

“Jamming on the Job” Episode 5: Robotics Engineer

[PBS KIDS music]

PBS KIDS Announcer: From your friends at PBS KIDS.

[A tour bus zooming down the open road.]

Andrés: Vamos amigos, it's time to go.

Christina: Get ready BoomBox, we have a show.

[Music: Jamming on the Job theme song]

Christina, Andrés, and BoomBox: (singing)

Jamming on the Job

Ja, Jamming

Jamming on the Job

Wooh Ooh

I'm Christina,

Y yo soy Andrés

And we play music

All over the states

We jam and learn

With people who

Work in jobs

They love to do!

If we get stuck

Or something goes wrong

An expert helps us

And we write a song!

[BoomBox beats]
Hey...Go BoomBox...¡Vamos!

Jamming on the Job
Ja, Jamming
Jamming on the Job
Wooh Ooh

[trolley car passing by]

Andrés: Hola, Jam Fam! It's sunny and cool here in San Francisco, California!

BoomBox: SAN FRANCISCO!

Christina: We're going to play a show here later.

Andrés: But right now, our sound check is all done, so we have some free time to explore San Francisco! : Hey Jam Fam, do you hear the city sounds?

[city sounds, traffic, trolley car]

Andrés: BoomBox, could you record?

BoomBox: RECORDING. TRAIN TRACKS. BELL. HORN.

[music]

Christina: San Francisco is a center of technology. People here invent ways to use technology and computers as tools to help people find jobs... or create art... or even find cures for diseases!

Andrés: Maybe we'll learn about a new invention!

Christina: Or maybe we'll see the Golden Gate Bridge!

Andrés: Or maybe we'll see the famous fog! Or maybe... maybe...

[stomach rumbles]

Andrés: Oooh! Maybe my tummy thinks we need to eat lunch.

Christina: (laughs) Okay! That's a great idea, too. What kind of food do you want?

Andrés: Oh my goodness. There are so many choices! I'm so hungry that I can't decide! Can you just pick something out?

Christina: C'mon Andrés, we need to figure it out together.

BoomBox: WE NEED TO FIGURE IT OUT TOGETHER, TOGETHER. WE NEED TO FIGURE IT OUT.

Andrés: Eh...

Christina: Look, how about this: Let's go downtown, and we can walk around and check out the restaurants there, and then decide.

Andrés: Ok, let's try that.

Christina: Great! I'll use the app on my phone to get us there. It can call us a ride.

Andrés: Sure, just do it quickly! I mean... yes, please. And thank you.

Christina: Okay, ordering a ride... and... done! And look, there's the car now!

[car approaches, beeping]

Andrés: Oh, look at that- that. No way! What is *that*?

Christina: Uhhhhh, I think that's... our ride?

Andrés: It looks kind of like a car. But different.

Christina: Sí. It has some extra pieces that stick out on the sides, and strange spinning machines on top.

Andrés: It looks like a cake! A delicious cake. Mmm.

Christina: Maybe our first stop should be a bakery! (laughs)

Andrés: Well, maybe the driver can tell us where to find one. Let me ask!

[opens car door]

Andrés: Excuse me- (gasp) Aah! Christina! Did you see that?

Christina: See what?!

Andrés: Nothing!

Christina: Nothing?!

Andrés: Nothing!!

Christina: Why are we yelling about nothing?

Andrés: There's nobody in the cab! There's no driver, Christina!

Christina: There's no driver? (gasps) [Andrés: No!] You're right! [car door closes]How'd it get here without a driver?

Andrés: Isn't it weird?

Desiree: Hiya!

[Christina and Andrés: (gasp) Aahh!

Desiree: It's safe to get inside. I ride in these dream machines all the time!

Christina: ¡Ay, me asustaste!

Andrés: I didn't see you standing there.

Desiree: Oh, sorry! I didn't mean to scare you. I'm Desiree. And you're about to take a ride in my favorite taxi cab of all time!

Christina: Uh, I'm Christina.

Andrés: Yo soy Andrés.

Christina: And this is BoomBox.

BoomBox: BOOM BOOM BOOMBOX!

Desiree: Pleased to meet ya.

Andrés: And we also have our Jam Fam with us, the listeners of our podcast. But wait, did you say you have a favorite taxi?

