

# Episode 7 - Alie Gonzalez

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## SUMMARY KEYWORDS

sparkfun, miami, mushrooms, run, hardware, hackathon, balloon, python, circuit, high school, micro python, big, people, uplink, project, helium, satellite, iridium satellite, rp, tech

## SPEAKERS

Paul Cutler, Alie Gonzalez

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### **P** Paul Cutler 00:03

Welcome to the circuit Python Show. I'm your host Paul Cutler. This episode I'm joined by Alie Gonzalez who even from a young age had an intense passion for technology. She taught herself how to program at the age of 10, she ran her high school's FTC competing Robotics Club, and while still in high school, she joined the team at AED mobilize the computer vision analytics company as the third employee. Immediately after high school she co founded matrix labs from within and mobilized and for five years led the team at matrix labs in creating Cutting EDGE Development Boards while making guides and videos which have had over a million views. In early 2021 ad mobilized and matrix labs were acquired for \$20 million. Later that year, Ellie was honored as an official arm innovator. She then joined the team at SparkFun, where she now leads their services division. Alie., welcome to the show.

### **A** Alie Gonzalez 00:53

Thanks. Great to be here.

### **P** Paul Cutler 00:55

So tell me how you first got involved with being a maker

### **A** Alie Gonzalez 00:58

Well, it was from when I was really little. When I was around five, my dad had me put together his computers, like putting all the wires in pretty easy, just color coordination. But then from there, he would give me his old computers that he didn't use anymore, and I could just take them apart and do whatever I wanted with them. And well, I remember one old laptop I took out I fully got it It took out the keyboard from it and then rearranged all the keys so that they they'd be in alphabetical order. I was maybe I don't know, seven at the time when I was doing this. I'm not really sure it was before 10 That was fun. It was like I was really early introduced

the hardware in tech. And then when I was 10. I was introduced to Roblox back when Roblox was like three years old at the time, and now it's this huge thing. But I was there in the beginning with the DSL connection, it didn't load very fast. You could program it with Lua. So I started learning how to program in Lua. And it was very simple stuff. But like that was my first real introduction to programming. Then from there in high school, I was president of my school's Robotics Club. It was like a first competing Robotics Club. So I worked super long nights got sponsors. I was the main person working on the robot, really. And we did pretty good. We went a couple times, even though we didn't have a very big budget. So yeah, I've just always been interested in tech.

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Paul Cutler 02:20

Well, that's awesome. So how did you start your professional career?

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Alie Gonzalez 02:24

Well, I actually started pretty young. I went to a special high school, it was a public school here in Miami. But in our junior and senior year, everybody in the school had to have an internship, it counted as two classes, you had to be there 10 hours a week. So I applied at a local startup that was doing computer vision, running out the edge for advertisements, ended up getting the job. I was like the third employee, I really loved it. I was working on Raspberry Pi's I was soldering I was given the independence of an adult, which had a 16 as a 16 year old was amazing. So I ended up working there 20 hours a week instead of 10. Because I loved it so much wasn't doing homework, but I wasn't going to do the homework anyways. So at least I was spending my time productively. And then I when I graduated high school, I co founded a company within it with the CEO of the company and with a few other cool people in the company. And that company we co founded was called matrix labs. And it made dashboards for the Raspberry Pi with like 15 different sensors on them and FPGA and arm MCU went on a Raspberry Pi we launched it on Indiegogo. And over the years, we made a bunch of like content and guides and videos for it, which I think at this point last time I checked, it was like over a million views collectively, which Wow boggles my mind. Yeah, yeah, I ran that company for five years, you know, along the learning everything along the way. I didn't go the University. I went for a month. And I felt like I was wasting my time. I spoke to the president of the IEEE club in the university one time, and he spoke to me at first as if I was a normal freshman, not knowing anything, as most threatened freshman in high school. But then I started telling him what I was doing and what my company was doing and everything and I just blew his mind. And at that moment, I knew, Okay, the university is not for me, if if this guy's a senior and doing all his things, and he is doing great for himself. But if I'm already past that, why am I going to university. So I dropped out after a month just wanting to do my own thing.

