

- Evelyn Lamb: [00:10](#) Welcome to the Lathisms Podcast. I'm your host, Evelyn Lamb. In each episode, we ask a Hispanic or Latinxs mathematician to talk about their journey in mathematics. Today we're happy to welcome Moira Chas to the show. Can you tell us a little bit about yourself?
- Moira Chas: [00:25](#) Yeah, I was born in Argentina. I did college there. College in Argentina is, you know, whatever you decide is your major, that's the only thing you do. Which for me was a fantastic experience. I came from a high school which was not really good. I like math but really studied in a rigorous way day and night, it was absolutely fantastic. I mean it was for me love at first class. But the love started a little late, compared to other people I started about 18. Then I finished college, which was a little longer, almost like a Master and a couple of years later, I went to Spain and did my PhD there and then I came here to States, I came for three months, doing a kind of short research project and I am still here since 98.
- Evelyn Lamb: [01:19](#) Okay, and in addition to doing research where you work at Stony Brook University, you also do a lot of outreach, including mathematical sewing and crochet, right?
- Moira Chas: [01:32](#) Not sewing, crochet. I wish I could do sewing but I did something really bad to my finger with a sewing machine so I limit myself to crochet. Crochet is relatively new to me, I started about three years ago and I started first with whatever most everybody else starts with hyperbolic crochet, and then I continued doing surfaces and then I studied maps on surfaces and things related to the four color theory. But another set in the sphere or the plane, and then it exploded. I do cipher surfaces now, I just finished something that I'm very proud of, mobius band.
- Moira Chas: [02:13](#) And it's double cover which is a cylinder going twice around the mobius band and I used all these things to teach and to do outreach from makers fairs to I don't know, sometimes I go to an elementary school and people get really engaged with, they say ``oh that's math?" And it is math and I try to do it in a mathematical way of course, I don't give all the rigorous details but I give some arguments to open the door to people to ... The thing that, the part of math they usually don't think of as math.
- Evelyn Lamb: [02:50](#) Right. So you mentioned that you went to a high school that maybe wasn't as strong in math. Did you have experiences early in life that made you think that you might want to become a mathematician eventually?

- Moira Chas: [03:04](#) I didn't know what was a mathematician so the answer is no. I liked math and I liked writing growing up and my family was more on the writing side but they got books, you know. I got all the books I wanted in my house and they got a couple of books that had Martin Garr there and one I really liked called, The Man Who Counted, I don't know if that is the name in English. But I didn't do math outside school and I did very basic math at school.
- Moira Chas: [03:39](#) I mean in high school we don't even arrive to calculus it was a lot of trigonometry and Cartesian co-ordinates. So I liked it and when I was finished in high school and I have to decide my major I wanted to, I think I want to write or do something with math and all the other things that had math, the non math part bothered me.
- Moira Chas: [04:07](#) And again I never thought about doing maths until a classmate of mine said I'm going to do a math major and I said okay, that's really something with math. And that's how I started but I didn't know what I was getting into until I started studying my first day of class, which was ... I mean my first math class, I don't know if it was the first but one of the first classes, one of the best moments of my life when I saw, I realized that you can understand things.
- Moira Chas: [04:42](#) The understanding gave me a sense of physical pleasure, the ah, this is so good. I spent most of my high school in some kind of foggy dark where you have to memorize things and I can't memorize and I can't produce nice neat documents, it was painful for me. I mean I didn't think it was important, I just need to pass the courses, your grades in Argentina don't count to enter at the universities so I just had to pass. But I had to sit all these hours not understanding.
- Moira Chas: [05:11](#) And when you could see a mathematical argument that you could go to the end, gosh I still feel good remembering how good I felt at that moment. I still have this great feeling of ah, aha that's so good.
- Evelyn Lamb: [05:25](#) Oh wow, that's really beautiful. And so were you encouraged by professors or your family when you did decide that you wanted to do math?
- Moira Chas: [05:34](#) My mother was very encouraging because she realized how good it was for me. It was kind of interesting, you know. I'd prepare, we had this entrance exam to university and I'd prepare with the professor and when I did really well he said

teaching is a good career for a woman. I was supposed to go to teaching.

