Maggie Zoerner

General Audience Abstract

My appointment at Argonne National Laboratory was inspiring, challenging, and informative. I am an undergraduate fourth-year student at Iowa State University studying meteorology and my project related closely to my area of study. I gained many new skills throughout my appointment, including machine learning techniques, technical writing, and an overall furthered understanding of the atmospheric science field.

Storm morphology can tell a lot about the atmospheric dynamics that go into storm development and evolution. Storm morphology can also tell us a lot about the impact a storm may have on its surrounding environment (i.e., tornado development, precipitation, winds). Current weather forecasting models do not accurately predict storm shape. The aim of my research was to determine whether the automated analysis of storm morphology would be feasible.

In my project, I performed image processing, statistical analysis, and machine learning techniques to develop an automated method of storm shape classifications. We grouped storms together into 4 separate clusters based on their similar shape characteristics. Each of these clusters contained storms with distinct shapes that were unique from the other clusters. Our results indicate that this technique is possible, as we were able to group storms together based on their common shapes.

I was also involved with the TRACER (Tracking Aerosol Convection Interactions Experiment) campaign in Houston, Texas. I participated in forecast discussions with the operations team that helped guide their decisions to launch operations based on the probability of thunderstorms and elevated levels of aerosols.

My experience at Argonne National Laboratory was vital as I move into my early career. I worked with tools and data that I wouldn't have had the opportunity to work with elsewhere. I made amazing, lifelong connections, and received so much support from my colleagues. I will always look back on my internship experience fondly and am interested in becoming a D.O.E. scientist in the future.