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Paul Cutler 04:29

So he ran matrix labs for five years, and I got acquired last year and now you're at SparkFun. Yes. How do you describe spark fun to someone who's not in the maker community?

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Alie Gonzalez 04:39

Ooh, you know, that's always that's always a hard question. So someone that's not in the maker community, I would say spark fun makes products so make it easier for you to make your own thing like make your own product, make your own project, whatever it is, if you're if you I mean if you already know what SparkFun is Is it you know, we make boards, we make dev boards, we make micro mod boards so that you can add things to it. And it just little we make the whole dev board ecosystem so that it's easier for anybody to do things with all the latest sensors and processors that are coming out. Yeah, that's always a hard question to answer. It is,

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Paul Cutler 05:18

and what do you do at SparkFun.

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Alie Gonzalez 05:19

So my role at SparkFun is the services manager. But me being me, I'm a jack of all trades, and I'm pretty add, so I like being everywhere. So I run our custom manufacturing division, like doing, if you have your own board design, we can manufacture it for you in our US manufacturing warehouse in Colorado, because we do it all ourselves for our own devices, I run our custom kitting division. So everything having to do with like putting together our product or someone else's products in a kit, so that a university or a company wanting to do a workshop can just provide that for their people easy. And then I also run our ala carte service. So that's a product that it's a website, you can go to pick what components you want, like what processor, wood connectors with sensors, and then it will automatically generate the board for you. So I that's all under my services hat. And then I also have a marketing hat. And that's where I run the live stream for SparkFun. Every month, I do content for them on the side, like in my free time. SparkFun pays for all my hardware. So if I want to make a cool project, which I do a lot and SparkFun will just buy the components for me and I just have to write a cool blog or make a cool video. So it's it's a pretty sweet gig. I'm enjoying it.

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Paul Cutler 06:36

That's great to hear what's the last blog post your last project you worked on?

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Alie Gonzalez 06:40

So the last blog posts I worked on was actually a recap of the Miami hack week, which was this big event that happened in late January. It was essentially a whole week where a bunch of people got together in different Airbnbs. around Miami, the Airbnbs were sponsored by some big companies and small companies. So it ranged from mansions that costs millions of dollars to you know, like a normal house. And each house like had a theme of some a lot of them were crypto, I helped organize the hardware house, the hard tech house. And then I was just supporting the teams there. So one of the teams made a weather balloon that took a picture from like the edge of space and minted that as an NFT. That team ended up winning the hackathon, which I'm very proud of them for doing that's the one I worked the most closely with another team made this really cool mushroom incubator. So essentially, like mushrooms

have very picky growth cycles, you can't just put them in the same environment and expect them to grow like from the mycelium up to the spore and everything they need to have like very temperature and humidity conditions. And it varies for the different types of mushrooms that you're growing, whether it's like portabello, or elephant ear or whatever. So they made an incubator with the entire sensor suite of like co2 sensors temperature, humidity in order to monitor the environment, they had little humidity creators which was basically just say little essentially like a speaker resonating at a specific frequency. And that would cause the water to turn into mist which super cool to see it's a really simple thing but it's cool. They had like heaters and coolers in there and then coolest thing was they had a robot arm that would go over the mushroom pod look you do some run some CV that they trained on like an NVIDIA Jetson nano and it was able to identify the mushrooms on the field of like mock mycelium because a week is not enough to grow their own. And then it was able to like go down and actually pick the mushroom kind of like a claw game. So with all these parts, you could make either like a small scale mushroom growth area like incubator for your house to have like fresh mushrooms to eat. Or you can have like a small scale like grow grow lab and you can make mushrooms and sell them at like farmers markets or whatever just making it easier to grow mushrooms in a more like contained manageable environment. Plus they collected all the data so that as an open source the whole project. So as you went as different people monitor the conditions of making different mushrooms, that data was collected and aggregated, and then they could find the best settings for each type of mushroom to optimize the growth cycles. So that one's a super cool project. I got like third place with it. A good friend of mine made it and it's I'm like really excited for that one because that has like a real utility in the world. Right and yeah,

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Paul Cutler 09:49

that sounds fantastic. Now tell me more about the weather balloon. What kind of hardware went into that to actually lift a balloon that high up?

