2023

WWU Environmental Health and Safety Intern

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Western Washington University

COLLEGE OF THE ENVIRONMENT

Internship Title: Environmental Health and Safety Internship Experience

Organization Worked For: WWU Environmental Health and Safety Department

Student Name: Kevin Nolasco

Internship Dates: 03/29/2022 - 06/9/2023

Faculty Advisor Name Manuel Montaño

Department ESCI

STUDENT SIGNATURE 

DATE: 06/9/2023

2022 – 2023 Internship Report: Western Washington University

Department of Environmental Health and Safety

Hazardous Waste Lab Assistant

By: Kevin Nolasco

Overview

Growing up in Whatcom County has had its advantages as an aspiring environmental scientist. The terrain is incredible, full of hills, coniferous and temperate evergreen forests. It has an ocean coast, several bodies of freshwater and highly valuable sources of drinking water in the Nooksack River and Lake Whatcom. The wildlife is amazing, and the community is rich in a variety of cultures that anchor old and new residents to the beautiful region.

After so many years in the county, one might imagine a desire to travel to continue admiring and, hopefully, work other beautiful regions. That is precisely what I strive to do once I am graduated. Even thinking of achieving something like that is now possible because of the various work experiences I have had that are directly tied to my studies.

In the Winter of 2022, I was going into the school term with the goal of starting an internship that would finally help me get a better picture of what I would like to do as a career in environmental sciences. The study is broad and allows the student to tailor their classes to align with their interests. For me, having previously worked as a lab assistant in the wastewater treatment department for the city of Bellingham's Public Works, I genuinely saw that the impact that studying water could have for the greater community. Therefore, much of my course work since finishing that position has revolved the study of water, in regard to its physical, chemical, and biological properties.

In honest terms, the Environmental Health, and Safety Department (EHS) at WWU was not offering an official internship for academic credit, but I was determined to change that. I came to them as just a potential candidate for their open Hazardous Waste Lab

Assistant position, but they heard my argument to let me transform the experience into an internship for the program of study requirement. Once I was hired (Figure 1), I worked with Professor Manuel Montaño to make this goal into reality, and here I am, almost an entire year and a half later in the last stretch the race.

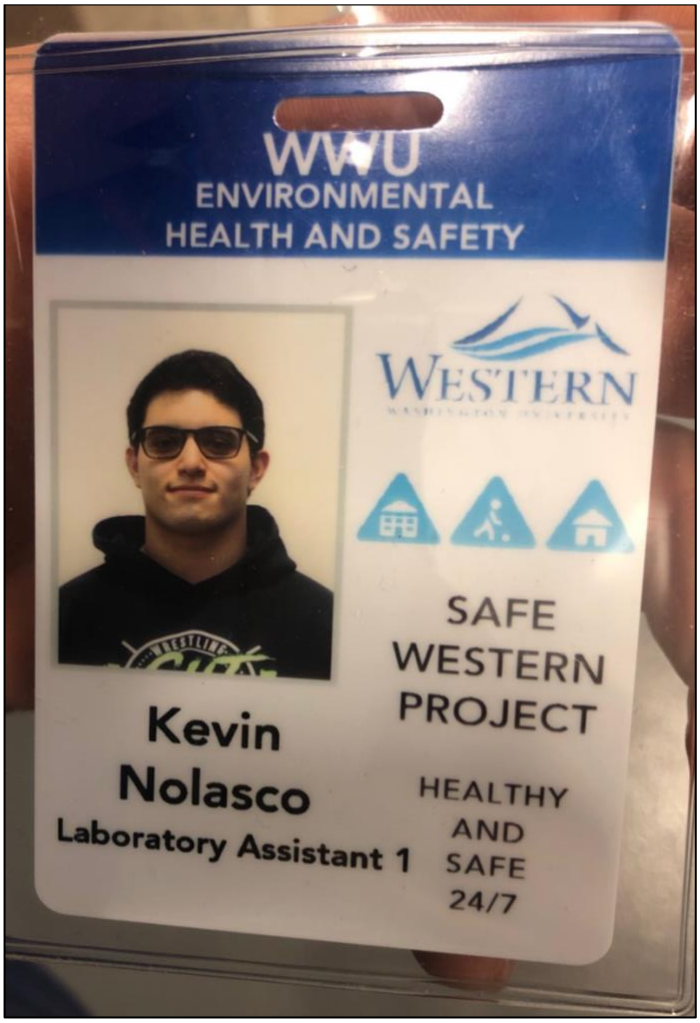


Figure 1. My official EHS ID badge.

