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**SPEAKERS**

Paul Cutler, Liz Clark

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P **Paul Cutler** 00:00

Welcome to The Circuit Python Show. I'm your host Paul Cutler. This episode I'm joined by Liz Clark, also known as Blitz City DIY. Liz is a Massachusetts based maker who dabbles in electronics, music, tech, 3d printing circuit, Python, and anything else that looks interesting that day, when her soldering iron is cooling, you can find her with her cats Winnie and Harriet. Liz, welcome to the show. Thanks for having me. Many of the projects and learn guides that you've shared are music related, what is your music background?

L **Liz Clark** 00:34

So I started playing piano when I was a kid, there was a program at Parks Rec Department that that's how I started. And then teenager, I picked up guitar, taught myself then those bands, and then I was coming up in bands just as MySpace started being a thing. And that became like the thing for bands to record or whereas before it was, you wouldn't necessarily go do that though. It's really expensive, gifties base, especially when you're a teenager. So that's when I started getting into recording audio. And then I found I liked actually like that a little bit more than, like, advanced. So that's why I had to study in college. And that's how I got to 50. And that's kind of been my journey.

P **Paul Cutler** 01:20

Okay, so you're studying music tech in college, is that when you first started to become a maker and get into that community as well,

L **Liz Clark** 01:27

I've always made stuff like I've done sewing and knitting, things like that. My family really like that too. But as far as like electronics and coding, like I didn't know, that was really a thing. until college, I was in college, I, it felt risky to be majoring it just because you know, you hear

things like oh, then we'll get a job and things like that. So I wanted to try to like expand my skills. And that's when I found out about Arduino. This is like 2011 2012. And I saw that folks were doing like, DIY music tech project like MIDI things, but robot instruments. So I attempted to do a little bit with Arduino. But again, I had zero coding background, you know, folks will talk about like using Max seven schooling, I never, ever did that. So it was a steep learning curve with really no guide. So I didn't do too much with it. But I it was something I always want to explore more of. So after I graduated, and I did get a job, everything I wanted to get back into doing more DIY things. And that's when I started my YouTube channel, as kind of a way to not get sucked into just doing a grind of like, going to work coming home, kind of keep my brain sharp. And that's when I started diving into Arduino and really learning it. And eventually, Python and all the other projects.

P Paul Cutler 02:53

How did you make the jump from Arduino, which is, you know, mostly sea bass to circuit Python, which is completely different.

L Liz Clark 03:00

Again, not too much coding experience. So I barely understood what I would be doing with Arduino, I really couldn't tell you why my code would be working, I would just be like trying a bunch of things. And then circuit Python came out. I was curious about it, because I knew that, you know, Python get used on Raspberry Pi. And I dabbled like a little bit of that, again, to really understand I was working but Adafruit had all these libraries, like a Python for stuff at the circuit Python essentials guide that katni did that kind of went through everything. I started to understand a little bit more. And I understood what the code was doing, which was a big game changer for me, as basic as that sounds. And then that's when I started trying to do slightly more complicated projects with it. And now that's just like go to for everything.

P Paul Cutler 03:51

Yeah, you hit on a key point I Python, it's all about the readability that makes it so much easier to read than some of the other programming languages out there.

L Liz Clark 03:58

And now that I've worked with Python, so much like other programming languages will make sense to me like I just finished a project with processing which is Java based and as little nervous at first because I hadn't done Java before and I slightly scarred from the Arduino experiences and not being able understand, but I picked it up a lot faster than I have. I think that's important, too. If people are just getting started coding, sorry sir. I thought that it might help them to understand other

P Paul Cutler 04:26

programming. You mentioned your YouTube channel, which is blitz city DIY. Is there a story

programming. You mentioned your YouTube channel, which is blitz city DIY. Is there a story behind the Blitz city DIY name

L Liz Clark 04:34

when I was starting a channel I wanted it to be a name that would kind of laugh and also be unique. I've been a lot bands at done the whole coming up with a band name thing. So I kind of approached it that way. It's kind of a reference to a couple different things. The Blitz comes from blitzkrieg bop remote and it's what's what's his now by the A as and then city. I like cuz that because the idea of like collective, the group, I didn't know if maybe had that work with people down the road or and also, I've always been really community focused. And then the DIY just to kind of give it some context. It all kind of from DIY, punk aesthetic. That's kind of it named Greta.

P Paul Cutler 05:20

Love it. So you also mentioned when you're talking about arduino robots who play instruments, and you built the xylophone, tell me about the xylophone.