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Alie Gonzalez 09:56

Yeah, so it was pretty simple how realize there was like an Iridium satellite uplink module that took up most of that was most of the hardware really. And that was able to send data to a satellite up in space to Iridium satellite, it would then go to another satellite and then go to a base station. And then back to us. It also had an ESP 32 camera module. So it was an ESP 32 with a little camera, and then just some batteries all in like a case that was about this big this thick. And the balloon itself was six feet wide, filled with helium at ground level. At its final altitude, which was we estimate like Max altitude it could really go to is like 150,000 feet. And because we did all the math to do it, and it would be about 30 feet wide at that altitude, because the pressure is less so it expands. And then it eventually pops. Yeah, it was that was a crazy project. It's they did it all in a week, which this is an advantage of a week long hackathon. You can do real hardware projects you can't do in a weekend. And believe it or not, they actually ordered everything like Monday of that week. And then it got there on time to get everything working. Yeah, that was that was such a grind for them. It was amazing.

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Paul Cutler 11:13

What were some of the biggest challenges they had to overcome. There

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Alie Gonzalez 11:16

were a couple so the satellite uplink, it was not clear how much it was going to cost. Their first estimate was that it was going to cost \$4,000 For the uplink. Mind you the prize for the Hackathon was like \$10,000. And they were already spending over \$1,000 on the hardware alone. So it's pretty rough to then spend another 4k on the satellite uplink. Luckily, when we finally got it, and we started testing it, it was much cheaper than that. But we still spent like a few \$100 on it. That was one problem. The other problem, the night before we were supposed to launch it, the balloons got stolen out of our car. Oh, no, one of the people lives in, I think, Ohio, and is not used to locking their car. Because why in Ohio, but in a big city like Miami, you need to lock your car. So they went into a gas station, five minutes later, they come out to the car, all the doors in the trunk is open. And like whoever stole it, like stole our two biggest balloons, plus like some a bathing suit and some socks, and like a Garmin, like satellite phone, which Okay, that was expensive, but like the rest of it wasn't like, it just they just took everything they could. So that was nerve wracking as heck it was around midnight on Thursday. And we had to like we had a friend of mine's dad offered to like take us out on his boat out into the middle of the water, like past any type of like flight restrictions or flight paths. Because you know, we don't want to get in trouble. We want to do this all legally and safely. And so we were worried that like, instead of having to use helium, which is inert, and it's good and easy and safe, we would have to use hydrogen to fill the balloon. And if you know anything about hydrogen, I'll give you a hint. It was used in the Hindenburg disaster. It's flammable. It's extremely flammable. And imagine filling a six foot wide balloon with hydrogen, like the NERT. Like it's a bomb, basically. And we were very much worried that we'd have to use it. So we just like over a few hours didn't weigh more math to see if there was some way that we could just use helium. And if we over inflated the balloon maybe. So that's luckily what we were able to do. And and also we weren't going to take hydrogen on my friend's boat. Like it's so dangerous.

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Paul Cutler 13:52

Yeah, I would think so. You want to combine?

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Alie Gonzalez 13:55

Exactly, yeah, yeah. So those were like the two big issues. It was pretty nerve wracking. And then we launched the balloon like right as they were doing the judging, and we were like FaceTiming so the judges could see it. And then we rushed back to the convention area where they were presenting everything. Within like 15 minutes, we had to go on stage and actually talk about what our project was. And 30 minutes later, they announced that we want which still like boggles my mind that that happened, but I'm I'm so proud of them and that we actually got like a hardware team to win this mostly crypto hackathon. That's a good feeling. Yeah.

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Paul Cutler 14:40

So Miami hack week was sponsored by hard tech Miami. Tell me about hard tech Miami.

