knowing your treble, your bass, your reverb, exactly how to recreate the sound. So, it does sound like you say you're communicating an experience.

Leslie Gaston-Bird
Yeah, there's definitely a creative aspect. And there's so much creativity, I think it's easy to get overwhelmed by all the technology. So, in popular political discussions, you'll often hear somebody talk about an echo chamber. Well, that's what you just described at Motown, was a chamber reverb and for our listeners do they have ever worked with computers and audio software, they've probably seen an echo chamber plug in that they can get, so that's definitely part of the creation. I mean, today we can make sounds that shouldn't really exist. I mean, we can make a dog sound like Godzilla. If we speed up or slow down a dog's growl, or we can make a jet engine that's passing by sound like a roar or thunder, we can do all sorts of things to our voices, we can sing in tune now, with auto tune. All of these things are manipulating sounds in cool ways and that's creativity and the urge to do that. I don't think everybody has the urge to do that. But it sure is fun. If you have access to the tools, it's a lot of fun.

Sue Nelson
What do you prefer, do you prefer recording live performances of say, an orchestra or being in a studio working with musicians to produce something that involves record production, you know, which might involve doing it again, and again, and again and multi tracking it?

Leslie Gaston-Bird
Well, at the moment, I'm doing a lot of sound for film and television. And I'm really enjoying that because if you're doing sound for a film, sometimes there are sounds that you can't record as part of the actor's performances. And so that needs to be redone. We call that process foley. So for example, if you imagine an actor on a set, stirring a mug of coffee, you know, they put the sugar and they stir the coffee, those subtle sounds may or may not get picked up by the microphone. Some of these very subtle movements and subtle sounds have to be recreated and then recreated after the fact. And then once that's done, it has to sound like it happened at the time. So that's really an art is trying to you know, as you're watching your favourite actor move around and create this story, you're not supposed to notice that those sounds didn't happen at the same time, you just assume they did. But a really good audio engineer can make things that do not happen at the same time, sound absolutely integral to the picture.

Sue Nelson
So, it's layers of sound there that are like you say, in balance, I suppose with everything because we all know the comedy that can be made if the sound effects of something is too loud.

Leslie Gaston-Bird
Oh, yeah, absolutely. So, you know, one of the first mistakes I made when I moved from radio, I'd worked at National Public Radio, as you said, and then I started working doing sound for films, and one of the first people who is sort of teaching me how to do this, after I laid in some sound effects said 'those footsteps are too loud'. In radio, it's not like that, if you want to tell a story about somebody, you know, walking across a field of leaves, hear [crunch noises]. You know, it's very present. But if you're watching that on film, the footsteps do not need to be that loud. You know, it's there as a texture'. And they're not propelling the story. So, it's, yeah, and but sometimes footsteps might propel the story, if it's a Quiet Place, one of those popular movies where every sound could bring the monster. You know, maybe that sound is supposed to be louder than you remember, because it could be very dangerous. Yeah, it's definitely an art.

Sue Nelson
Yeah, I remember you just saying about the foley sound. I did a few what they called spot effects in radio dramas. I had to have a glass of water next to me. And that lovely sound. And I had to be really careful for

exactly the same thing. Because if you were if you were too close to the microphone, and similarly with crockery, it's really intrusive. It's amazing the way certain sounds just cut through as well and dominate if you're not careful.

Leslie Gaston-Bird
Yeah. And it's built that way we're built that way. High frequencies are supposed to get our attention because it could be the mosquito that's about to bite us or it could be a bird about to swoop down on us or cat, predatory feline crouching down in the grass. So, we're really attuned to high frequency noises. And I think that's why...

Sue Nelson
Or a child crying.

Leslie Gaston-Bird
Absolutely, I have experience with that, and it's very, very loud. But to sort of acknowledge that, yeah, a clinking glasses something that we are so used to that we don't notice it, but as soon as you put it next to a microphone, it sounds incredibly loud and distracting.

Sue Nelson
Now, your background that's sort of hinted at it there. You're from Ohio and you studied Audio Technology at Indiana University. You've done a BA in telecommunications, which I must admit, when I saw that made me go, 'oh'.

Leslie Gaston-Bird
Yes and it's because I would have gotten a BA in audio, but it didn't exist at the time, it was 1987 and they didn't introduce the bachelor's degree in audio until I think 1992 or at some point later.

Sue Nelson
But then you did go on to do a master's in you in Recording Arts.

Leslie Gaston-Bird
That's right.

