Commuting between Two Worlds

China is one of the fastest growing economies worldwide. Are science and research also in the fast lane? We talked with **LUO Yuan**, scientist at the **Institute of Coal Chemistry** in Shanxi, and **Axel Mosig**, Professor at **Ruhr University** in Bochum, who has first-hand experience working and living in China.

Interview with LUO Yuan: **"You have to be open-minded"**

Chinese student LUO Yuan, 27, is studying toward her Ph.D. in materials sciences at the Max Planck Institute for Chemical Physics of Solids in Dresden, Germany. She is currently spending her fourth year in Germany as part of an exchange program between the Chinese Academy of Sciences and the Max Planck Society. We talked with LUO Yuan about her research, the major differences in work culture between China and Germany, and her future plans.

Photo: private

How did you become interested in the exchange program?

LUO: When I studied in Shanxi, the institute pointed out to us that there was an opportunity for CAS students to take part in a joint doctoral program at the Max Planck Society. The idea immediately appealed to me. We were able to select an institute, a research field, and a supervisor who we wanted to work with. After doing some research on the internet, I filled out the application form. At that time, there were more than 50 other applicants.

What were your expectations in the beginning?

LUO: Actually, I had no clear expectations at first. But I knew that the Max Planck Institute for Chemical Physics of Solids would be a good place for my scientific research. I contacted the scientist in Dresden who was my first choice of supervisor, Marc Armbrüster, and we initially discussed a lot of issues via e-mail. On the basis of our correspondence, he invited me for an interview. At this point, I clearly knew what research I wanted to carry out during my Ph.D., and that I wanted to stay in Germany for the entire three years of the program.

What is the topic of your work?

LUO: My research focuses on nanoparticles and their role in catalysis. So far, a knowledge-based approach to improve catalysts and understand the processes involved is possible only in the rarest of cases. The reason for this is the use of very complex systems, which are hard to characterize and consist of many potentially active components.

Catalysts can be simplified by using well characterized intermetallic compounds such as ZnPd. In my work, I have tested several intermetallic compounds for their catalytic properties. Materials that display good catalytic properties will be synthesized as nanoparticles, which can substantially increase the catalytic reactivity of the compounds.

Do you remember your first day in Germany?

LUO: Yes, I do! I arrived in Dresden at the beginning of June 2010. I remember being astonished that everything seemed to be so automated: for example, we bought train tickets at a vending machine and then just got onto the train. Nobody checked the tickets – as would have been the case in China. Also, everything was clean, very quiet and well organized! When I arrived in Dresden, Mark Armbrüster met me at the train station and showed me around.

Please compare your home with your current host institution.

LUO: In China, a supervisor has a lot of Ph.D. and master's students. As a result, supervisors in China have a very packed schedule and don't have much time for each individual student. This means you have to learn a lot of things through your colleagues and the people you share an office with. Sometimes, there isn't even any time for discussions. Here in Dresden, one supervisor has roughly two to three students – so he or she has much more time to discuss your work with you in detail. And if you have a question, you can meet your supervisor or contact him or her via e-mail, so any problems tend to get solved quite quickly.

On the whole, I think there's an impressively high level of efficiency here. In fact, I work fewer hours now than I did in China. At home, it wasn't unusual for me to work the whole day as well as the weekends. But often, despite the long hours, I didn't get that much out of it.

I thought that, in terms of efficiency level, China was even higher than Germany?

LUO: No, I wouldn't say that this is the case. In Germany, you have to learn a lot of things by yourself; you have to be quite disciplined. You have to learn how to structure your research, which has taught me to become more independent.

Are there any major differences in the work cultures of the two countries?

LUO: [laughs] Well, I think the most important difference is that, here in Germany, you have to plan everything!

Did you find it easy to make friends with German or other international students?

LUO: The work environment is very international. There are students from Canada, Sweden and Korea, as well as from China. It's a genuinely multicultural environment. And we socialize quite a lot. Every Thursday, we go out for a drink or to play snooker. In the summer, we spent a lot of time in the Grand Garden in Dresden, which is a truly beautiful location. For Christmas this year, our supervisor rented a kitchen in a pub and we cooked international food – it was great fun!

