

Evelyn Lamb: [00:00](#) Hello, and welcome to the Lathisms Podcast. I'm your host, Evelyn Lamb. In each episode we ask a Hispanic or Latinx mathematician to talk about their journey in mathematics. Today I'm very happy to have Minerva Cordero on the show.

Evelyn Lamb: [00:22](#) Welcome, how are you?

Minerva Cordero: [00:25](#) Hi, I'm doing very well. How are you doing, Evelyn?

Evelyn Lamb: [00:28](#) Just fine. So can you tell us a little bit about yourself?

Minerva Cordero: [00:31](#) Yes. I grew up in Puerto Rico. I am the fourth child, we were six children growing up. I have three sisters and two brothers. My sister that is a year older than me, we both have a PhD in mathematics, even though our parents did not attend school. My mother went to fifth grade, and my father went to the second grade.

Minerva Cordero: [00:58](#) We grew up in Puerto Rico, attended the University of Puerto Rico for my undergraduate degree, and then I came to the United States for my master's degree at the University of California at Berkeley, and then my PhD from the University of Iowa. Currently I'm a professor and Associate Dean for Science at the University of Texas at Arlington.

Evelyn Lamb: [01:20](#) Did you know when you were growing up that you wanted to be a mathematician? Did you have early experiences that way?

Minerva Cordero: [01:27](#) Well, that's fairly interesting. I always liked math from an early age. I was very privileged that I had some really good teachers starting with my fourth grade math teacher. To me math was always intriguing, and it was fun because I didn't have to memorize, I just had to think on the spot. So from an early age I knew that I really liked math above everything, but I really did not know what does one do with a degree in mathematics. I just knew when I graduated from high school that I wanted to learn more math. I didn't know exactly what job I would have with a degree in mathematics, but when I enrolled at the University of Puerto Rico I started studying mathematics without really knowing what career that would lead to.

Evelyn Lamb: [02:17](#) Were you encouraged to pursue graduate education by people at the University of Puerto Rico?

Minerva Cordero: [02:24](#) Yes, my parents actually did not care one way or another what we studied, however they supported very much education, and my mother was the strongest supporter. She always said, "An education's the greatest gift I can give you because that is the one thing that nothing, not anyone, can ever take away from you." So she encouraged

all of us to go to school, and actually more so the girls in the family than the boys because she wanted us to have that freedom to be able to take care of ourselves.

Minerva Cordero: [02:55](#) At the University of Puerto Rico, my last year as a senior I had a wonderful professor, a woman named Carol Knighten, and she was teaching at the University of Puerto Rico and she told me, "Why don't you go to the United States and get a PhD?" Honestly, I did not know what did that entail, and I didn't know how I could do that to come to the United States.

Minerva Cordero: [03:20](#) She encouraged me to apply for a National Science Foundation Fellowship, which I did, and I got accepted into University of California at Berkeley, and that's how I came to the United States. Had it not been for Professor Knighten, I wouldn't have even known that there was something beyond a bachelor's degree in mathematics because at the University of Puerto Rico at that time there was no PhD program. There was a master's program, but no PhD in mathematics.

Evelyn Lamb: [03:51](#) When you got the US, where you mentored by people both in graduate school and then as you started your career?

Minerva Cordero: [03:59](#) Actually, not, and this was something that was really hard for me when I left Puerto Rico. I was living at home in a small countryside, and going to the University of Puerto Rico in a very sheltered environment. Then I got here to United States at Berkeley, and I felt quite a sense of loss. I felt very lonely at that time. That made it really hard at first. Then when I moved to the University of Iowa for my PhD in mathematics, again it was a sense of not much mentoring, which is why this is one of the things that I spend most of my time nowadays is mentoring, especially first generation college students who do not know how to navigate academic life. It was kind of a little bit unsettling for me to come to United States, and kind of find myself so lonely, and not really knowing what the next step would be.

Evelyn Lamb: [04:59](#) In your work today, you say you do a lot of mentoring. What form does that take?

Minerva Cordero: [05:06](#) Several forms of mentoring. Well, first thing when I came University of Texas at Arlington there was no math club, so I started a math club so that I could get to know the undergraduate students, and I could kind of empower them to realize that they can ask for support from faculty. I myself have mentored five PhD students formally, but informally have mentored many other, especially women and underrepresented minorities. I meet with them regularly. I direct a program, an LSAMP-

BD Program for underrepresented minorities and first generation students. I started a chapter of SACNAS here at UTA. I am the faculty mentor for the SACNAS chapter.

Evelyn Lamb: [05:56](#)

Can you tell us a little bit about SACNAS?

Minerva Cordero: [05:59](#)

Yes. So SACNAS is a Society for Advancement of Chicanos and Native Americans in Science. It's an organization whose goal is to promote the advancement of minorities in science. Our chapter here has been very valuable for many of our students who come here who are first generation, and who are Hispanics. It's just wonderful for them to see other students like themselves pursuing similar degrees, but also to have faculty members working with them.

