

The Missing Puzzle Piece

by Saia Patel

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Interviewee: Dr. Mary Albert

On a frigid January day nearly five years ago, Dr. Mary Albert stood out among a panel of speakers at Dartmouth College discussing the impact of global warming on the Antarctic. The lecture drew crowds and I was captivated by the portrayals of life at the bottom of the world. Through my recent exploration of applied environmental studies, I learned that Dr. Albert was still placing the puzzle pieces of her glacial knowledge amidst global warming. I was eager to discover her life journey.

Dr. Albert spent much of her childhood roaming the outdoors in the brumal Pennsylvania weather. With a far-off look in her eye, she describes the days spent backcountry skiing and building snow forts. Consistently outpaced by her athletically built male siblings, which she lightheartedly labels as “training for the real world,” she turned to her father, a high school math teacher, who encouraged her to use intellect to outperform her brothers. She recalls finding her source of strength through the mental challenges of solving puzzles. Her confidence grew and she no longer worried about physical strength. Dr. Albert comments that “it was the simple joy of solving a puzzle” that she valued.

Although she was naturally adept in the STEM subjects, Dr. Albert pursued art at the Pennsylvania State University, but simultaneously enrolled in a rigorous differential equations course - the only art student to do so. Struggling to understand what her teachers were seeking in her artwork, Dr. Albert longed for the dependable objectivity that math provided. Shortly after, she changed her major to mathematics and quickly settled into a familiar yet equally stimulating rhythm of solving puzzles.

After graduating with honors, Dr. Albert took a position as a high school math teacher and quickly grew into her role as a respected teacher. Receiving high praises from her students, she earned a departmental award in her third year of teaching. Although she found joy in illuminating the study of math, she could not envision herself in that same position for the rest of her career. She secured a job at the U.S. Army Cold Regions Research and Engineering Laboratory (CRREL) in Hanover, NH, where she stumbled upon the beauty of applied math. Witnessing the freedom of thought that the engineers possessed simply allured her. Since Dr. Albert appreciated challenges that involved people and their surroundings, she furthered her education in engineering: “It became a transition from solving computational puzzles to finding solutions to problems where I could make a difference.”

Dr. Albert secured Army funding to attend graduate school and received her MS in engineering sciences from the Thayer School of Engineering. Knowing that she required a PhD to apply for grants as a principal investigator, she pursued a degree in applied mechanics and

engineering sciences at UC San Diego, where she encountered her first opposition to becoming a female engineer. After passing the rigorous PhD oral exam, her faculty advisor later disclosed that she was asked much harder questions than her male peers. Reflecting on this experience, Dr. Albert notes that “if the professors told me they were going to grill me harder than my male counterparts, I would have been angry and intimidated.”

Even after she returned to CRREL as a professional engineer, she faced resistance from a second-line supervisor who refused to sign off on her travel request for research. Dr. Albert would consistently find herself presenting similar instances in which her male colleagues would be approved for similar trips. Likewise, there was public opposition when she decided to form a daycare program at CRREL. One man posited that women should stay at home with their children instead of pursuing a career. Dr. Albert acknowledged that “you have to deal with that behavior, address it in a straightforward manner, call it what it is, but keep going.” Her unwavering confidence amidst the noise allowed her to stay on track, stemming from the grit she had developed while solving mind-bending puzzles.

Delighted in her newfound ability to pick projects that she was most interested in, Dr. Albert used math as a tool to further her scientific knowledge and curiosity. She was invited to Greenland by atmospheric chemists, seeking to better understand the interaction of snow in the atmosphere. She was hooked! “It was in Greenland where I truly appreciated that math is the language of nature.” Captivated by exploring the Greenland ice sheet on top of two miles of ice and snow, Dr. Albert would return year after year leading a series of polar expeditions to study the effects of climate change.

In 2016, she received an invitation from the National Science Foundation asking her to present research to the indigenous community, who were curious about the information she gathered. At the end of her presentation, Dr. Albert recommended the discontinuation of fossil fuel usage. She used her own Vermont house as an example to demonstrate how solar energy could save money for households, even in dark parts of the world. Several Greenlanders approached Dr. Albert and urged her to visit their town. Using her own funds, Dr. Albert traveled to their community to identify ways to increase energy efficiencies in order to preserve their land and culture. Intrigued by the complexity of the environmental, financial, and social components of this puzzle, she applied for a grant and secured the funding to identify solutions for communities experiencing the effects of global warming.

What’s next for Dr. Albert? She plans on completing her “senior honors thesis,” as her graduate students playfully call it. With a twinkle in her eyes, she explains that her greatest career accomplishment will be the positive impact she can make for the Greenlanders. “After spending most of my career on the ice sheet and working in the polar regions, I’m doing something different now. This project will draw my research together and could have a real impact on society.” Indeed, this may just be the most fulfilling puzzle piece in Dr. Mary Albert’s professional career.

About the Author:

Saia Patel is a junior at Hanover High School in Hanover, New Hampshire. She hopes to utilize her background in STEM research to further her interests in environmental studies and public health policy as it affects global economies. She has presented original research at the American Association for the Advancement of Science's annual conference for the last four years. Saia is also a member of multiple sectors of student life at her school, including the Environmental Club, in which students are actively implementing directives of the student-written Climate Action Plan to address climate change at the local level. Additionally, she actively advocates for gender equality and the education of girls across the world. Her other interests include coxing crew (whenever possible), hiking in the great outdoors, playing the flute, reading biographies, and listening to podcasts.