The experience has been life changing to say the least. There was a tremendous amount of support from my supervisors, as well as a distribution of work with my coworkers who shared the same title as me. All together, we have been able to assist

the department in their hazardous waste management, safety, and the drinking water quality monitoring program.

Learning Objectives

Since the beginning of the internship, a primary objective was to continue becoming proficient in following standard operating procedures (SOPs) regarding any laboratory safety while actively working with hazardous materials. The SOPs in the lab setting included chemical safety, chemical properties, personal protection, and emergency response. Outside of the lab, the primary objective was to get familiar with the SOPs for data entry, document organization and communication through various modes, including phones, radios and driving any of three university vehicles.

Other objectives that were included in the umbrella of internship were to get familiar with respiratory training, health evaluations, and fit tests as a safety precaution in any safety department. For an EHS department, safety is the number one driving factor for any of the decisions we make. Another objective to understand the significance of the safety precautions was to under the Washington State Department of Ecology regulations and any other associated materials. As this internship involved a significant amount of independent effort and judgment, being able to recall or research the regulations was essential.

In summary, my supervisors depended on me to be responsible, communicative, and wise as the job demands a high level of professionalism. Also, the fact that I was working in an EHS department means that I learned the basic understanding of environmental health science that benefits the public. In addition, as I produced efficient

and reliable work, it ensured that the university as a whole was complying with federal and state regulations.

Job Duties

The main task as the lab assistant was to collect and characterize any hazardous wastes that were produced by academic, research or other department laboratories. This consisted of seventy percent of my time because the process is time consuming, and this task was to be prioritized as the hazardous wastes were not to be kept in Satellite Accumulation Areas (SAA) more than three days. A large amount of the waste came from the chemistry (CB), environmental science (ES), and biology department (BI), but departments such as the engineering and technology (ET) building would request waste to be picked up a couple times per quarter.

On a regular basis, the routine was to check our online database where I could see if any hazardous waste pick-up requests had come in since my previous shift. I would then type all of the requests based on sites and then print a copy to carry on my clip board (Figure 2). This would let me know which buildings to go to first to make the task as efficient as possible.

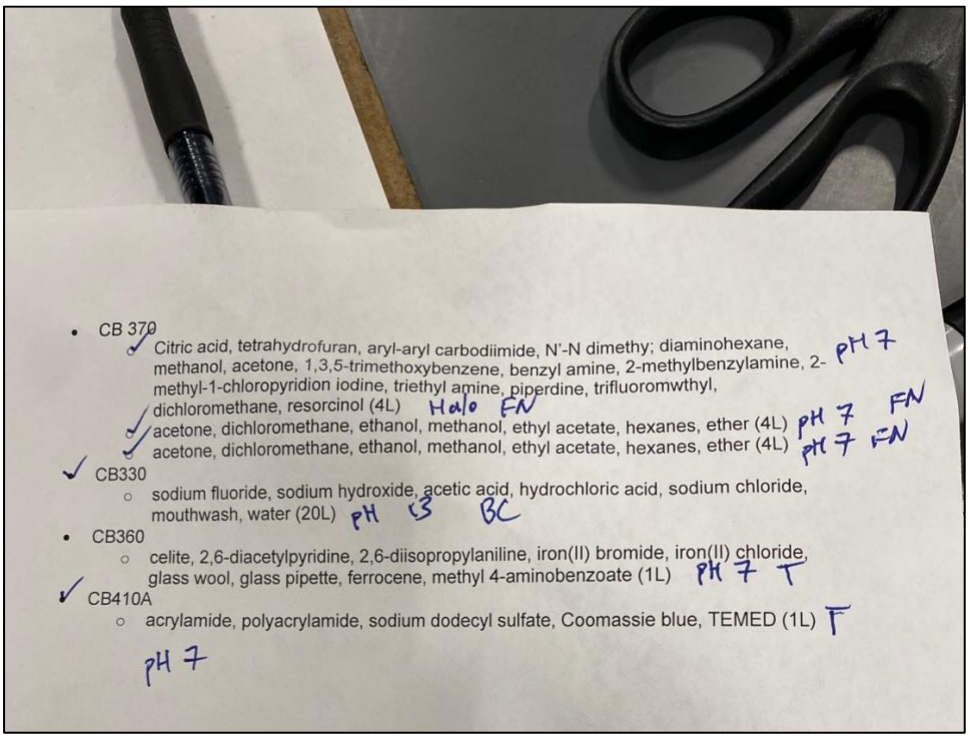


Figure 2. An example of what I would print out to carry around while I collected chemicals. This example is organized by floor level and the notes indicate the characterization I gave each container.