By the way, I should probably mention that, although we speak English at work most of the time, I also took some German language courses. I enjoy speaking German, and thankfully my German has improved considerably over the years. My German colleagues and I now even sometimes talk German outside of work.

Is German a very complicated language?

LUO: It's a challenge! What I find most difficult is German grammar, for example, the correct use of the definite articles der, die, das, and also the right gender of German nouns. German syntax isn't that complicated.

Is there any advice you would give to Chinese students wanting to do their Ph.D. in Germany?

LUO: I would say that initially you have to be very open-minded because the two cultures are so different. And I would probably advise them to develop stronger communication skills. In China, we usually don't communicate that much. But communication is a very important aspect of German culture. For someone with an open personality, it will probably be no great difficulty to become integrated quite quickly by joining working groups or taking part in social activities.

You are going back to the Institute of Coal Chemistry in Shanxi to defend your thesis in May 2014. Do you also have an advisor at your institute in China?

LUO: Yes, I do. Last May, we arranged a meeting between my German and Chinese supervisors. My German supervisor visited the Institute of Coal Chemistry in Shanxi. He also wanted to find out whether there was an opportunity for collaboration. We spent a week at the Institute of Coal Chemistry and the Shanghai Advanced Research Institute of my supervisor in Shanghai.

Do you plan to come back to Germany?

LUO: Absolutely! In fact, I am already looking for a job here. I would really like to work in Germany.

Are you looking for a postdoc position?

LUO: Well, this is actually quite interesting: I have discovered that it might be better for me to work in the chemical industry than in academia. At the Max Planck Institute, the priority is, of course, basic research. During my studies, I came to realize that, while I am a creative person, I may not be quite so deeply analytical as some of my colleagues. So now I will try to move away from research and do something different.

Good luck with defending for your thesis and with your future career! ◀

The questions were asked by Barbara Abrell

Interview with Axel Mosig: **"To expect the unexpected"**

The German Axel Mosig has spent more than five years at the CAS-MPG Partner Institute for Computational Biology (PICB), a joint effort of the Chinese Academy of Sciences and the German Max Planck Society. He studied computer science at the University of Bonn, where he also received his Ph.D. in 2004. In 2005, he became one of the first scientists at the newly established PICB in Shanghai. Two years ago, he returned to Germany and was appointed Professor at Ruhr University Bochum. The current focus of his research is computational bioimaging and RNomics.

How did you become aware of PICB?
MOSIG: When I heard rumors about plans for a new institute in Shanghai spreading through the hallways, I was quite curious about the idea of bringing together German meticulousness with the dynamics of emerging China. So I was very glad to see when things materialized in the course of 2005, and I even had the chance to be among the group of five founding members from Germany, headed by Andreas Dress as the founding Director of PICB.

What was the initial goal of the joint effort and how has PICB evolved over time?
MOSIG: Beyond the scientific goals, PICB's mission was, of course, to amalgamate the structures of the Max Planck Society with a campus of the Chinese Academy of Sciences into a new research institute, which obviously wasn't a straightforward endeavour. Now, eight years later, this merging of research cultures is still a very prominent part of PICB, which certainly makes it a very unique place.

Scientifically, the original directions of the institute were set up by Andreas Dress and JIN Li as the two founding directors. JIN Li brought in the topic of population genetics and Andreas Dress, combinatorial phylogenetics, as well as computational topics relating to multi-label fluorescence microscopy. The latter evolved into something different over time, as plans to establish certain imaging technologies at PICB didn't work out. For me, on the other hand, as a relatively young postdoc, this created quite a bit of freedom to fill the gap. In the end, things worked out rather well, as there was plenty of space for interesting and fruitful collaborations on quantitative image analysis.

What were your expectations in the beginning?
MOSIG: In terms of research, there was a big pool of topics and ideas, and with the founding directors, it was clear that PICB would be an excellent place to do science. In terms of the surrounding setting, I had never been to China before I joined PICB, and there were far fewer foreign scientists working in China than there are today. So expectations in that respect were rather to expect the unexpected. From today's point of view, I can only say I wasn't disappointed in any respect. I remember well that reactions and advice from different people about moving to China were mixed at that time. So there was a sense of adventure from my perspective – which may have helped create the right mind-set for doing research. Considering how research conditions in China have developed since 2005, young scientists moving to China today have much clearer expectations, and there are now attractive programs for international researchers through different institutions.

