

An Interview with Dr. Lorenza Cooper

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Dr. Lorenza Cooper is a life-long Atmospheric Scientist and serves as an Assistant Professor at American Public University System. Dr. Cooper serves as a lead instructor and course developer of all meteorology courses offered at the University. In this capacity, he plans and prepares curriculum that remains relevant in a rapidly advancing discipline. His focus is on his students, and he establishes learning outcomes to best position students in a competitive career environment. For students with an interest in learning more about the weather, Dr. Cooper initiates and facilitates discussions to promote critical thinking, as well as providing quality and timely feedback to assist students in successfully achieving course objectives. We are featuring Dr. Cooper in this edition of *SESA* to highlight the connections between the atmosphere and many aspects of physical science.

Dr. Wyatt: Can you start by talking about how a career in meteorology has impacted your life, both personally and professionally?

Dr. Cooper: *All meteorologists have an obsession with the beauty and power behind weather. Hurricane Hugo inspired me. As a child I remember running to the window whenever there was a storm. Its power and strength amazed me. Ever since, meteorology has been my passion and I pursued courses in atmospheric science in school. I never knew that meteorology was a major. I saw the broadcast meteorologists on tv—many of whom were reading a script. Now I realize that meteorology is interdisciplinary, and there are linkages between meteorology, geology, and space. I became a storm chaser, and I was honored to receive a fellowship with both NASA and*

NOAA. Who knew my fascination with weather could blossom into a career? My kids have also caught the bug, and are intrigued by weather as well.

Dr. Wyatt: How do you separate prevailing thought from science and data when it comes to atmospheric science?

Dr. Cooper: *Atmospheric Science not only means the here and now, but includes a historical perspective of the past. There are weather records dating back to the 1800s. These data collections help researchers draw climatic trends. It's important to focus on the data to develop scientifically sound conclusions. In the courses I teach, I strive to create a relationship between weather and life experiences. Weather affects our lives on a daily basis. In the classroom, the theories and abstractness of weather can become*

more concrete. We can see both the national and international implications of weather on a daily basis.

Dr. Wyatt: APUS has a large number of students and a plethora of disciplines. How does weather relate to other careers offered by APU?

Dr. Cooper: *It's important to see the connections between meteorology and all major disciplines. Let me discuss a few. For careers in business, there are monetary implications to weather. For example, a wind storm would produce a prolonged power outage, affecting millions of residents. For those in the health field, flooding can cause standing water which results in unhealthy conditions. In fact, we are in the midst of a pandemic because of a temperature-dependent airborne virus, so understanding how air quality, temperature, and circulation patterns affect humans is important. Entomology, which is the study of insects, highlighted how Malaria was transported via insects. Hurricanes can affect life and property when they prevent damaged areas from receiving supplies in a timely manner. So, Disaster Relief efforts can affect the supply and demand of an area both before the storm when purchasing items and afterwards when conducting recovery efforts. A single event can affect the hotel industry, the ability to provide fuel (gas) to impacted areas, and may limit food distribution. There are many more questions to consider which impacts various careers such as:*

- *Is this impacting a town, county, state, or region?*

- *Is the weather instantaneous?*
- *Are the impacts easily addressed?*

Dr. Wyatt: There have been discussions about creating a Space Force? How will weather impact this emerging field?

Dr. Cooper: *This is another area in which weather is key, literally. Weather is the core/center between atmosphere and space. Imagine the type of weather that may be encountered as you travel through the atmosphere into space. Satellite imagery, GPS, cell phone coverage are all impacted by space weather. Solar flares can affect radio signals, and the ability to communicate from one country to another.*

Clouds cover a huge surface area of the earth, and many areas are cloud covered the majority of the year. Satellite imagery helps us understand the interactions of weather on the surface of the earth, over oceans, and throughout the "column" from the earth to the upper atmosphere. At APUS, we have courses that delve into these very facets of the earth's atmosphere to highlight why understanding space weather is critical.

Dr. Wyatt: You are currently the course creator for several atmospheric science courses at APUS? Can you tell us about these courses?

Dr. Cooper: *APUS provides several courses for individuals to expand their knowledge of atmospheric science. There are four meteorology courses—one of which is the SPST465 [Space Weather Course](#). The space weather course investigates weather throughout the at-*

mosphere such as Venus, Mars, and Jupiter. Our [SCI137, Introduction to Meteorology Course](#) (general science requirement), investigates various phenomena of weather to include tornadoes, floods, fires, and hurricanes. The course is three credits, but if you include a lab component, the course is four credits.

For the more advanced we offer a course on [Atmospheric Dynamics](#). Thermodynamics is the movement of weather from one level to another (temperature and wind). It's important to understand these fluctuations on a microscale (50 meters) to a macroscale (5000 meters).

What's great about these courses is that there is a weekly discussion forum that helps students make connections to real-time weather occurrences. For example, the latest hurricane, storm, or blizzard can affect those who have careers in Health, Computer Science, STEM, and Business.

Dr. Wyatt: Who should enroll in these courses? Are they for anyone, or just to those pursuing a degree in science?

Dr. Cooper: [Introduction to Meteorology](#) is open to everyone. This course fulfills an APUS general education requirement. I see students from a variety of majors enrolled in the course—including health, natural sciences, emergency management, transportation and logistics, and fire science. Everyone can benefit from a diverse discussion that includes a variety of perspectives.

Dr. Wyatt: How can a certificate ben-

efit someone in a closely related scientific field?

Dr. Cooper: The possibilities are endless with an [APUS certificate in Meteorology](#). APUS has many fields of study, so this certificate compliments the stellar coursework offered at the University. The courses are more than just learning about the interdisciplinary implications of meteorology. They also provide critical thinking, practical research applications, and an evolved train of thought when it comes to the atmosphere.

Dr. Wyatt: What are the connections between weather and space, artificial intelligence (AI), hydrology, air quality, modeling, oceanography, and climate science?

Dr. Cooper: Weather connects to just about every discipline. Let me give you a few examples. Artificial Intelligence (AI), can use data to create business forecasts models for energy security, solar energy, and wind energy. Many businesses will conduct a weather analysis to ensure the land is not in a flood plain before starting a construction project. Wind Farms conduct a similar analysis when searching for the best locations to create these farms. Understanding these trends over time is the very definition of climate science. Climate, which is weather over time, has never been stagnant, and continues to evolve. Water is the most precious resource, and hydrology can identify impacts when too much water (flooding) or too little water (drought) affects an area. More than 70% of the earth is covered by water, so it's also important to have oceanographers who an-

alyze sea level rise, underwater currents, and carbon dioxide trends.

Dr. Wyatt: What are some resources you have used or provided in the past to help individuals become more aware of the atmospheric sciences?

Dr. Cooper: *The field of meteorology and atmospheric science continues to expand. I encourage people to review peer-reviewed journals, such as [Space Education & Strategic Applications \(SESA\)](#), for advancements in weather.*

For atmospheric sciences, I recommend the [American Meteorological Society's](#) periodical, called the [Bulletin of the American Meteorological Society](#), for peer reviewed work. For real-time information about weather, I encourage reviewing operational meteorology web-pages such as the [Storm Prediction Center](#) (www.spc.noaa.gov) which provides around the clock forecasts and updates for the United States. In addition, many government websites provide access to data at no cost, and provide a wealth of information.