

RISE Germany 2017 - Final Report

Name of intern: Audrey Brown

Home university: Tulane University

Subject: Earth Sciences

Guest university / institute: Leibniz Institut für Troposphärenforschung

Name of supervisor: Markus Hartmann

What is your impression of research in Germany?

I found research to be generally well-organized, with significant amounts of funding into such matters as the changing climate of our world. It appears that there are many opportunities for post-graduate academics to be able to conduct research in a variety of unique and interesting locales (people in my lab, for example, have gone on campaigns to the Arctic as well as Cyprus, Cape Verde, and a number of others).

What is your impression of German universities?

I worked at a research institute, where all of the Masters and PhD candidates were earning their degrees from the University of Leipzig, although none of them were taking classes there due to the level of their program. I found this to be interesting, as research institutes of this nature seem to be more common in Germany than in the United States, where people most commonly conduct research at University facilities.

It continues to both impress and depress me how affordable higher education in Germany is compared to the United States. When I talked with my colleagues about tuition rates back home, they were in shock. I appreciate how accessible higher learning is for all if you meet the requirements, and it is interesting as well that most of the people at my institute went directly from their Bachelor's to their Master's and then their Doctorates with maybe just a few months "gap." The great majority of graduate students in my department back home worked for at least a couple of years before returning, often out of necessity in order to pay back some student loans.

What did you find particularly interesting about your research?

My research group ultimately focused on studying the properties of clouds, particularly those above the Arctic circle, in order to determine whether there is a significant presence of Ice Nucleating Particles (i.e. tiny mineral-based or biological aerosol particles around which water droplets can freeze at higher temperatures than they would otherwise). This research was a part of a much larger research consortium that aims to study Arctic amplification, the positive feedback mechanism where changes in net radiation create a greater impact on temperature increases near the poles compared to the rest of the planet. This phenomenon is very significant to the understanding of the greenhouse gas effect and climate change as a whole, and is still not totally understood.

Describe a typical day of your internship.

Each day I would bicycle to work and arrive around 9am. Most of the time, I would collect my filter samples that I would be working with from the large freezer in the Chemistry building (I worked in the Cloud Lab). I would be running two sets of measurements, one on the cold stage Leipzig Ice Nucleation Array (LINA) and the other in the ethanol bath Ice Nucleation Droplet Array (INDA). I would begin by running blank tests on MilliQ water in order to make sure that it was freezing at sufficiently low temperatures and there was no contamination. In the morning I used only LINA and in the afternoon I conducted tests using both experimental setups.

To prepare the samples, I would carefully place the filters in tubes and add the correct quantity of water and then put the tubes in the shaking machine for 20 minutes. For LINA, there were a total of 90 droplets of one microliter each that needed to be carefully deposited via pipette onto the cold stage; for INDA, 96 droplets of 50 microliter size would be inserted into PCR trays and then carefully sealed. I would need to adjust the parameters on the different cameras and thermostats to make sure that the experiments would be correctly photographed as the temperature dropped in order to determine a rate of freezing. While one experiment

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was running I could prepare the samples for other experiments or I could use the Python scripts on the lab computers in order to calculate the quantities of Ice Nucleating Particles.

Each day, the entire staff would eat lunch together in the cafeteria at noon, followed by coffee and conversation in the breakroom, and most days I would leave by 5:30 pm.

Highlights of your stay (both personal and academic).

While staying in Leipzig for my internship, I had the incredible opportunity to travel on weekends both around Germany as well as Europe as a whole. Within Germany, I visited Berlin, Hamburg, Dresden, Potsdam, and Frankfurt, and outside of Germany, I travelled to Copenhagen, Amsterdam, Vienna, and Prague.

Being able to practice my language skills as often as possible was another highlight. From Kaffeeklatsch with my colleagues to ordering food at restaurants to the family whose flat I rented a room in, I would certainly say that by the end of the summer my command of the German language certainly improved.

I also had the opportunity to attend a retreat for PhD students in Zingst on the Baltic Sea during the last week of my stay. This was a highlight both personal and academic, as I attended many research-related workshops and even gave a presentation of my own regarding post-graduate research programs in the United States (and also had the chance to get to know many of my colleagues outside of work while playing beach volleyball during evening free times).

What is your impression of Germany in general?

I have always taken a great interest in Germany. My parents lived both in Berlin and the small town of Bad Aibling for a total of five years when my dad was in the army before I was born. They spoke very highly of their opportunity to interact with the people and the culture, and that convinced me to take German classes in high school. Before my last year of high school, we participated in a brief exchange with students from Straubing, Bavaria, and I was able to spend three weeks in Germany. It was the best summer of my life and I knew I would return someday, but I was not certain of how I would be able to do that until being awarded this internship opportunity.

There are many small things overall that I truly appreciate about Germany. I enjoy how being green and environmental is simply the way of life, from reusable grocery bags, to the intense separation to trash and recyclables. I love the quantity of bike paths here, and how easy it is to bike even from one town to another. I find where I lived to be an overall very affordable place to live, and the people were very friendly. I love city centers with wide-open walking plazas and large quantities of markets. I hope to someday be able to return again, next time to possibly work towards a graduate-level degree.

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