By: Abigail Ahlert

Upon arriving at the office of Professor Jeffrey Stehr, I was not at all surprised when the first thing he asked me was, “So how are you enjoying the Maryland weather?” If anyone is willing (and, indeed, excited) to talk to me about weather, it would be this professor of atmospheric science.

Stehr received his graduate degree in physics from the University of Michigan, and is currently the associate director of the brand new undergraduate Atmospheric and Oceanic Sciences (AOSC) program at the University of Maryland, College Park. He plays an active role in promoting and conducting research with the help of both graduate and undergraduate students while building the foundation for a new major.

Stehr’s research is primarily focused on air pollution and atmospheric chemistry, and his team currently holds a contract with the Maryland Department of the Environment. Their goal is to use measurements of different chemical compounds collected from a small private airplane at different positions and altitudes to model the composition of the atmosphere with more detail and accuracy than others have before. “The idea there is, with this small airplane you can get into these tiny little airports and get all the way down to the ground, then spiral up. By getting that profile with all those measurements, you get to really challenge the model in a way that it’s not used to being challenged,” Stehr said. “Most of the [original] models have been evaluated with surface measurements. Those will tell you a lot—and are relatively cheap compared to what we’re doing—but they really can’t tell you what’s going on aloft.”

Stehr and his team take the plane up on hot days in the summer, when air quality can vary dramatically. The plane heads west or south of Washington, D.C., depending on the wind direction that day. As it flies, eight different instruments measure the amounts of carbon monoxide, sulfur oxide, ozone, particulate matter and nitrogen dioxide in the air. The instruments also take readings of current temperature, relative humidity and air pressure.

These flights have been taking place for multiple years now, and the data is consistent, yet surprising. “By flying in spirals out over the mountains to the west, we can see that we have this [pollution coming over the mountains that wasn’t in the model, and that was a significant fraction of our problem,” he said. Stehr and his group of graduate students estimate that about 30-50% of the pollution in Western Maryland is coming from the Appalachian