Desiree: You bet your hubcaps! I call 'em by their license plates, and this one is 6WA95K. I call it Six-dub for short.

Christina: Oh, that makes sense.

Andrés: What makes sense? This car has no driver!

Desiree: Of course it makes sense. We have driverless taxi cabs all over San Francisco.

Christina: That's amazing!

Andrés: I know that lots of cool inventions are made here, but... *driverless taxis?*

Desiree: Sure as your hat! I work for the taxi cab company. I'm a robotics engineer! That means I design and test robots... [Christina: Huh!] like these cars!

Christina: That's your job? That's awesome!

Desiree: So awesome! And part of my job is to test how these driverless taxi cabs drive on the road. And today is li'l Six-dub's turn for a test spin! Mind if I hop in and ride with you? I can tell you all about being a robotics engineer... and show you the sights!

Andrés: Really? Yay!

Christina: We'd love that!

Desiree: Fantabulous! Let's get inside, and I'll cue up that test.

[car doors opening and closing, seat belts clicks, car starting]

Desiree: That's the car's "start driving" sound!

BoomBox: START DRIVING!

Desiree: What a quaint little mechanical pal you have! Is BoomBox a robot?

Andrés: Oh, no, BoomBox isn't programmed by humans. BoomBox just kind of... is.

BoomBox: BOOMBOX IS, YEAH, BOOMBOX IS.

[car noises, beeping and turn signals]

Christina: Whooooa. Look at that! The steering wheel is turning, and the pedals are moving on their own... even though no one is moving them!

BoomBox: RECORDING, SIX-DUB.

[remixed sounds of Desiree speaking and car noises]

BoomBox: SAMPLES RECORDED.

Andrés: The driver's seat is empty. It's kind of like... a ghost is driving the car! ¡Uy!

Desiree: Oh, but that would just be silly.

Christina: It would?

Desiree: Of course. Ghosts can't drive cars.

Andrés: Oh, well, yeah ... of course, you're right, yeah...

Desiree: But computers are starting to! [Andrés: Ok...] What's driving this car is all the rules my team and I programmed into it! [Andrés: Huh!] So the car knows how to follow all the traffic rules, and how to keep a safe distance from other cars, and from bikers and pedestrians.

Christina: Wow. That's amazing!

Desiree: Plus, Six-dub knows to consult all the maps and traffic patterns in the area, and calculate the best route downtown.

Christina: And it's taking us... over the Golden Gate Bridge?!

Desiree: You betcha!

Andrés: Oooh, it's beautiful here!

Christina: And the ride feels so smooth. We really are staying the right distance from all the other cars.

[cars driving by]

Desiree: Check out the glittering San Francisco Bay on the left... and the Pacific Ocean on the right!

[car slowing down alert]

Desiree: Oh, and that's the "slowing down for a turn" alert.

[car slowing down alert]

Andrés: And we're over the bridge! ¡Qué bonita ciudad!

Christina: Yes, it is a beautiful city. Ok, so Desiree, you're a robotics engineer. And you test these cars. Is the car... a robot?

Desiree: It's part of a whole robotic system! A robot is a kind of machine with a computer inside that helps us do things.

Andrés: I thought that robots said stuff like (in robotic voice), "Beep. Bop. I am a robot." And then they did a little dance!

[Andrés makes beeping noises and does a robot dance and laughs]

Andrés: Robots are so awesome!

BoomBox: ROBOTS ARE SO AWESOME.

[musical remix of Andrés's robot dance]

Desiree: It sure would be spiffy to program this car to do a robot dance! The only thing my team has programmed it to do is drive around San Francisco.

Andrés: You programmed it?

Desiree: Yes sirree! We did! When we program our driverless cars, we give them rules. Like, “If you see a red light, then stop. If you see a green light, then go.” And then we add more rules, so they learn to do more stuff.

Christina: But... how does the car know what to do?

Desiree: Well, they get a lot of information from their sensors.

Andrés: Sensors? What are those? Like those big spinny things on top of the car?

Desiree: Bingo! You guessed it! This baby has radar sensors and light sensors to find out how far away the other cars are, and where the edges of the road are. And it’s also got video cameras to look for traffic lights and pedestrians. All those machines are a bit like the car’s eyes and ears.