Once I had picked up the wastes, I would take it back to our Central Accumulation Area (CAA) and characterize it based on its contents (flammability, corrosivity, toxicity, reactivity, or oxidizable) and its pH levels. Due to our hazardous waste vendor, Clean Harbors, the exact pH would only be noted on the primary label, but each individual container would be characterized as either acidic corrosive (pH 0-4), basic corrosive (pH 10-14) or neutral (pH 5-9) using our waste pH sticker labels (Figure 3). It was important that the primary label had listed all the important information of the generator, names of every chemical, an initial fill date and properties checked off.

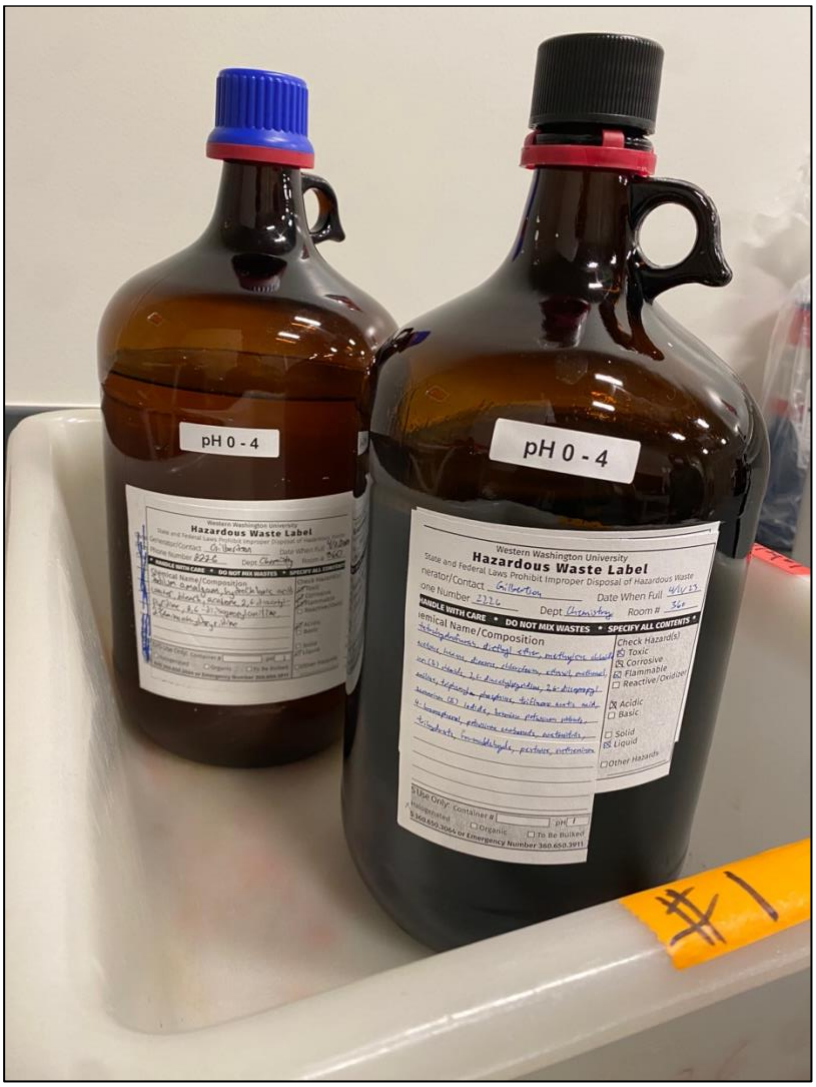
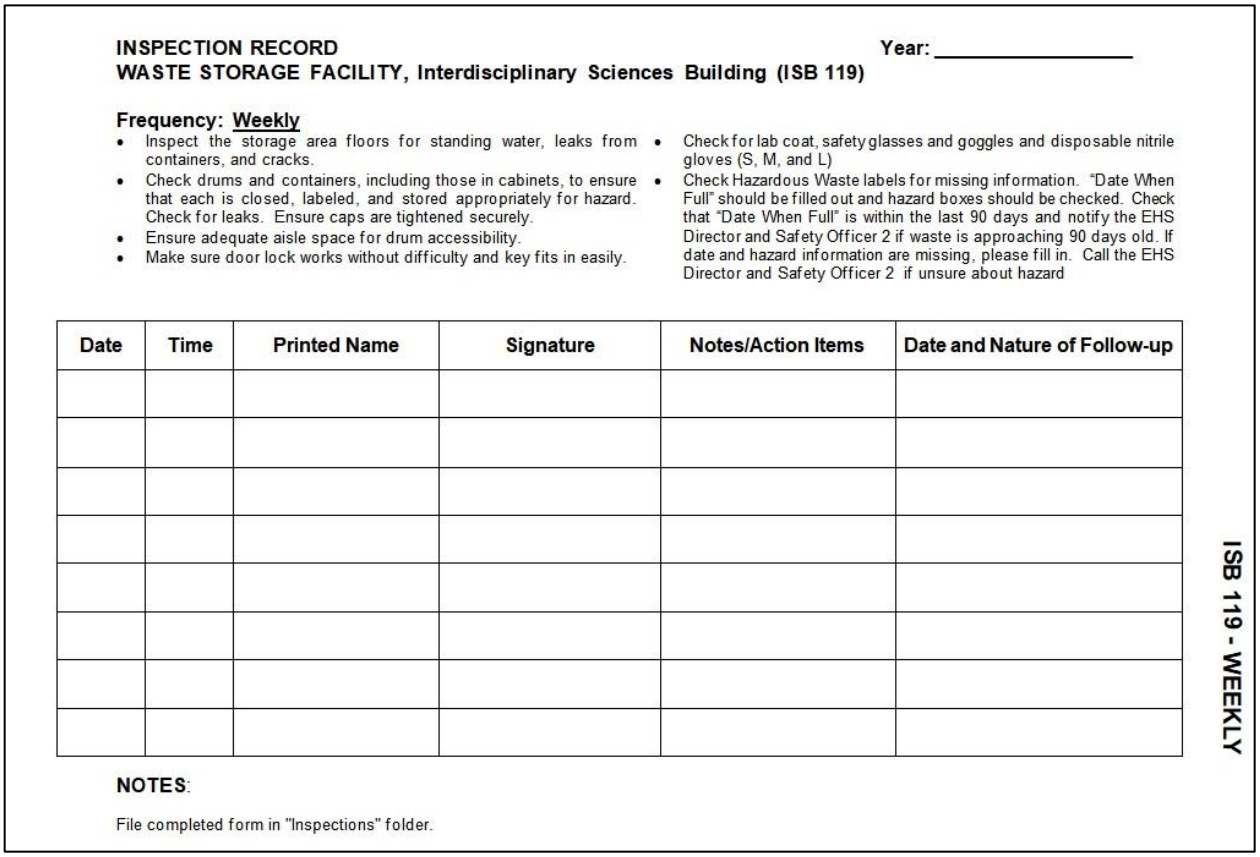