Do you remember your first days in Shanghai?
MOSIG: Very intense, in a very positive sense. There was limited time between arriving in Shanghai and the inauguration ceremony of the

Photo: private

institute. So not only were the first weeks busy, but there was also a very new environment to explore and get used to, like the everyday and omnipresent competition for every inch of space on the street or the subway, or, even more challenging, catching a taxi on a rainy day with half a dozen competitors trampling on each others' feet. Actually, when you leave Shanghai, you can miss such things after a while.

What were your tasks in the beginning?
MOSIG: In the first months, there were a number of organizational matters to get the institute running, and it took some time to get fully into research. In terms of administrative tasks, it is, of course, challenging if you are reliant on someone's help to even read the title of a form. PICB's administrative office was always very motivated and helpful in solving such issues. In the end, thanks to the hard work of the administration office, there was always enough time to stay focused on research.

What have been the major differences in work culture?
MOSIG: In research, of course, work culture is also different. Although it may take a book to describe the differences, let me try to summarize as follows: The Chinese system is fabulous in filtering out talent from all corners of the country, but only recently has it started to create the structures to develop this talent into creative scientists. Working with the students we recruited from universities in China in their first months was very different from working with students in Europe or the US. Trying to coin it in a single sentence, I would say that Chinese students first want the feeling that they got some work done, and then they feel comfortable discussing it. Western students, rather, first want to discuss before they feel comfortable about getting work done. I should stress, I don't think either of these two approaches is better or worse – they're just different. And if you have different approaches, you bring forth different kinds of ideas and results, so for the diversity of science, it's good to have something from each side.

Have you been involved in teaching or applying for external grants?
MOSIG: Doing research in China obviously doesn't mean being able to escape the duties of teaching and grant writing. For teaching, PICB's curriculum for training Ph.D. students was initially a blank sheet of paper and, naturally, it took some time to find the right format that reached our students. In the end, this again gave me the freedom to create something that was quite productive for my work – teaching a small, talented and eager crowd of Ph.D. students, some of whom I could recruit to join my group. Competing for grants is also an essential cornerstone of research in China in general. The danger of the grant business is, of course, that one may end up doing research only to acquire grants, rather than the other way around. At PICB, there was a good sense of keeping in mind that the ultimate goal is scientific results, and that grants are the means by which to get to them.

How was life outside the PICB?
MOSIG: Experiencing a different culture was (and still is) a very valuable experience to me. Understanding how people with very different life experience think, eat and behave helps you understand both the benefits and also the shortcomings of your own culture much better. You can see this from the perception of traffic and eating between Western and Chinese people – when you arrive in Shanghai for the first time, you will realize that traffic is often a mess because drivers are always in a hurry and squeeze their way in through every little gap they can find. Conversely, when Chinese people arrive in a Western country, they will realize that Western food is often a mess because cooks are always in a hurry and don't take the time necessary to prepare proper food. Luckily, I'm seeing trends toward improvement in both Chinese traffic and Western cooking. Besides, I'm convinced that experiencing a different culture is a very valuable experience for interdisciplinary research as well. It is something very exciting if the other side shares the same sense of curiosity.

What about your former cooperation with Chinese scientists?
MOSIG: I keep up a number of collaborations and plan to do so in the long run. As I mentioned before, having a diversity of backgrounds and approaches is one source of inspiration.

How do younger researchers from China see their future?
MOSIG: The question of whether to stay in academia or to join a company is on their mind, as well. Development in both academia and the commercial world has been progressing at quite an impressive pace over the past years, so overall, there may be more of a sense of opportunity than elsewhere these days.

Do you follow up on the latest efforts of China to become a major scientific power?
MOSIG: Obviously, there is quite a bit of coverage on this in both the scientific and the popular press, which of course I am following with interest. My personal take is that different cultures of doing research bring up different kinds of ideas, and scientific innovation is generally not a limited resource. So, it should be perceived as good news for science that China is investing so heavily in research. ◀

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