L Liz Clark 05:28

That was actually the thing that I originally wanted to build in college, when I found out that that was a thing people were doing. But I did not. At the time, I played the mallet stuff in high school in college, because I showed up to the band room. And I didn't play the band instruments. But because I played piano, the band director said, Oh, xylophone, I've always really liked the sound of that and percussion instruments, too. So I had the glockenspiel from there. And I thought it'd be so cool to have it be able to play like automated music from because the only thing about mallet instruments is you're limited to how many mallets you can have. And so you can play for, but it's really hard. You also, it's hard to do stuff really fast and everything. So the idea of making an acoustic instrument that can play stuff that a human necessarily wouldn't be able to very easily. So that was kind of my ration for it, and was circuit Python, and it made it a lot easier.

P Paul Cutler 06:29

So for someone looking to get into MIDI, what do they need to get started.

L Liz Clark 06:34

MIDI is this kind of standard way that started up in the 80s, of having musical instruments communicate with each other, digitally. So it's actually it stands for Musical Instrument Digital Interface. So for MIDI, there's really good library support now with both Arduino and circuitpython. Back when I was starting, which what helped me up a bit, and to do weird stuff, baud rate. But the circuit Python library, especially, is really plug and play. And basically, it makes that your microcontroller interfaces through USB, there's other ways you can do it too.

But the easiest way to get started, you can just have simple things like button input, or the geometer. And you can control either software or hardware sent, because it's sending these MIDI messages. And you can code it to fit your needs.

P Paul Cutler 07:28

So when you code the notes, it's actually sending it right back. If let's say I had an electric piano or a keyboard plugged in, it would send the notes back to the keyboard and the keyboard would sound like it's playing the actual notes. Yes, yeah, exactly. Yeah. How does it work on a computer do you need like a digital audio workstation to capture those.

L Liz Clark 07:45

So you can use a digital audio workstation like Ableton or Pro Tools or reason. Then there's also little programs that can kind of read the note back to almost like serial interface, one that I really like is called MIDI Berry. That's what I usually use. When I'm building a new MIDI project, it'll tell you exactly what MIDI notes you're sending. And that way, you know you can have the repple in Moo tell it to you, but to actually see that the MIDI messages are truly going into another program is important. And you can have like a software, there also, playback that note be affected by the different messages because you can also do things like pitch bend or modulation

P Paul Cutler 08:25

stuff. Tell me about the MIDI arcade project that you're about to learn guide for video, arcade fighter

L Liz Clark 08:30

is a collab, they do have an iris, and he designed the case. And it kind of came from a need he had which is why DIY MIDI controller I think are so exciting. He does a lot finger drumming. And he will take the time to map the different sounds is door to the MIDI controller. And so he was like, it'd be really cool if you could assign them like on the controller kind of on the fly. And so that's why that particular MIDI fighter, and there, there was a company that used to make up things called mini fighters notice these arcade button things, it's kind of become like its own genre of MIDI controllers. And so for our version, there is a little screen with a five way joystick where you can adjust the MIDI notes on the fly. So everything can be mapped like live. And then someone the community actually made a addition to the code that you could store MIDI mappings in a JSON file and call them up that way, which is really cool. That's one reason why I love learn guides, you can kind of put like this basic version of the code or basic and then people can build on it. Because that's totally something like that would have been awesome to do but to then some of the community take it from there, too. And the reason why that's I think a good starter One is I think most folks when they want to start with pity, they just want to get a note going somewhere. And that project does that and it also shows you how you can have

stuff lighting up because we've got lights on the arcade button. And also that additional thing of the MIDI note mapping, I think is just helpful for folks because you can either take the really basic stuff kryb it to your project, or you can kind of build on that.

P Paul Cutler 10:17

Hi, it's Paul. I'll get you back to the show in just a moment. Thanks for listening in. If you're enjoying the show, please tell a friend or write a review. You can also support the show financially. Your support helps cover the cost of podcast hosting, recording services and transcriptions. For more information visit circuitpython show.com/support. Now back to the show. You just finished a MIDI learn guide deep dive into MIDI for the Adafruit Learning Guide system. What were some of the key takeaways from that?

L Liz Clark 10:45

When Petey brought up the idea that guide kind of pity for makers, I wanted to write it almost for myself, like five or six years ago. And I just thought of like, what was I looking for with no background knowledge on how to get started. There's all sorts of information like what it is how it works, but then also like what for work with circuit Python and Arduino. And the different types of MIDI communication because there's USB MIDI, there's also MIDI over UART, which is serial communication. And that's when you see those big chunky like five pin connectors. So that's working, there's also Bluetooth. So just kind of explaining how that all works. I wanted to have three examples for in, which is sending MIDI messages into the destination, and also MIDI out debugging. So there's an example for a critical keyboard, having pots control things. There's also showing how to convert MIDI UART to USB. Because you can you can do that circuit Python and Arduino. But, and all the examples are in circuit Python. So folks can just use that library. And that's kind of cool.