Christina: Mmmhmm! The spinning sensors on top of the car are always paying attention!

Desiree: That’s right! And the more these cars learn and the better they get, the more cities we can bring them to!

[trolley car bells]

Desiree: Oh, hey, there goes Molly the Trolley!

[trolley car rolls past]

Christina: Uh...Molly the Trolley?

Desiree: She looks like a Molly, don't you think? We programmed in a safety rule for our taxis to always stop here and check if the trolley is coming.

[taxi cab slow down alert]

Andrés: So... you said you're making these taxis better all the time. *How* do you make them better?

Desiree: Testing them out is a big part of the job. And the more we test them, the more we learn! We're always discovering new situations that we didn't expect.

Christina: Huh! Jam Fam, I think Desiree might have the coolest job ever.

Desiree: It's the greatest! When I was a kid, I always loved solving logic puzzles, learning math, and playing with toy cars. And playing video games, too. Now, all those things are part of my job!

Andrés: You play video games for your job?!

Desiree: You're darn tootin'. Our office has a simulator! It's like a big driving video game, where we test out what our cars would do in the real world.

Christina: Ooh. You get to... experiment!

Andrés: Experiment!

BoomBox: EXPERIMENT!

Desiree: Yeah we do! Sometimes we'll go to a whiteboard and list all the ideas we can think of, even the really wacky ones. And then we'll get into the simulator and see which ones work!

Andrés: Awesome! Do lots of people write rules for robot cars?

Desiree: Oh, it takes a whole load of people to get these cars on the road! All my friends at work have different kinds of jobs. We help each other as a team, and we figure it out together!

BoomBox: WE NEED TO FIGURE IT OUT TOGETHER, TOGETHER. WE NEED TO FIGURE IT OUT.

Andrés: Hey! That's kind of how Christina and I write songs!

Christina: It is! If a song idea doesn't work, we'll jam together to think of a new one!

Desiree: Very experimental of you! It can feel a little frustrating when you've worked hard on something, but then you have to start all over again.

Andrés: ¡Muy cierto! But it's part of the songwriting process. We figure it out together!

BOOMBOX: FIGURE IT OUT – TOGETHER!

Desiree: And it's also part of being a robotics engineer!

Christina: Speaking of which... (whispers) Andrés!

Andrés: Are you thinking what I'm thinking?

Christina and Andrés: We've got a job to jam on!

BoomBox: (singing) WE'VE GOT A JOB TO JAM ON! WE'VE GOT A JOB, WE'VE GOT A JOB, JAM! OHHHH...

Christina: Desiree, we'd like to write a song about you!

Desiree: About me?

Andrés: Yeah! ¡Sí!

Christina: And we can sing it at our concert tonight! We'd like you to be our special guest! If all of that is ok with you.

Desiree: Well, isn't that just faboo! It's more than ok! It's the spiffiest thing I've heard all day! A song all about me! Desiree!

[car slows down, seatbelts unbuckle, doors open]

Desiree: Here we are! Downtown San Francisco! First-rate job on that test spin, Six-dub!

[car beeps]

Desiree: Well, isn't Six-dub just the ginchiest? Now, where're you two headed?

Andrés: Somewhere with food, hopefully!

Christina: But we actually don't know where. There are so many options that we didn't know what to do. We got kind of stuck.

Desiree: Hmmmm. Well, when you're writing your songs, how do you figure out what to do?

Andrés: Well sometimes I'll have an idea for a tune.

Christina: Or sometimes I'll have an idea for song lyrics.

Andrés: Or if we're really stuck, sometimes we'll ask BoomBox for a beat!

Christina: Hey, BoomBox, could you sample a beat for us?

[BoomBox plays reggae beat]

Andrés: Oh yeah, I love reggae! It's a cool Jamaican rhythm. Wait, it reminds me... that I love Jamaican food!

Christina: And there's a restaurant for jerk chicken right across the street!

Andrés: No way! ¡Perfecto! ¡Gracias, Desiree! I was so hungry that I forgot that BoomBox, Christina and I needed to figure it out together.

BOOMBOX: FIGURE IT OUT TOGETHER.

Christina: You helped us experiment like engineers, and that got us unstuck! Now we gotta go eat some chicken... and jam on that song!