Sue Nelson
Yeah. And now you're doing a PhD in immersive sound?

Leslie Gaston-Bird
Yes

Sue Nelson
At the University of Surrey's Institute of Sound Recording, which is incredible that you're continuing to learn and learn new things as your career progresses. How would you describe immersive sound?

Leslie Gaston-Bird
Immersive sound and Spatial Sound is really a buzzword now, we're starting to see it everywhere. And it's just briefly, it's this sensation of hearing sound and a 360-degree sphere. So, in nature in life, if you're walking down the street, you might hear a crane, like a construction crane on a building above, you might hear the dog you're walking next to you, below you. You can tell that there's a pedestrian coming behind you, so you might want to get out of the way and move your dog out of the way. And then you're looking forward, of course, to see where

you're going. So, the sound is happening all around us. And you to take a more natural stance, if you're in nature, there's birds in the sky, there's water below, all of the things that we hear every day are all around us. And the fact that we listen on left and right loudspeakers is that's sort of baked in because of technology is what we're able to do. But in film, it was the case with Fantasia from 1938, the Disney movie that they did experiment with having speakers in the back of the cinema and then three speakers in front. That was one of the first immersive cinema experiences. Today, because we have technology and computers that can handle more than just two channels, manufacturers, audio technologists, digital signal processing experts are trying to deliver a immersive experience through headphones, and some are trying to deliver immersive experience through sound bars for our televisions, or through these Amazon Echo devices. It's back. You know, it took a while to get from Fantasia to here but yeah, it's back.

Sue Nelson
So, what does the cause actually involve, does it allow you to experiment with sound or is it predominantly an academic look at it?

Leslie Gaston-Bird
So, I'm doing a dissertation called 'immersive and inclusive', because what I'd like to do is for there to be more access for women and underrepresented groups. I happen to be a black woman, I identify as African American because I was born in America, and that is the politically correct term that we use. You know, I'm also a black woman, African American, you know, that's who I am. And when I go to academic conferences, when I am taking courses, and I'm learning about immersive audio, I'm very often the only woman in the room, or one of two women in the room, or the only black person in the room. In my dissertation, what I want to do is sort of discover 'why is that?' because I think there's a lot of cool things we can do with immersive sound, through audio dramas, we can make these sort of amazing effects where people feel like something's coming from inside their head or something might be coming from behind into the right or over headphones, but there's also immersive sound art, immersive sound installations, where we have speakers everywhere. So, you know, we rely on speakers to create that illusion in a space and that we can share with other people. For example, a cinema would fall into that category. In my dissertation, that's what I'm studying is like, how can we improve access and participation by women and underrepresented groups. In doing that, what I'd like to do is invite women and underrepresented groups, to come to experience immersive audio, and to come and learn about immersive audio. So, what we learn about head related transfer functions, why, if we only have two years, can we use those two ears to tell if something's coming from in front behind above to the left and the right below? How does that work. And so we talk about this psychoacoustic effect as a head related transfer function, how the ear is shaped actually helps determine our experience of that. And that can be electronically reproduced if you put the right EQ and time filters. I'm super simplifying this already. If it sounds complicated, it gets more complicated, I'm being super simple in my explanation, but you can create that effect using some software and digital signal processing to make it appear as if somebody is coming from these different directions. You don't necessarily need to do that if you're using loudspeakers. Because if you want it to sound like somebody is coming from behind you, you just use your software to pan the sound to the speaker that's behind you. So it's a little less reliant on these transfer functions. And so I want to teach about these things, I want to teach about the tools that we use. There's different tools that can be used for video games for cinema for music, Dolby Atmos is one of them. There's also Auro-3D. And then if you're coding for video games, you might use a program called Wwise. So, there's all these tools and ways that we can create experiences for people. And it's so important for us to be able to tell our own stories, and to have those tools and to see what can be created by everybody. Anybody who's interested in immersive audio, I think, should try it out.

Sue Nelson

What I was surprised to hear you say is that, you know, you would often be the only woman in the room because a love of music and sound doesn't have a sex effectively because you hear, you know, you see teenagers all listening to music. So why do you think it is that the profession is not attracting as many women?