- Moira Chas: [05:55](#) Even if I did the best of all the students there, which were all male. In my university, at the Universidad de Buenos Aires, it was a really stimulating place to work. I had good classmates, very very very good education, I'm really thankful for all what they gave me. Many people passionate about math. So I think it was encouraging to be a student there.
- Evelyn Lamb: [06:23](#) You've mentioned a little bit about being encouraged differently from male mathematicians when you were in college. What other experiences have you had related to be a woman in math and how do those intersect with being a latino woman in math?
- Moira Chas: [06:37](#) When I was young in my college and then in my PhD I was in a Latino country so I didn't notice I was a Latino because that was the standard thing, the normal thing. But I remember once I was in Spain, and I went to a talk, to another university and not mine and the professor came to me and said ``hey honey, this is a math talk." So that was quite a shock, you know? I shouldn't be there, he said.
- Moira Chas: [07:12](#) I lived in my personality I guess is I'm a little foreign everywhere I go I'm a little in my own bubble. I hear little comments here and there. I don't think they affected me a lot but I think as a woman I have many of the things that women, many mathematicians share. But impostor syndrome, I have a PhD in impostor syndrome or psychology has corrected me now and they say we should say impostor feeling, it's not a syndrome.
- Moira Chas: [07:45](#) But the idea that what am I doing there, they allow me to be here by mistake, that's one of the things I feel as a woman and sometimes those types of feelings make you go slower.
- Evelyn Lamb: [07:59](#) Do you think that you've been encouraged a lot as a woman in math?
- Moira Chas: [08:07](#) I don't know how to answer that question. I think as a woman I was not encouraged to do math. I think society doesn't encourage women to do math and it's I mean ... I give talks about this around the world as much as I can and I realized you know, right now, yes we can enter the university and we can get PhDs not like, Sofia Kovalevskaya, who couldn't even even put the foot. She couldn't even audit classes.

Moira Chas: [08:37](#) She had Weierstrass as a private tutor in fact. Well right now we don't have these clear visible obstacles. But what we have now is an enormous amount of tiny obstacles, little things, that they seem like nothing, but they accumulate to produce a big obstacle which is harder to see. In fact, I'm working with a psychologist now, I just started with a professor Regina Balian in mathematical models of how the accumulation of small obstacles makes a big hurdle to women and other minorities in math.

Evelyn Lamb: [09:19](#) Yeah, I think I saw in one of the articles he wrote, imagine you talked about kind of made a mathematical metaphor for this that exponential growth, it only takes a little bit to build up.

Moira Chas: [09:33](#) Right, it's little by little, sum of infinitesimals, when it's infinity can be big.

Evelyn Lamb: [09:40](#) So since we're pivoting a little bit to mathematics, can you tell us a little bit about your research?

Moira Chas: [09:46](#) Happy. So I have, I would say two main branches in our research. One is working on curves and surfaces. I mean just in curves and surfaces curves up to deformation, continuous deformation up to free homotopy. So you look at these set of classes you get, and then you attach numbers to each of these classes.

Moira Chas: [10:12](#) One number could be the self-intersection number which is the smallest number of times a member of the class crosses itself. Another number could be what is supposed, you have the fundamental group of the surface had a set of generators and you represent your free homotopy class with a word, where a word is the smallest number of letters you can have for a word representing that curve you're studying. That's another number. Both are integers.

Moira Chas: [10:44](#) Then you can have a metric like hyperbolic metrics, constant at the curvature, so if you have a metric on the surface, you have the length of the shortest curve on the class, which is the length of a geodesic in the class that's another number. So part of my research is studying relations between those numbers, statistics, and there are other numbers that we could, I'm also interested in.

Moira Chas: [11:15](#) That's one part, and the other part is related to a structure that was discovered by Goldman, and now it's called the Goldman bracket, and it's related to the operation that suppose you have

two curves on a surface and they intersect in many points and you choose one of the points and at that point you're going to cut the two curves and reconnect it.