Minerva Cordero: [06:33](#)

I attend the national conference. I take students to the national conference. My students that do research with me, I make sure that they go the SACNAS conference to present their research. It has been a wonderful organization to help students, and for me personally. I have attended the SACNAS leadership conference, which has been a wonderful experience for me, and really life changing in terms of opening my eyes about what we can do to help promote other Hispanics and Latinos.

Evelyn Lamb: [07:04](#)

So you've mentioned that students do research with you. Can you tell us about your research?

Minerva Cordero: [07:10](#)

Yes. My research is in an area called finite geometries, and finite geometries is at the intersection of algebra, geometry, and combinatorics. We study finite structures, so it's very algebraic in flavor, and it combines the algebraic structures with the discreteness of geometry. It's a beautiful subject. A lot of the research done in finite geometries happens outside of the United States, mostly in Italy. So every two years we have a conference in Italy that I have attended since I got my PhD, to discuss the research that we do.

Minerva Cordero: [07:47](#)

It's very interesting that even though it's a finite area in mathematics, it has applications, especially to coding theory. My last two PhD students did something more applied with the geometric structures that we worked with, looking at them, and how we can use them for communications, like for example cell phone technology, for creating codes that are safer than the ones you could create with other geometric structures that exist.

Evelyn Lamb: [08:17](#)

You advise students who are working both in the more theoretical side of math, and more in applied math?

Minerva Cordero: [08:24](#)

Correct. The area per se is pure, but it has several applications, and so more and more I see students

interested in going into that direction. One of my students, his goal is to get a job at the National Security Agency, and he knew that following that path into the structures that relate to coding theory would be a good way for him to train for that.

Evelyn Lamb: [08:49](#)

Do you have any advice about overcoming challenges, especially related to research or progressing in an academic career?

Minerva Cordero: [08:59](#)

Yeah, the important thing, I guess, is to realize that sometimes it takes a little bit longer to get to where you're trying to get to. For example, when I started college, I had not had calculus. I had to start in pre-calculus, and I didn't learn that stuff. I even said, I wanted a very solid foundation in pre-calculus, so I took the pre-calculus that was two semesters as opposed to condensed one in one semester because I'm a firm believer that you wanna take small steps, but very strong steps.

Minerva Cordero: [09:36](#)

So sort of take your time, and realize that you're going to get at the end actually, and you might get there faster than someone who's really starting very quickly, but you wanna make solid steps, and not give up. Just as when I started in pre-calculus, then by the time I was a junior I was taking the courses that other students were taking, and I was taking four math courses a semester because I had developed a very strong foundation.

Minerva Cordero: [10:02](#)

Perseverance is really important. When I started as an assistant professor, I knew what was expected of me to get tenure. I was very, very focused in doing what I needed to do to get tenure. I understood that that really meant working really hard for that period of time, and I did that. Now moving forward into academics, and I'm now a full professor, so perseverance, believing in yourself, and taking the time to get where you need to get. I don't think that there is any magic key to success except for persevering, staying on what you're doing, and not forgetting what your focus is, and where you want to get.

Evelyn Lamb: [10:52](#)

Do you have anything that you tend to do to help encourage students who might feel like other people are further along that path than they are, and to help them not give up?

Minerva Cordero: [11:05](#)

Yes, and that's really very interesting. When I came to the United States, having studied at the University of Puerto Rico, it was very big eyeopening when I stepped foot in a classroom at Berkeley. My classmates had clearly had much stronger training in their undergraduate schools. You know, in Puerto Rico at the time we had wonderful

teachers, but the idea was to understanding what we were doing. So for example, in my Complex Analysis class as an undergraduate, we covered two chapters of the book. Here in the United States perhaps you would have covered five or six or the entire book. Getting to Berkeley to see that, that my classmates knew so much more than I did was a little bit intimidating. Yet I realized it's a matter of what you have been exposed to, so there's no way I would know as much as they know because they had been exposed to so much more. However, what I knew, I knew it quite well.

Minerva Cordero: [12:14](#) So having that confidence that you are capable of learning as much as anyone else, and it's a matter of what your circumstances have been that determines how much you know, how far you have gone. When one feels that like, "Oh, I'm just so behind, and everyone else is so ahead of me." First of all, that is not necessarily true, and being a professor now I see that on this side, that there are students that display a lot of confidence in their knowledge even though someone else who is not displaying that confidence might have even more knowledge than they do.

Minerva Cordero: [12:55](#) One young lady that I mentor now, we meet regularly to talk about her studies here at UT Arlington. She's a second year PhD student. She's managed to be successful in her classes, and pass the doctoral exams. I asked her, "Is there something now after two years, that you wish you knew when you started when you were so scared starting here at UTA?" She said, "I wish I knew that people really didn't know as much as I thought they did." I thought that was really interesting because it is so true.