Leslie Gaston-Bird
Thanks for asking that question. And we have the answers. We have data that shows us what the participation is at various stages of delivery. So for example, there's a group called the University of Southern California, Annenberg Inclusion Study did a focused research on 300 songs that made the Billboard charts between 2012 and 2019. And what they found was only 21% were women and 16% were songwriters, but only 2% were producers. So those numbers are pretty dismal. But I talked to Erin Barra, who runs a group called Beats by Girlz and she taught at the Berklee College of Music. She elucidated those numbers through some of her own research through an initiative called Women in the Music Industry and said, 'No women are here, they're in the industry, they're present and they're working, but they're not getting the opportunities to work on those chart making songs'. So, we have to be careful when we talk about why aren't there any women here, we are here. Women are definitely here. We're making songs we're recording, but in a lot of classroom environments and academic conferences, we're not represented. It's not the fact that women aren't interested, of course they are. It's, how do you, in the words of soundgirls.org how do you break the glass ceiling, or how do you break the studio glass? How do you make sure that we can get women behind the glass for the movies that are getting made in Hollywood. I got some data that showed that only 9% of re-recording mixers in Hollywood were women, 9%. And so, it's not that we're not here is that we're not in the larger places. And that's why it's really important for me to pursue getting the answers and then making inroads to make sure that we can, as women and underrepresented groups, be creating in this this format that it's not such a niche format that you can't experiment with it and you can't get involved, you totally can.

Sue Nelson
And that's why your Women in Audio book is important, because I'd not heard of so many of the women that were there. Just a couple of them like Marie Louise Killick, you know, she actually designed something that many people of a certain age will have used or benefited from.

Leslie Gaston-Bird
Yeah, definitely I would recommend going to MarieLouiseKillick.org and learning about her story. She's from Brighton, I'm actually speaking to you from Brighton, England. She had been a nurse in World War Two. Somehow, she was, you know, listening to phonograph records and she didn't like the fact that the needle that they were using was damaging the records. So, you would play back on a vinyl record and the needle would sit in the groove and just basically scrape it. She came up with a rounded tip to the stylus and started a company called Sapphox. TelArc approached her and said, we would love to buy your patent and she said, 'Nope, I will be keeping my patent', a company infringed on her patent, it was company called Pye radio.

Sue Nelson
Yes, I've heard of them. I've seen them on lots of 45 singles.

Leslie Gaston-Bird
Mary sued them and won, and she won a multi-million-dollar settlement, which in today's dollars would be very, very hefty. But she never saw a dime of it, because they litigated it to death. And she ended up dying homeless, with four children. This is another reason why the experience of writing this book was more than a research paper. It moved me in unspeakable ways it moved me because I realised the work that I was doing was so important. And she's not the only one who was brilliant enough to invent something and patent it and who ultimately had to fight for it.

Sue Nelson
It's that importance, again, of having control of your work, and being in a position where you can control the nature of your work. The course that you're doing then sounds interesting, and like you say, it's important in terms of what you're doing? You're still working at the same time and working on projects.

Leslie Gaston-Bird
Oh, God. Yes.

Sue Nelson
It's full on.

Leslie Gaston-Bird
Oh, yeah it's always full on. My colleagues and I sort of speak about our lifestyles. I can't think of an audio engineer that just has one job. Even when I had one job, I didn't have one job because I was working at the radio station but then I was recording with my band, I had two bands. It's just like, somebody somewhere gave the awful advice. I'm being sarcastic, but 'do what you love, and the money will follow.' That's not how that phrase should go. It should be 'do what you love, and you will never stop working'. My son saw an equaliser in the kitchen and he was like, 'yep, when your mom's an audio engineer, this is the kind of stuff you see' like, what is their EQ doing on the kitchen island where we keep the fruit and bread?

Sue Nelson
Did you grow up with that sort of lifestyle because both your parents were musicians, weren't they?

Leslie Gaston-Bird
So my mother played piano in a church choir. And then she sort of didn't play much. But she taught me my first notes on the piano. And my dad taught me some other first notes on the piano. But my dad had a reel to reel recorder. I learned how to operate that when I was tiny. He said, 'hey, Leslie, you want to record your voice?'. I got right on the microphone like [mumbles]. You know, my voice was so super distorted because I was eating the mic. But I remember putting a reel of tape on the machine, he showed me how to thread it across the tape guides and over the head stack and back up through the take up reel and pinch it, you know, while you turn it so that the tape would catch and hit these big buttons with these two tiny little six-year-old fingers. Cachunk and now you're recording. So yeah, that was my first experience with a reel-to-reel recorder when I was a child.

Sue Nelson
Now you got to tell me about what it's like to be a judge on the Grammys?

