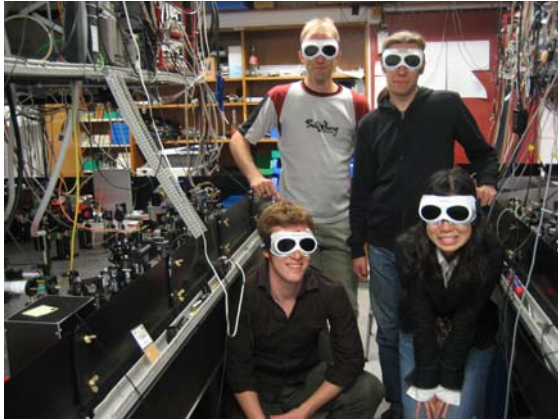


Summer in a German Physics Lab

by Robin Zheng '09



I have to admit: when I announced my summer plans to all friends and acquaintances, the exact words out of my mouth were: “I’m going to Germany for two months!”—and not, you may have noticed, “I’m going to do physics for two months” or even “I’m going to do physics in Germany for two months.” Having said that, however, I would now like to emphasize that the physics was an inescapable—and to be perfectly honest, wholly appreciated—part of the RISE experience. For me, one of the greatest things about RISE from the very beginning has always been its attitude that both halves of the program, doing research and being in Germany, are equally valuable and require equal amounts of effort from us participants. At our first colossal meeting in Heidelberg, when it eventually came down to the question of what sacrifices need be made, Dr. Schafer settled the matter with admirable and incontrovertible finality: “Work hard at your research, go out and see Germany: sleep when you go back to North America!”

I went into my research armed with a tiny bit of experience from the summer of my freshman

year, a few, mostly introductory courses in physics, and a complete lack of preparation for the vastness of what experimental research really entails. While my previous work had consisted only of straightforward data collection and analysis, I now faced something completely different. My group, whose work involves using lasers to trap rubidium atoms and raise them to highly-excited Rydberg states, wanted some way of taking a laser beam and focusing it into specific patterns with well-defined spaces in between points or foci. This would allow them either to concentrate the excitation only in certain locations inside an atom cloud, or alternatively to create several distinct atom traps at certain distances apart from each other. What we were given to work with was a half-dismantled LCD projector that had previously been used by another group, and consequently already had a missing lamp, malfunctioning buttons, and its entrails strewn about the outer shell. For us, the most important component was the projector’s LCOS (Liquid Crystal on Silicon) chip. When we projected an image on the LCOS, each pixel of the chip would rotate the polarization and shift the phase of any light passing through it, to an extent depending on the color that the pixel was supposed to display. The light would then be focused through a lens and the different phases allowed to interfere—thus producing patterns. My project was essentially to determine how well this LCOS chip could be used to make the interference patterns desired for the Rydberg experiment.

I would never have guessed the range of skills needed to tackle what seemed a relatively simple problem. It appears that any capable physicist should be able to write programs in C, Mathematica, or Matlab, examine a slab of circuitry and solder back broken wires, operate

the heavy machinery needed to drill holes through brass plates—and on top of that, of course, understand all the physics at work behind the experiment! But to my great relief, the Ph.D students supervising me were incredibly patient and supportive. They never hesitated to stop and explain exactly what we were doing. I was also thoroughly impressed by the solidarity and closeness of the group. When my supervisor first took me around to meet the people in the four different projects, I could only commit to memory the three in my own office, but by the end of my stay I had already had at least one or two conversations with all twenty-something members of the group. I was even more impressed by the pains they took to ensure that I felt included; for example, I always spent my lunchtimes in the company of some members of the group (and, if we happened to eat in the Mensa, always with the mandatory remarks disparaging the day's mystery meals). And at the weekly group meetings, when members of each project reported on the breakthroughs or problems of the previous week in order to exchange questions and suggestions, I also offered a few brief sentences on what I had worked on. My inability to speak German never presented much of a problem, since all the students spoke good or even impeccable English, and everyone was careful to make sure I understood what was going on. In fact, I vividly remember one meeting that occurred after a conference hosted by our university, in which I had been one of many volunteers manning the refreshment table (all of which were quintessentially German: pretzels, beer, and sparkling water). To my astonishment, my small presence alone was enough to make all thirty people in the room conduct the entire meeting in English! Overall, I

cannot imagine a more friendly and helpful environment to have worked in.

I will never forget the train ride I made near the end of my stay, returning from all the way from Berlin back to Freiburg. The flat yellow plains, sliced through with wind-mills ticking periodically past my window, eventually gave way to deep verdant hills festooned with clusters of tiny red roofs. As they did so, I felt a most incredible sensation of, how else to describe it? but homecoming. It was amazing to me that during a mere two months' stay I had grown to feel so attached to this part of the world. Looking at the itinerary that would lead me back to the airport in Stuttgart—a trip mirroring the one I took when I very first arrived—I was struck again by that strange sense of familiarity. All these cities whose names I couldn't even pronounce had by now sprung into life; I could picture what each train station looked like, I knew RISE students or German friends who lived in each, and for the rest of my life these cities would mean more than arbitrary black dots on the map. Maps can do nothing to even approximate the extraordinary beauty of German cities and countryside. I can't either, but I can say this: it is truly the stuff of fairy tales. Castles overlooking luscious green vineyards, delicate cathedral spires reaching into the sky, cobblestone streets rimmed with canals—everything is here, real and very much alive in a place where our very fairy tales were born, hundreds of years ago.

I know that there were far too many wonderful things about Germany for me to remember them all. Yet I can only hope I hold on to

enough that if I ever come back, it will be with a very small, but heartfelt, feeling of homecoming. To all of you at DAAD! Thank you so much for everything!!



Robin with Malek Abu Alhaj '09 who also worked in Germany for the summer