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Alie Gonzalez 14:45

Yeah. So hard tech. Miami is an organization that I helped run. It wasn't founded by me but I was one of the founding members of it. And essentially the idea of it is to bring together hardware and deep tech people that are in Miami but also from other areas of the US or globe even and bring them together have built this community here. So it's not just crypto in Miami, like we do real hardware things, real AI and machine learning things here. And there's a lot of companies already doing it. It's just they're kind of like in the dark, like, the engineers don't come out of their offices or homes. So we're getting more people engaged. And then we're getting people to move to Miami, like in the hackathon, the entire team that did the NFT balloon, they're all moving to Miami. Some of them are moving to Miami in the next month. And they've all gotten or three of them have gotten brand new jobs making way more than they ever imagined. Thanks to the hackathon, which is such an accomplishment, like, and I'm from Miami, I'm Native to Miami. So bringing people here getting tech people here getting people interested in the things I'm interested in is it makes me so happy. And it makes me so happy to see the city itself growing and maturing and actually being more than just a party city like it's been known for the past 4050 years.

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Paul Cutler 16:08

Well, that is an added benefit to moving to Miami is the weather.

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Alie Gonzalez 16:12

The weather totally It is currently 73 degrees at this time today. In March. And a Yeah, it's it's nice, the weather is very nice. There's tax benefits, no state tax, you save 8% or more, which I'm not complaining about COVID regulations are kind of loosey goosey that has its pros and cons. I won't get into it. But it has its pros and cons. So yeah, and there's just so many people like it's buzzing. Like there's daily tech events. The community here is really nice. Everyone's happy to talk to you, and like support you and make become friends. And it's a really nice atmosphere. I'm really proud of it. It doesn't it's not it's not. It doesn't feel like the old Miami where it was very like status driven. Like, that's not what the tech ecosystem is here. Makes me happy.

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Paul Cutler 17:06

Well, that's great to hear that. Yeah, there's definitely a lot of buzz that Miami is one of the hip places to be in tech right now. Yeah. Well, we're running out of time. But before we do, I'd like to do a segment that I call turn the tables. I'm a big vinyl record fan. So it's kind of an in joke for me. But I'd like to turn it over to you, you can ask a question of me that I get the answer.

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Alie Gonzalez 17:25

Totally. So I love hardware. And I've done some things with circuit Python. But I've also heard a lot about micro Python. So what's the difference between the two? Why should I use one over the other.

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Paul Cutler 17:41

So there wouldn't be no circuit Python without micro Python, it's a derivative. And it's a fork. So everything that circuit Python does is built on the backs of giants already, circuit Python, I think their goal was to be a little more simplified easier for learners. Some of the other key differences is it had to have native USB, I'd be able to plug it in, and it had to show up as a circuit pi drive, though that's starting to change a little bit. And then the codes got to run as soon as you save it, which is a little different than micro Python as well. But syntactically they're very close, very similar. But I think the audiences are just slightly different.

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Alie Gonzalez 18:16

Got it. Okay. Yeah, circuit Python seems more approachable.

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Paul Cutler 18:19

I would agree with that. Last question I have for you is you're starting a new project, which microcontroller are you going to reach for and why?

A

Alie Gonzalez 18:29

Ooh, that's a good question. And lately, I have been really into Spark funds thing plus line, especially like with ESP 30 twos, but I've been really wanting to dive into the RP 2040. I have a few Raspberry Pi Picos. Here. I like how small they are, like great for wearable applications, like and they're cheap. So I can just throw them into whatever, right? So yeah, I'd say RP 2040. And it has an ARM processor and I am an arm innovator. So not a requirement that

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Paul Cutler 19:05

can't go wrong with it. RP 2040. Thank you to ally for being on the show. You can find me on Twitter at a li e underscore GG. This was episode seven recorded March 3 2022. For shownotes transcripts or to support the show visit [circuitpythonshow.com](http://circuitpythonshow.com). Thank you for listening and until next episode, stay positive