Margaret Dowling

Amelia Campbell and David Rasmussen

URSI ORISE, US ITER Project Office

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Final Reflection

US ITER Internship Experiences

When I joined the US ITER project for my internship, the ITER Organization (IO) in France had started working on rebaselining – changing major aspects of the scope, schedule, and/or cost. My main task at US ITER was to interview US ITER, ORNL, ITER Organization (IO), ASDEX, WEST, and Sandia National Laboratory (SNL) staff. I reviewed with them the proposed changes in the rebaselining, listened to their concerns and comments, took notes, and asked questions. To become familiar with the IO's proposed rebaseline, I analyzed reports, studies, presentations, and graphs. I also attended conferences and webinars, both domestic and international. I compiled all the information and contrasting opinions into one presentation to present to US ITER staff.

I was able to gain a broad overview of the decisions that go into a plasma fusion project and what kinds of systems function concurrently. I also talked to many fusion scientists from different fusion devices. As a result, I gained insight into the differences between these fusion devices and how they relate to US ITER. One of the main technical changes within the IO's proposed rebaseline is a switch from Beryllium plasma-facing First Walls to Tungsten plasma-facing First Walls. This change affects many different systems including plasma heating systems such as Ion Cyclotron Heating and Electron Cyclotron Heating, the Water-Cooling Systems, and the diagnostics systems. It also introduces completely new (to ITER) systems like Boronization. Through this project, I received an overview of ITER, and I gained technical experience while talking to experts in different systems.

The Department of Energy conducted an Independent Project Review (IPR) of US ITER this summer. I attended multiple technical sessions during the week of the IPR. This was a unique experience, and I am incredibly grateful to have experienced it. The office had been diligently preparing for this review since October of 2022, so it was amazing to see professional presentations and the comments and recommendations from the review committee.

I also had the opportunity to tour many of Oak Ridge's labs and historical spaces throughout my internship. I toured Frontier and Summit, the Materials Plasma Exposure eXperiment (MPEX), the Graphite Reactor, K25, the ITER Fueling Pellet Injection system (FPIS), the Manufacturing Demonstration Facility (MDF), and the High Flux Isotope Reactor (HFIR). Ray Smith - the Oak Ridge city and Y-12 historian - was my tour guide for the graphite reactor, and he told a lot of interesting stories that made me view the graphite reactor's impact more objectively. My tour guide for HFIR, Jeremy Rumsey, told me about his work as a science writer and how important it is to present data in an easily accessible way.

Science is not the only thing happening at ORNL. The people working here are not just engineers or chemists. There are also historians, journalists, administrators, arborists, and maintenance workers. One of my favorite things about working here was getting to meet all the different people who have similar passions but different paths.

US ITER / ORNL Comments and Critiques

I loved working at US ITER this summer. I was so lucky to have the expertise of Amelia Campbell and David Rasmussen guiding my internship. Amelia is incredibly personable, and I really appreciated her ability to explain concepts in a basic way without being condescending. She is one of the hardest working and best engineers I know, and outside her own expertise, she is also knowledgeable about everyone in the office. Whenever I rarely presented a question she could not answer, she was able to redirect me to someone who could. Through her mentorship, I was able to learn not only about plasma fusion, but also the community within an engineering project space. She also provided me with professional and life advice based on her experiences as a woman in engineering.

Dave was dedicated this summer to teaching me everything he could. Even while he was abroad visiting personnel at the IO, he made sure to arrange online calls so I could join his meetings and meet scientists from all around the world. He invited me to attend many technical meetings, and he was very patient in explaining the graphs I did not understand. With his guidance, I gained familiarity with technical documents and graphs at a high level. Dave is also an amazing role model and mentor for knowing what types of questions to ask and when to ask them. This is an extremely important intuition and skill that I have improved on from observing Dave.

I had an amazing time learning at US ITER, and I am so thankful for the amazing mentors and employees, all of whom were welcoming and eager to teach.

ORISE Suggestions

My overall experience was amazing, and I am proud of the work I have accomplished. There are a few things I think would make the process easier, but they absolutely did not take away from my experience, and Oak Ridge did a fantastic job managing the interns' expectations, mental health, and enjoyment. That said, I have some suggestions for the future.

It was a little confusing distinguishing between the Undergraduate Research Student Internships (URSI) and the Technical and Professional Internships (TPI) during my application process. The differences within the programs were not obvious to me. According to the ORNL internship website, the TPI "provides opportunities for… helping manage and operate research projects and activities." The URSI "provides research opportunities… by utilizing the unique resources and mentorship provided." At face value, these two are not incredibly distinct by these descriptions alone. I would encourage ORISE to put an emphasis on the strengths and differences of both programs.

Once URSI accepted my application, it redirected me to the training within the Zintellect website. This process was very understandable and easy to complete. It clearly showed how

many documents I had finished. I would, however, recommend communication about the status of the onboarding process. It may be useful to email a reminder a couple of days before each due date. Most people are finishing finals or moving during this time, so these Zintellect due dates can be difficult to keep track of, especially when every document is due on a different day.

I would have preferred the ORISE staff to email me through my assigned ORNL email once the internship started. Because I was in the office 45 hours a week, and we are not meant to check our personal emails during work, I usually only had time to check my personal email on the weekends. Throughout the summer, I would often see newsletters about something interesting (SNS tour, the safety lunch), then I would realize the event occurred a week prior. These newsletters also clogged my personal inbox to the point that it was difficult to find communication from my school. I understand the ORISE team has already received this feedback, but I wanted to join the consensus.

Around six weeks into the internship, Crystal Black scheduled a meeting with the interns to discuss our opinions on the ORISE experience. I appreciated having this meeting, but I think it would have been more useful to have two meetings over the course of the summer. Reflective meetings or surveys three weeks in and seven weeks in may give your team better perspective on how students are feeling.

The events scheduled for students were remarkably interesting and useful. I learned a lot about various aspects of science, stress-management, and professionalism. Some of my favorites were the DOE-arranged meetings. I thought the imposter syndrome one was particularly important for younger professionals. I also attended a WINGS lunch and learn called “A Path Forward… 3 Steps to Accessing Higher Levels of Performance, Peace, and Potential”. The talk was incredibly interesting, and Erin Benson was very well-spoken and engaging with his audience. I would highly recommend scheduling this as a talk for interns next summer. The Lunch and Learns were all amazing, but please understand that it might be difficult for interns to attend certain meetings in-person due to everyone working in different buildings and campuses. I would have to schedule out 30 minutes both ways if I wanted to attend a meeting on the main campus. I worked at the US ITER project office, so I felt a little disconnected from the intern community on the main campus. Something that might help in the future is a required in-person orientation advertised as a networking event.