Moira Chas: [11:40](#) Now these curves, I didn't say it are directed, they have an arrow so if they're directed you can reconnect it in only one way to make a single curve that continues the direction. You can imagine that you had two circles, you open them up, they are circles oriented and then you glue them back you get a new bigger circle.

Moira Chas: [12:00](#) So using that idea you define the Lie algebra on the linear combinations on these classes of curves, for me it's a little math miracle that it's a Lie algebra, you know when you have a nice identity and something to define you have something good there.

Moira Chas: [12:16](#) And then I study again relations, what happens with, how this is related to the intersection structure. And then with Denis Oliver, who is my husband, we generalize this idea to manifolds of all dimensions.

Evelyn Lamb: [12:30](#) Okay, and is there are research accomplishment or academic accomplishment you've been most proud of?

Moira Chas: [12:38](#) Well, spin topology is a really good thing but it's like an old lover, I prefer the newer ones. So right now I'm quite excited about all this world of, I studied a lot, I didn't mention that I do a lot of experiments with the computer and this is really a new level field so I'm proud of opening up, there's people studying these things. That I'm proud.

Moira Chas: [13:04](#) I'm also very proud of my children, I'm, my mathematical children. I'm very interested in mentoring undergrads and I had, Stony Brook is a great place to do that because some of our students are fantastic and some they need support and I can provide that, mathematical and a little bit human.

Moira Chas: [13:28](#) And I seem them blossom now in the math world, and I'm really happy about that.

Evelyn Lamb: [13:34](#) How do you overcome challenges related to academics and your research?

Moira Chas: [13:41](#) How do ... when I over come this sometimes I'm just defeated but I have one thing that helped me a lot is my goal is to be, I feel like I'm a math servant, I'm there to serve math. And the

only thing I can do is serve math the best way I can. And that takes the pressure out of me. It's not like I have to achieve this or that, I just have to be the best math servant that I can.

Moira Chas: [14:11](#) So what I do is, if I have to give a talk, I'm less nervous now but I used to be nervous before giving a talk, I tell myself, it's not about me, it's about the math, you know? I'm not the topic of my talk and that really helps.

Moira Chas: [14:30](#) And what also helps is trying to recover this feeling of understanding, and usually it's working hard, I tell all the students and I don't believe this math people and not math people. Everybody can understand math at different speeds and at different levels. So working and understanding something always makes me feel better in a challenge.

Evelyn Lamb: [14:54](#) So in addition to Math, you also do some writing, both mathematical writing and some fiction writing. Could you tell us a little bit about that?

Moira Chas: [15:04](#) Yeah, it all started as interestingly enough, this is related to being a Latino, when I moved from Spain to the United States I stopped writing. I always wrote all my life and I couldn't write. I tend to think in the language I live and my english still is a work in progress and I couldn't write. And then there was this contest at the Simon Center of Geometry and Physics of a science play and I hear about this fantastic woman called Alicia Wool, she's the daughter of George Wool and I decided to write a short play about her and incorporate she was studying the equivalent to the platonic solids but in four dimensions.

Moira Chas: [15:46](#) And she really developed this out of academia. She and her sisters, they're all fantastic, very accomplished ladies, everybody was very original and their father died when they were very young so she developed it herself, and I wrote about her and I'm very proud of that too, it makes me happy.

Evelyn Lamb: [16:07](#) Yeah, multi-talented, multi-faceted life in mathematics.

Moira Chas: [16:14](#) Yeah I think it's all one thing, you know? Like math is only one and my math and my writing really merge.

Evelyn Lamb: [16:21](#) Thank you so much for being on the show today. I really enjoyed talking with you, bye.

Moira Chas: [16:26](#) It was wonderful to talk to you too, thank you.

Evelyn Lamb: [16:28](#) 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 Volvere 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 Lathisms.org.

Evelyn Lamb: [17:07](#) Join us next time to hear from another inspiring mathematician.