

Winter report 2016

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Ever since I came back from Germany, I had three conferences to attend. One in Ohio right I got back; Microscope & Microanalysis 2016 meeting (M&M), one in Salt lake city; Materials Science and Technology conference (MS&T) 2016 and a week after MS&T, one in Las Vegas; American Nuclear Society (ANS) winter meeting. In this report I would like to talk about those meetings and the things I presented.

For M&M, I had only a week after coming back from Germany. The data I acquired at the lab in Germany did not really give us interesting findings, so I had to use the microscopes we have at UCI. In order to analyze the samples using the microscopes, I have to modify those samples. I decided to prepare the presentation using the samples irradiated at University of Tennessee while I was in Germany since I had too many samples and it would be easier to make a presentation using the set of samples with less variables. For the samples preparation for microscopes, I have to thin samples to the thickness that electron beam can penetrate through. Typically focused ion beam (FIB) is used for this process. Using a dual beam electron microscope we have at laboratory for electron and X-ray instrumentation (Lexi), where I work as a lab assistant, we can cut out a slice of a sample and attach it to a grid that is used to load samples into transmission electron microscope (TEM). In my project, I analyze the damage caused by accelerated ion beam in ceramic materials. TEM is very useful to observe the damage because the damage causes a distortion in the crystal structure of ceramics and appears dark in the image. The sample preparation takes about three hours per sample. I prepared 6 samples for M&M and characterized the damage. I literally worked overnight every day. For this presentation the most interesting finding was that the grains in certain materials grew under irradiation. So I focused on that result in the presentation. After the presentation, the session organizer from Oakridge national lab came to talk to me about an opportunity to use their microscopes which have a lot higher resolution than the thirty years old microscope I have been using. I really wanted to go over there and study under well experienced microscopists but since

I had so much of work to do other than that project and I had to submit a proposal to be granted the time slot to use those microscopes, which takes time to write. So my PI and I decided not to do it. Besides, at UCI, we are installing cutting edge microscopes and they are supposed to be ready soon. Thus we can just use ours instead of going all the way to Oakridge. During M&M, there were so many booths for microscope related companies and I walked around and talked to the sales persons. Since UCI purchases so many new microscopes, everyone got excited and was happy to talk to me as soon as they saw UCI on my name tag. I really enjoy this conference because I got to talk to so many researchers and scientists interested in microscopy.

Regarding the new microscopes, as a lab assistant for the facility I have been working hard to prepare the instruments for users. A few weeks ago, we had a technical training given by technicians from a microscope company TESCAN. The new microscope (scanning electron microscope (SEM)) we purchased from TESCAN is specifically modified for TEM sample preparation. The technicians showed us their tricks and the instrument is so different from the SEM we already have and I have been using (FEI instruments), so I had to get used to the interface first. After a week of training, now I understand how powerful the instrument is. It was very interesting that each company focuses on different function from the others and the users have to choose which to use depending on their priorities.

For MS&T, I really wanted to include the results from the experiment I conducted in Germany but I did not have enough data to make a presentation and it would be confusing to add them to the results from UTK. So we decided to go with the results just from UTK experiments, which essentially is same as the presentation for M&M. I added better pictures and more analysis on the samples. The presentation slides came out much better and the presentation went well. Since this is my Fourth year of my PhD, I am so used to conferences and giving presentations that I don't really get nervous before the presentations. As I go to more and more conferences, it gets less exciting to go and give a talk at a conference. That is a little bit sad but at the same time it makes me select which conference is really valuable to attend. After the conference, my PI took the whole group (only PhD students) to Bryce canyon which is about 6 hours south of Salt Lake City for the weekend. The national park was so beautiful and I had really good time.

The last conference I attended this year was awful. The ANS winter meeting in Las Vegas, My colleague and I got excited since it was in Las Vegas but the conference itself was

totally a disaster for materials scientists. All the talks are more focused on reactor management than materials aspect. We had an excellent in Vegas but we came back saying the conference was terrible, which taught us that we should think about the talks they will have more carefully.

Next year in January, I am going to a short course for high resolution microscopy in Tempe, Arizona. I have received a scholarship to attend this short course and I am really excited to learn more about microscopy. I am planning to graduate next fall and I started looking for jobs where I can use microscopes. So it is valuable to talk to people in microscopy field to make connections. I went to an information session that Intel had on campus and it made me reconsider what type of job I want to have. I initially was thinking that it might be better if I can work for a microscope company and develop microscopes but then I realized that I really enjoy working materials related projects and I don't really have an electronic skills. So currently I am looking for job in R&D and I am not specifying the field because knowing basic materials science characterization techniques will enable me to work in any fields. I am really grateful for the advice that my co-PI gave me a while ago. He told me that "A lot of PhD students get caught up on their projects (results) that might not be related to their carrier. Instead of focusing on the results you get from your projects, you should focus on the skills you can get during your PhD projects, which will be more applicable to the jobs you will get in the future." Now that I can see the end of my PhD program, I am more interested in listening how people found their jobs than before. So far my mind is set for industry not for academia, but depending on how things go I might change my mind. I am TAing next quarter and I found out that I really like teaching, so I might also consider some kind of position where I can train people. However things will go with the new president, I am really excited about the future after my PhD.

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