Desiree: You got it, chickadees. I'll see you crooners at the concert later.

Christina: ¡Hasta luego!

[BoomBox plays samples of dialogue and car sounds from throughout the day. References Six-dub and car noises]

[concert crowd applause]

Andrés: Thank you, San Francisco!

Christina: You've been a wonderful audience. For our final song, we'd like to invite up a special friend.

Desiree: Oooh, oh. Do you mean me?

Andrés: Uh-huh!

Desiree: I get to go up onto the stage?

Christina: ¡Sí!

Desiree: Oh, wowzers!

[concert crowd applause]

Desiree: Oh, uh. Hi! Thanks, everybody!

Andrés: Yeah yeah, give it up for Desiree!

[concert crowd applause]

Andrés: Everyone, this is Desiree, the robotics engineer!

Christina: She helps keep the city moving!

Andrés: This song is for you, Desiree. Everybody let's sing along and dance along, show me your best robot moves!

BoomBox: 5-6-7-8!

Christina, Andrés, and BoomBox: (singing)

Robots are so awesome (robotics, robotics)

We get to design them, program them, they're rockin'

We are problem solvers (robots are on our thoughts)

Robotics engineers, we're rockin', so awesome!

Whooo!

Here in San Francisco we've got driverless cars (They're robots!)

That take us to the baseball game, the zoo and the park (Let's go!)

These robot taxis learn from driving millions of miles (Whoo!)

They learn from their mistakes cause they take millions of tries

Help us solve the puzzle

(spoken)

Hey engineers! We need the whole team working together
We're going to make this robot taxi even better!

Help us solve the puzzle

Is this traffic or ducks in the road?

Help us solve the puzzle

How does the cable car schedule go?

Robots are so awesome (robotics, robotics)

We get to design them, program them, they're rockin'

We are problem solvers (robots are on our thoughts)

Robotics engineers, we're rockin', so awesome!

Yeah robotics engineers take problems

And we work together with our team to solve 'em

Challenges are unpredictable like the weather

We can solve the puzzle, figure it out together

Robots are so awesome (robotics, robotics)

We get to design them, program them, they're rockin'

We are problem solvers (robots are on our thoughts)

Robotics engineers, we're rockin', so awesome!

Robotics engineers, we're rockin', so awesome!

(spoken) So awesome!

[concert crowd applause]

Christina: All right! That rocked!

Andrés: I loved writing this song with you, Christina!

Christina: Right back 'atcha, Andrés! It works out great when we...

Christina and Andrés: Figure it out together!

BoomBox: WE NEED TO FIGURE IT OUT TOGETHER, TOGETHER. WE NEED TO FIGURE IT OUT.

Andrés: Just like robotics engineers do, we experimented until we figured it out! Thanks for teaching us about your job, Desiree.

Desiree: You got it, buds! Hey, I wonder if anybody listening out there likes to experiment, too.

BoomBox: EXPERIMENT!

Christina: We can ask! Hey, Jam Fam! Did you ever have a problem that you experimented with?

Andrés: Did you try out ideas until you found one that worked?

Christina: And did someone else help you figure it out together?

Andrés: It's time to say adiós, Jam Fam! Catch you next time, on Jamming on the Job!

BoomBox: JAMMING ON THE JOB!

Christina, Andrés, and BoomBox: (singing)

Jamming on the Job

Ja, Jamming

Jamming on the Job

Wooh Ooh

Christina: Ok, BoomBox it's time to rap the credits!

BoomBox / Pierce Freelon: (singing and rapping)

Jamming on the Job is hosted by

Christina Sanabria, Andrés Salguero

And yours truly

We wrote these original songs to keep you grooving

But let me introduce myself

BoomBox it goes

Last name Freelon

First name Pierce

Milena Tinoko played Desiree our Robotics Engineer

Michal Richardson wrote this episode your hear

Aaron Keane was audio engineer

Terence Bernardo did sound design and the mix

Isaac Klein and Daniel Rinaldi produced and

David Huppert produced executive

Outta Durham North Carolina

We are here to represent

Thanks for listening

Make sure you come back to jam once again

Pierce Freelon: Jamming on the Job is made possible by a Ready To Learn grant from the U.S Department of Education through the Corporation for Public Broadcasting.

[Music fades.]

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