Leslie Gaston-Bird
Yeah, it's really interesting and it's a lot of fun. Every year there are hundreds of submissions, an absolutely enormous amount of material to listen to every year. What we do as members of the Recording Academy is we get an email saying it's time to judge and then you can pick which categories you listen to. And some of the categories like, best new artist, have hundreds and hundreds of people but then there's other categories like Best Music Video, which only have 70 for example, depending on how much time you have to judge and where your expertise is you can pick which category to listen to.

Sue Nelson
What categories in particular do you feel suit your background most?

Leslie Gaston-Bird
So, it's the Best Engineered Album or Producer of the Year. Those are the categories that I vote in because I'm an engineer and not an artist.

Sue Nelson
And what for you is an example of a really great Engineered Album, either modern or one from the past?

Leslie Gaston-Bird
You know, I'm gonna choose one from the past because I play it all the time. And it's Donald Fagen's Morph the Cat from 2006. It's a surround album, and it was mastered by Darcy Proper. It's just incredible. And I guess the reason why it's my favourite is because it's one of the first ones I played in surround and I was able to listen to each speaker separately, and I could listen to just the left and right, or I could listen to just the two surround speakers and I could listen to just the centre. And then I could listen to them all together. And it's just rock solid. So, if you have a chance to listen to Morph the Cat by Donald Fagen.

Sue Nelson
It's a great name.

Leslie Gaston-Bird
Yeah.

Sue Nelson
And, you know, if you were giving advice to somebody who was interested in becoming a sound engineer, what would you say, or if it was something that they love, like for you, you know, being somebody who liked maths and also was a musician, that sounds like a good pairing, for instance. But what for you would be either a hint that someone might be interested or, or maybe they should just explore for themselves?

Leslie Gaston-Bird
The thing I think people don't know about being a sound engineer is the patience you have to have for things not working, like, if you get a dialogue box on your screen, and you're like it's broken, somebody fix it, then you might be in a little bit of trouble. But if you get a dialogue box on your screen, and you go to Google to find the answer, and you're willing to open terminal to try and disable the extension that's keeping that thing from working, you're on the right track. It's absolutely essential to be prepared. So, if you're having a client come in to record, you do not just show up on the day and turn the computer on and say 'this is going to work'. No, you spend a couple days before doing what you're going to be doing with your client to make sure that everything is going to go smoothly on that day. And if something happens, and it probably will, you have to be super cool and say, 'hey, no problem, I've saved all our work because I have a backup process in place, I can recover what we just did. Can I offer you a tea while I reboot the computer?'. That's what I do. There's other sound engineers who do not work with computers, for example, location sound engineers who are holding the boom on the actor. They don't have to deal with computers. I know somewhere in your audience is a production sound mixer going, 'hang on Leslie, I've got Pro Tools, and I've got redundant hard drives and that's just not true'.

Sue Nelson
So, it is this combination of logic. It's not feeling overwhelmed by computers. It's the engineering, the knowledge of sounds, the knowledge of what you can do with the sound. It's having that ear as well.

Leslie Gaston-Bird
Yeah, I think so.

Sue Nelson
So it's sort of crosses arts, maths, science, engineering, effectively?

Leslie Gaston-Bird
Yeah, I mean, there are some people who are producers who said ‘I know what I want to hear, but I can't use a computer’. There's some people who have great ears who can communicate what they want to the engineer, but I would, you know, I'd also put that in this sort of technical category, because they have to have the skills to be able to say, I want this album to sound like the Beatles’ Revolver and I know that they have the sound on the drums, make that happen. And I think somebody who is a producer has that acumen, too. And again, I'm sure there's people in the audience, too saying ‘Leslie, you're doing a terrible job of describing what a producer does’. To them. I apologise. For the most part, I think you do have to have logic, troubleshooting, patience, diplomacy. And like I said at the beginning, that desire to get what's here and here, over there.

Sue Nelson
And like you say, you end up working and doing so many different projects in parallel at the same time. Is there any one thing that you prefer doing over another, or is it that variety being the proverbial spice of life here?

Leslie Gaston-Bird
I think if I would have my druthers, I would have a million-dollar studio and I would have musicians show up and I would work from 10-6pm and I would have somebody take over because I do not do nights. Since I don't have that, what makes me most happy is working on sound for films and bringing those sounds together to tell stories.

Sue Nelson
Leslie Gaston-Bird, thank you very much for joining me on the creative future podcast. Find out more about the Queen Elizabeth Prize for Engineering by following @qeprize on Twitter and Instagram, or visit qeprize.org. Thanks for listening and see you next time.