P Paul Cutler 12:00

I thought it was a great guide, it actually inspired me to go get our old electric piano that we've had in storage out and bring it down near my office trying to figure out what kind of projects I can start to do with MIDI. Because you know, I need another project on my list. That's

L Liz Clark 12:13

awesome. That's awesome. I'm hoping it will be a good resource for folks at it won't feel save someone from having to have like 15 tabs open when they're under disconcerted.

P Paul Cutler 12:24

What is your music setup like at home,

L Liz Clark 12:26

Liz Clark 12:26

I've got this synth shelf that I built during the pandemic, because I started getting into your rack and other things. And I've got Eurorack on top pocket operators, and robot xylophone that we talked about on the bottom here. Then going down, I've got mixer and my USB audio interface for mic inputs. And then to my right is my guitar setup. So my amps and things like that. And behind me is actually used to be where the stunts shelf was. And were the pandemic seeming to possibly be getting better. And as a result, having folks over dinner or often hopefully, I thought it'd be better to get my table cleared off. So now everything is kind of in one spot, which is nice before it's a little bit disjointed. I've really come to love Eurorack. And since people are doing a lot of really cool stuff, open source, and synthesizers like the flowers winter bloom, she has some circuit Python modules. So there's a really cool overlap with synthesizers or Python, the tech right now. So that's kind of

P Paul Cutler 13:40

why I got into that. And for those who might not know what is Eurorack, it's

L Liz Clark 13:45

these different, they call them modules. And you'll see them they're like these little kind of PDP thing, circuit guns on the back and you rack them up. And basically it's, you got to think of them as like little pieces of a large synthesizer. So you're taking these modules and building a basically your dream. And so there's all filters and oscillators and things like that. It can get upsettingly expensive, so I tried to keep it as minimal as possible. And also, market is the way to go. But it's, it's really fun. It's you patch everything with these little cables. So you're almost kind of building these little musical circuits. If you think about like, if you're going to blink an LED microcontroller, you have the wire to the resistor and the LEP. It's similar to patching a synth voice on your rack, you have your oscillator, you have your filter, you have your escapia It's really cool way to kind of keep it like a creative musical experience, but also like technical.

P Paul Cutler 14:45

And they have a similar community as I think we'd find in circuit Python, which is very open, very open source oriented. Is that correct?

L Liz Clark 14:52

Yes. Yeah, the corners that I've been in at least have been very open and open source and people are really into building their We're on module two. And I hear a lot from via that, like people ask like, well, I don't have this module, but like, people will want the kit over a fully built module, which is

P Paul Cutler 15:11

interesting. Well, before we wrap up, I have a segment that I call turn the tables where I've been asking all these questions, now you have a chance to ask me a question

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L Liz Clark 15:19

My question for you is, what is your favorite circuit? Python library?

P Paul Cutler 15:23

That's a good question. Right now, I've been playing with my PI portal. Okay. Yeah. So I'm cheating because it's a whole class, right? It's not necessarily a library with the PI portals got those tools built in where it can actually read a JSON file, take an image, put it through Adafruit IO and give you the bitmap back. So that's what I've been playing with. So it's not NES I'm so I'm cheating. It's I'm not really answering your question. But that's currently my new favorite thing to play with is just trying to feed it. What can I feed this class? And what do I get back? Excellent. Where can people find you online?

L Liz Clark 15:54

So I post on Twitter and Instagram as we'll see DIY, as of a website that has not been updated a very long time was the diy.com And also, let's say DIY channel, and I have also recently begun working full time with Adafruit. So I'll be having a lot more guides and hopefully videos to with them as well. That's great

P Paul Cutler 16:15

to hear. So speaking of Adafruit, you're about to start a new project or prototype, what microcontroller Are you going to reach for first?

L Liz Clark 16:22

Recently, it's been the feather but specifically the RP 2040 Because it has the stemma Qt connector. And when prototyping, even if it's a stomach beauty, I do still like to have that base of the breadboard. So I like to have that plugged into the breadboard. And then you have the ability to do them up, which is really nice. That's kind of my go to and the feather to when you're prototyping usually has enough pin, possibly more than what you

P Paul Cutler 16:48

like. That's a great pic. It's amazing how far the RP 2040 has come in just a year.

L Liz Clark 16:52

Yeah. That was a very nice, I think, kind of jumpstart to microcontrollers and kind of electronics community. And I think it also got a lot more people using Python on microcontrollers, because

community. And I think it also got a lot more people using Python on microcontrollers, because when it initially was released, there was certain Python and micro Python support and the Arduino core wasn't quite ready. So I think it got well to explore a little bit.

P Paul Cutler 17:13

That's a great call out Liz. Thanks for being on the show.

L Liz Clark 17:16

Thanks so much for having me. Great talk.

P Paul Cutler 17:19

Thank you to Liz for being on the show. You can find Liz's youtube channel at blitz city DIY. For show notes transcripts and to support the show because it's circuitpython show.com. Until next episode, stay positive