Podcast: Women in Math: The Limit Does Not Exist
Episode 37 - Marie Curie

Anushka Naiknaware: Hello and welcome to another episode of Women in Math: The Limit Does Not Exist.

My name is Anushka, and I am currently a student at PCC. This is being recorded in November of 2020, during the infamous coronavirus pandemic.

I hope all of you guys listening at home are staying safe, or perhaps it's completely over with, and you guys can invent a time machine and tell me from the past all about it.

The topic of today's episode is Marie Curie.

Marie was a female Polish scientist in the 1800s. Among the numerous accolades she collected throughout her life, the most notable was that Curie would be the first woman to win a Nobel prize.

And not only the first woman, but the first *person* to win *two* Nobel prizes. Her first prize was in physics and her next would be in chemistry.

Now, of course, this is a math podcast and none of those are necessarily math prizes. Many speculate the reason why there is no math category for the Nobel prize is because Alfred Nobel supposedly had competition with his mistress's significant other, who was a mathematician.

Of course, whether that's true or not, we'll never know. But, it's a fun story nonetheless.

Marie's life is a very good example of how far grit can take you in life. And also to show us that most math does not exist in a vacuum. And that, although pure math exists, there is also a field of applied math, or using math in order to fuel your other passions of science or art, or other disciplines.

Marie was born as Maria in Warsaw, Poland. At the time she was born, Polish and Russian relationships were really tense. In Polish schools they had to teach Russian-approved curriculum. This meant there was no Polish curriculum, and all instruction was done in Russian, and all the history they learned about was from the Russian perspective.

While Maria was studying in school, her mom and eldest sister would die. Like many others, Maria threw herself into her work. She became a very "serious child" after that. Many people around her say she was robbed of her childhood.

Even though she finished high school as the top student in her class, two years early with a gold medal, Maria would later say that was kind of an empty achievement for her, because of the personal tragedies in her life. Yet, she wanted to continue with her education, and at that time no Polish schools could give diplomas to women. Maria had to find another way to get one.

Another barrier to her education was the cost. Maria's dad was unable to pay for her potential tuition. Maria and her Sister, Bronya, joined something called, "The Floating University," which was an illegal, underground university in Poland. If the two were caught, they would have been taken to jail and incarcerated.

The Floating University taught them the basics of what they wanted to learn at a much cheaper cost. The Floating University also took female students, whereas doctorate programs in Poland did not at that time.

However, money would still remain an issue. The compromise Maria and Bronya made was that Maria would take a job as a full time governess, which is essentially a live-in tutor, so she could earn money to get Bronya through university. And then after her sister became a doctor, her sister could pitch back in for Maria's education.

And eventually this would happen, and years later she would get access to a chemistry laboratory and be accepted by a university in France to continue her studies. Yet again, money was an issue. Although she had collected enough money to pursue her chemistry degree, Marie didn't have enough money to meet the requirements for her math degree.

Maria asked around, and many of the senior French scientists recognized her innate ability and strength in those fields. So, Marie was awarded a scholarship for being an outstanding Polish student. And she was commissioned by the Society for the Encouragement of National Industry to do studies about magnetic

properties of different steels and their chemical compositions. Through that, Marie got more experience in lab work.

Eventually in 1893 she would get a master's degree in physics at the top of her class. The next year in 1894 she would receive a master's in math. This time the top spot eluded her, and Marie was second in her class. That was still an amazing feat for a woman at the time, because of the barriers, both implicit and explicit, in higher education.

And even after she was nominated to go to Sweden to receive the Nobel prize for her work with pitch blend, which is uranium, as well as with radiation in general, Marie declined that visit initially. Her parents and friends had to encourage her, telling her the opportunity won't come again. Eventually Marie was convinced to go, so that's how she received her first Nobel prize.

At the time, World War I was also starting to gain traction. As a woman living in France, Marie wanted to help the people on the front lines. She wasn't a trained soldier or medic, so instead Maria and her oldest daughter, Irene, who was 17 at the time, they made portable radiography units. Those are essentially like portable X-rays. They went on battlefields and trained other medics and doctors on how to use them. Marie was an incredibly selfless person.

One of the things she tried to do was give away her Nobel prize so they could make airplanes out of the material, since metal was very valuable at the time. Obviously they rejected it and sent it back when they realized what it was. Marie was incredibly

selfless. She became a hero in Poland, France, and abroad here in the United States.

In her time, women were often mistreated and disvalued in and outside of the laboratory. Marie pushed through that, as well as the numerous personal tragedies in her life, and circumstances that didn't put her in a financial stable position all the time. Yet she pushed through to be one of the most amazing female scientists and mathematicians, perhaps to have ever lived.

Although Marie took a stand that the ideas of women in academia are extremely important. And critical to advancing our world as a whole. Obviously the values she believed in aren't necessarily the ones that were upheld throughout the decades. That's our job to do, to fix the gap for the generations to come.

And to recognize the contributions of women in math, applied math, and the sciences. Then we can appreciate those and learn from those. I think Marie really teaches that a lot of people are robbed by circumstance. It doesn't make sense to fear the things ahead of us, just do the best we can. And that there is always a way.