Minerva Cordero: [13:29](#) Many a time, especially Hispanics, women, underrepresented minorities, we feel like everyone else knows more than what we do, but that is so not true. I have seen that. I've been teaching now for over 25 years. I see that still today this happens, that we think the other people know more than what we do. Also we think that it is easier for someone else to learn, which is not true. It's just a matter of how much time you put into what you're doing. If you put the time, and you stay with it, and you stay with the task, you're gonna be as successful as they are.

Evelyn Lamb: [14:08](#) Yeah, I think a lot of us have that experience at the beginning of graduate school, coming in and thinking, "I'm the only one who feels like this. Everyone else knows what they're doing."

Minerva Cordero: [14:20](#) Exactly, and it surprises me when I hear someone else saying that like this young lady who talked to me. It's just like, no, it is not true at all. Everyone is in the same, and

I say, "But even look at that. The people you thought that were doing so well, some of them did not pass their exams, but you did. You passed all of them."

Minerva Cordero: [14:37](#)

So it's definitely something that we all go through, especially as I said, women and other underrepresented minorities.

Evelyn Lamb: [14:48](#)

Do you have favorite bit of math that you like to share with students or with maybe people that you meet at a party who when you tell them you're a mathematician, they say, "Oh, I hated math?"

Minerva Cordero: [15:02](#)

That happens all the time as we know, this comment, "I hate math." Yes. I'm very excited about math, and this is the one thing that students always comment on my student evaluations is how excited I am about math. When I give talks to undergraduate students, and I'm getting ready actually to give a talk to a group of students at a school here in Texas. It's sponsored by the MAA-SUMMA Program for women doing mathematics. I love talking about my research area because it's really very easy to understand, the definitions, the concepts. It's just a really neat area, yet it's such a powerful area that can be used in so many things, including medicine, economics, statistics, so many things. So such a simple and beautiful theory can have applications to so many other things.

Evelyn Lamb: [15:52](#)

Yeah, that's a neat thing. You wouldn't necessarily think that these really abstract finite geometries would help you make a cellphone call without too much interference on it.

Minerva Cordero: [16:02](#)

Exactly, or make a beautiful picture, you know how you make movies that it's all about the pixels, and those are just a set of points that you're putting together to create a beautiful picture. For a movie, like to watch on TV, but also for a movie like when you get an image that you get on a scan, on a CT scan, where you get an image, an image is just a set of points, and it's a finite set of points. Yeah, this applies to that, which is something that can be so serious and can help save someone's life.

Evelyn Lamb: [16:36](#)

Is there anything else you wanted to share?

Minerva Cordero: [16:37](#)

I guess for the students that listen to the program, know that you can achieve as much as anyone else. There's really no limit as to where you can go. I do see that so much in my students that they sometimes don't feel that way, but just don't be shy to ask for help. Don't be shy to go to your professors or to someone who can help you move forward. It just saddens me so much when I meet a student that is a junior in college, and who made wrong

choices and decisions about classes, about career, when they were a freshman because they didn't know that they could ask.

Minerva Cordero: [17:19](#)

So always ask to get the help that you need. And also to the people in my position, always remember that we have a great potential in our hands to help the future generation. We should continue to reach out to those students whether it be in a student club or making presentations, just so that they realize that there are people that actually care about them. I was reading some reports of statistics about why women, but I know that minorities do not pursue careers in STEM, and it's because they're not encouraged to do that.

Minerva Cordero: [18:01](#)

Do that when you meet someone who has the potential to move forward. Please talk to them, and let them know about all the options that are available when you pursue a career in science, but especially in mathematics. Mathematics is so powerful, and most people do not know how far you can go with a career in mathematics, how many different types of jobs you can have, how many different contributions you can make to society just by the fact that you know mathematics, that you're doing mathematics. Mathematics really opens so many doors for so many people.

Evelyn Lamb: [18:41](#)

That's a really great message to end with. Thanks a lot for being here.

Minerva Cordero: [18:45](#)

You're very welcome.

Evelyn Lamb: [18:49](#)

Thank you for listening to the Lathisms Podcast. It's produced by me, Evelyn Lamb, and made possible by a Tensor-SUMMA grant from the Mathematical Association of America. Our music is Volveré by La Floresta. Lathisms is an initiative to celebrate the accomplishments of Hispanic and Latinx mathematicians. It was founded in 2016 by Alexander Diaz-Lopez, Pamela Harris, Alicia Prieto Langarica, and Gabriel Sosa. You can find more information about the project at Lathisms.org. That's L-A-T-H-I-S-M-S-O-R-G. Join us next time to hear from another inspiring mathematician.