

“Breaking the Silence”

by: Peter Holman (Francis C. Richmond Middle School)

Interviewee: Niny Arcila-Maya (San Francisco State University)

It is a common misconception that the mathematical sciences are an individual endeavor: an activity carried out alone, and only shared with others once it is complete. On the contrary, math is a conversation, ever moving, and changing. Unfortunately, it is all too often that many people, including women and people of color, are excluded from that conversation. This is what motivated Dr. Niny Arcila-Maya to organize Pares Ordenados, a mentorship program for Latino undergrads, which is helping to bring more people into the conversation.

Dr. Arcila-Maya’s story begins in Manizales, Colombia, often known as the “city of open doors.” Nestled among coffee trees in the Colombian Andes, she learned the importance of perseverance from her parents, who nurtured her love of math from an early age. Whenever she came home from school, her parents were always excited to talk about the math that she had learned that day. She completed her undergraduate in Manizales and her master’s in Medellin, both at the Universidad Nacional de Colombia. There, she began to notice that she was unique as a woman in mathematics. While studying for her bachelor’s, she discovered that she enjoyed the language of math. However, being the only woman in many of her classes shut her out of the dialogue. In one class, she faced discrimination from a professor who pronounced that women would never be good at math. She was scared to ask questions, because if she got it wrong, it would seem like she didn’t belong.

This isolation and constant feeling of impostor syndrome would follow Dr. Arcila-Maya through the rest of her schooling, and at times she felt like her voice could not be heard. The absence of female role models at the Universidad Nacional de Colombia was particularly challenging. “Having a woman as a mentor would have been way easier,” she said. However, she was fortunate to have a wonderful male supervisor during her master’s, and after finishing her master’s program made one of the most pivotal decisions of her life: to leave the comfort and warmth of her Colombian home and cross a continent to pursue a PhD at the University of British Columbia in Vancouver, Canada.

Doing her PhD abroad was a test for her mind in more ways than one. After leaving her home, she was submerged in a cold, foreign land. The damp Vancouver climate, combined with the long distance from family, weighed down on her. There were days when she felt like giving up and going home, but she persevered and obtained her PhD, writing three papers out of her thesis.

Today, Dr. Arcila-Maya is an assistant professor at San Francisco State University, where she balances teaching and research. As a mathematician, she specializes in algebraic topology and topological data analysis, using mathematics to find patterns more traditional methods may have missed. The field requires deep understanding of complex and rigorous proofs, as well as excellent visualization of abstract shapes. Her current project at the intersection of topology and cellular biology involves finding shapes in protein networks using topological concepts.

She is also interested in the application of these tools to problems in life sciences and social justice.

Social justice and outreach in the mathematical community are topics that Dr. Arcila-Maya cares deeply about. She believes that “there is always a way to create an activity where everybody, regardless of age, can engage meaningfully with mathematical concepts.” She started her outreach work during her postdoc, where she participated as an instructor in a program that helped female high school and middle school students understand more complex math concepts through interactive activities. Her greatest outreach project, however, is Pares Ordenados, which she organized along with Maye Cárdenas Montoya and Carlos Ospina. Pares Ordenados (“Ordered Pairs” in English) is an online mentorship program to give Spanish-speaking undergrads in Latin America a chance to work with a mentor for a semester-long reading project. The objective is to connect students across Latin America with experienced mathematicians who can serve as role models in their academics—something that they otherwise may not have access to in their home country. Pares Ordenados is currently in its fourth edition and has helped nearly 100 students across 10 countries.

Furthermore, Dr. Arcila-Maya volunteers as a mentor for the AWM, helping women navigate their mathematical careers.

Whether through Pares Ordenados, AWM, or as an assistant professor at San Francisco State University, teaching and interacting with students is clearly a passion for Dr. Arcila-Maya. Her favorite part of teaching comes from the fact that she learns from her students, every day. She says that she loves when “all of the sudden...concepts click, and you can see that in their faces, because they shine up.”

As an undergraduate student, Dr. Arcila-Maya didn’t have any female role models, and as a result, she “kept silent about many things.” Through her mentorship work, she is breaking through that silence, because “that’s not how math is supposed to be. It’s supposed to be a conversation with other people, and that conversation can be so helpful for you to create mathematical ideas.” From her early years of isolation to becoming an open door for students, she believes that “you should share with people and then all of the magic will come from sharing with someone else, having that conversation, making mistakes out loud. That’s beautiful, and that’s very important.”

About the author:

My name is Peter Holman, and I am a Peruvian-American 8th grader at Francis C. Richmond Middle School in Hanover, N.H. I am currently taking Geometry, and enjoy learning about math and science. In my free time, I enjoy playing piano, practicing Tae Kwon Do, and participating on my school’s debate and Mathcounts teams, as well as doing service projects with my Scout troop.