New Mexico Activities Association Student-Athlete Spotlight

Running a Mathematical Marathon

By Tyler Dunkel, Sports Information Director at the NMAA

Running and mathematics are two activities that many people stay as far away from as humanly possible. Mayfield High School senior Sophia Sanchez-Maes can't imagine her life without them.

Sanchez-Maes fell in love with running after joining the cross country and track and field teams as a freshman. She used her membership on these teams to keep her focused.

"I love cross country, or running in general, because it keeps me going forward. This year I will break from track and field and will train for a marathon this spring. I ran all four years under coach Dean King. I started running cross country because I had never participated in sports but after my first week of cross country, I just fell in love. I knew I wanted to do high school sports but I couldn't really see myself doing anything else other than running."

Every year during her high school career, Sanchez-Maes qualified for the state cross country championship but said representing the state of New Mexico in the Junior Olympics in cross country is one of the proudest moments of her young career.

"I was lucky enough to qualify for state all four years, either as an individual or with my team but I'm also a two year qualifier for the Junior Olympics in cross country, performing in the top-20 in the state, which qualified me for nationals. I then represented the state of New Mexico in the national event in Albuquerque during my sophomore year. It was a true joy to represent our state. The Junior Olympic Cross Country meet is like no other race I have ever experienced. It was an honor to compete."

Despite being a successful runner both at the high school and Junior Olympic levels, her true passion is mathematics. At a very early age she realized math was a passion and has developed into one of the brightest mathematical young minds that Mayfield High School, the City of Las Cruces and possibly the state of New Mexico has ever seen.

"It was actually in fourth grade when I realized I was good at math. I used to ditch my reading book and listen in on what the higher level math students were learning. My teacher noticed my attention was in math and she really worked with me in that area. After that, it was all systems go. I was my own propellant through my math courses. I started doing recreational math problems at home and somehow I ended up going from grade level math in the fourth grade to taking Calculus AB and BC my freshman as a 13-year-old. It was a big jump for me but math was something I love doing."

She also commented on the support her parents, Jim Maes and Margaret Sanchez-Maes, have given her over the years.

"My parents have been so supportive of me through all of this. I remember when it got to the point where my parents were unable to help me with my homework and I think it was hard for them but that's when it really mattered that I had to love what I was doing. After I completed my entire math requirements in high school it was hard to find other avenues but my parents knew what I loved and helped me get that."

After completing all the math courses that Mayfield offered by the end of her freshman year, Sanchez-Maes attended a summer program with the aid of a scholarship at Brown University. There, she studied Number Theory, a branch of pure mathematics devoted primarily to the study of the integers, sometimes called "The Queen of Mathematics" because of its foundational place in the discipline.

She then returned to Las Cruces and enrolled in the dual credit program at Mayfield and began to take math courses at New Mexico State University.

"At NMSU I started taking Mathematical Proof courses and that's where I really took the next step. In lower level math you find a lot of repetition but at the high levels that is where the creativity comes in. In Proof Math it's like pounding at a cinder block wall until you break through and find that one piece that will make your proof work. It's like laying out the framework."

This past fall, Sanchez-Maes teamed with NMSU professor Dr. Joseph Lakey, department head of Mathematical Science, on an independent study of Frames in Hilbert Space, which is used in digital signal processing applications.

"My independent study with Dr. Lakey was a great experience for me; one that I feel was invaluable to me in my advancement."

Dr. Lakey talked about the first time he met Sanchez-Maes, "I first met Sophia in my Math Appreciation class here at NMSU. Early in the semester we were talking about women in the field of science and I mentioned that Maria Curie had won the Noble Prize for her work in radiation. A student sitting up in front of the class spoke up and said, 'She also won the Noble Prize in Chemistry' and I thought that was something someone in this class wouldn't normally know about and that student turned out to be Sophia."

He continued, "The thing I found remarkable about Sophia is how quickly she picked things up. Normally I would have to explain material at this level two or three times before it really sinks in but not with her. The amount of material we got through in one semester was a surprise to me, but her thought process and ability to absorb the material helped her along."

Following graduation in May of 2015, Sanchez-Maes will continue her education in the fall at Yale University, receiving a full-ride scholarship, which according to her is worth about $63,000, covering tuition, books, room and board and personal expenses, including trips back home.

"I received a full scholarship to Yale from top to bottom, including travel expenses home. I did apply to a few other schools but I have every intention of going to Yale. A full ride to Yale University is just something you don't turn down. I feel so blessed to have this opportunity."

She continued by saying, "I applied to Yale through a program called Quest Bridge. The program collects students from low income families with the top universities in the nation. Coming from a low income family has presented some challenges along the way. I've had to work since I was 15-years-old but it's been a real blessing at the same time because it has provided me with opportunities to enhance my experiences."

Additionally, Sanchez-Maes received two other scholarships during the process, one from the Hispanic Heritage Foundation Scholarship in Innovation and Technology and the other from The National Center for Women and Information and Technology.

Although running and mathematics are on different sides of the spectrum, Sanchez-Maes feels for her that the two complements one another. "I think math and running definitely complement each other. There is a saying that goes around the cross country world that, 'Our sport in your sport's punishment', and all of us runners say that with a sense of pride because it takes a mental toughness. So does math. It's the same kind of endurance to work through the toughest problems and running really helps me work through those ideas. I don't clear my head when I run but when I'm running I do get a type of clarity with all the jumble that is in my head. When I'm running I get some of my best ideas or if I'm hitting that cinder block wall I lace up my running shoes and go. It's a peace for me and helps me focus."

Despite experiencing so much at a young age, Sanchez-Maes can't wait to leave her hometown and see the world. "I've always thought it was weird that I lived so close to another country but I've never been outside the United States. There is so much of the world that I haven't seen and I really want to. This college experience is going to give me the opportunity to do that and more. Then one day when I do come back to Las Cruces or New Mexico. I can truly say I'm an asset to my family, myself, this community and the state of New Mexico."

Dr. Lakey said, “I’ve been on the faculty at NMSU since 1995 and during that time she is the first student I have encountered who is under the age of 18 that is working at this level. We’ve had a handful of very bright students around the same level but none like Sophia. The way I look at the world now, we need more problem solvers not just in math but in other areas and Sophia has the ability to be one of those special people that will make a difference.”

She plans to earn a Master’s degree, continue running and pursue a career in research, but will go where her job takes her, with the hopes of eventually ending up back in New Mexico. One thing is for sure - no matter what comes her way Sophia Sanchez-Maes will continue to run through those cinder block walls in search of the answer.