

**Timothy Wendorff, University of Wisconsin-Madison,
Chemistry, Universität Mainz**

Having reached the apartment my mentor had helped arrange for me in Mainz, the reality of my situation began to sink in. I was in Germany for three whole months, living by myself for the first time. For a couple of weeks in the winter I had scurried to pick internships that interested me, ask for letters of recommendation, acquire transcripts, and mail everything off to the correct people in the correct places, but even after being accepted, the whole thing still seemed somehow theoretical to me. Now that I was in Germany, everything was far more real.

The first few days took some adjustment. I learned quickly that grocery stores have shorter hours in Germany, most stores prefer cash, and that finding noncarbonated water was far more difficult than I was prepared for. I also had to quickly adapt to a public transportation system that was larger and more complicated than those I had previously dealt with.

Luckily, my lab group helped make the transition very easy. Everyone in the lab was quite friendly, and so adept at English that there were times I wished they would let me struggle with my German a little more. I was in an organic polymer lab, which also happened to be an International Research Training Group, which was partnered with labs in Seoul National University. This internationalism struck me more than anything else where, over the course of my stay, 3 other RISE students joined, as well as 3 other students from South Korea. More than anything else, this lab was perfect for opening my eyes to the broader world of research and of international collaboration beyond what I had seen before.

My own choice of project which brought me to this lab was interesting, if only because the subject was slightly different from my major at my home university. I am majoring in Biochemistry, but had chosen a project looking at functionalizing acetal polymer chains connected to an inorganic matrix. This difference in focus had the distinct advantage that I was

soon learning a whole new set of terminology and lab procedures. I learned more about modern polymer chemistry than I had before, and soon realized it was more than I would have learned without this internship, as my undergraduate curriculum would likely not have included a devoted polymer course. The advantageous nature of this became clear to me when my mentor, discussing some of her own research experience abroad, told me that it was important to do research in places that could really help you progress your own research and education beyond what a home institution could offer. I realized I had done just this; I had gone to Universitat Mainz, one of the strong centers of organic and polymer chemistry, to do research at the crossing point of those two exact fields. This again helped emphasize the importance of this internship.

In terms of the actual project, I found myself working with a huge palette of techniques. I began by synthesizing the acetal monomers. I then turned to polymerizing these monomers and carrying out polymerizations which connected the growing polymer chains to an inorganic polysilsesquioxane matrix, to form an inorganic-organic hybrid material. In both polymerizations, I was using such research techniques as reversibly addition fragmentation chain transfer (RAFT), developed to create small polydispersity in chain length.

Once these hybrid polymers were created, the true focus of the research began. Because these hybrid materials had inorganic components, they could be coated to glass surfaces. This created an easy way to perform functionalization experiments on the acetals in the organic block, as well as providing many ways to analyze the success of such functionalization. ATR-IR spectra, contact angles of water drops on the surface, which took advantage of the differing hydrophilicity of the functional groups, and finally surface quality tests, such as AFM, XPS, and the ISO cross cut test were performed. Looking back on it all, I am amazed at the great range of research methods and techniques I learned.

Of course, I did not spend all my time in the lab. There were quite a few RISE students in Mainz, and we took advantage of the rail system to travel around Germany on weekends. I got to see Berlin, ride a boat up the Rhine Valley, take a beer tour in Munich, enjoy some Black Forest Cake in the Schwarzwald, and much more. I began to get a sense of how each area of Germany had its own distinct feel, but that there was still a German culture which all shared.

The lab group also knew how to have a good time. We would regularly have barbeques, or have “welcome” breakfasts as people moved in and out of the lab. Eurocup 2008 began right after I got to Mainz, and every time Germany would play, the lab would get a crate of beers, go down to the large chemistry lecture hall and watch the game. I became quite familiar with such cheers as “Ole, Ole, Super Deutschland, Super Deutschland, Ole!”

Perhaps the most important experiences for me while working in Germany, however, were the failures. Sometimes an experiment went wrong, and there were a number of times where I found myself doing things wrong where I should have known better, as well as running into miscommunications of intent with my mentor which were not related to different first languages, but to differences in how phrases and tones of voice could be interpreted. Yet in these difficult moments, I learned to more easily accept problematic results, to deal with and try to better my own failings, and to gain a clearer sense of how I came across as a person.

As I leave, my mentor also travels to the US to present her work, of which my internship was a part, at the ACS meeting in Philadelphia. While at times I had my doubts, I am amazed at how the research came together, and am excited that it will be presented at such a meeting. I will miss Germany, I will miss my lab in particular, but I am happy to have gained a better understanding of the international scale of research, and to have grown in my own abilities as I continue to pursue what I hope will become a lifetime of research.