Figure 3. Representation of characterized hazardous waste. These specific bottles went into our flammable, acidic corrosive section.

Another important duty was to ensure that chemical waste storage facilities were well maintained through weekly inspections. If something was wrong, such as label was missing or a container was leaking, it was imperative to make of a note and report it back to my supervisors. These inspections were split up between On-Campus Inspections and Off-Campus Inspections. On-campus facilities included our CAA in ISB 119, CB 141 (our previous CAA prior to 2022), BI 131A, BI 240 (Biology Stock Room),

ET Sheds (discontinued at the end of 2022), and Fine Arts (FI) 241 & 240. As we inspected each site, we would fill out inspection documents (Figure 4). These documents were tailored to each site and reminded us of where to find the inspection site, what to look for, date and any notes of what was observed.



INSPECTION RECORD **Year:** _____
WASTE STORAGE FACILITY, Interdisciplinary Sciences Building (ISB 119)

Frequency: Weekly

- Inspect the storage area floors for standing water, leaks from containers, and cracks.
- Check drums and containers, including those in cabinets, to ensure that each is closed, labeled, and stored appropriately for hazard. Check for leaks. Ensure caps are tightened securely.
- Ensure adequate aisle space for drum accessibility.
- Make sure door lock works without difficulty and key fits in easily.
- Check for lab coat, safety glasses and goggles and disposable nitrile gloves (S, M, and L)
- Check Hazardous Waste labels for missing information. "Date When Full" should be filled out and hazard boxes should be checked. Check that "Date When Full" is within the last 90 days and notify the EHS Director and Safety Officer 2 if waste is approaching 90 days old. If date and hazard information are missing, please fill in. Call the EHS Director and Safety Officer 2 if unsure about hazard

Date	Time	Printed Name	Signature	Notes/Action Items	Date and Nature of Follow-up

NOTES:

File completed form in "Inspections" folder.

ISB 119 - WEEKLY

Figure 4. The inspection document used when inspecting the CAA in ISB 119.

The Off-Campus Inspection sites were all based at Western's Physical Plant (PP) where most of the facilities management (FM) was stationed. We would inspect the FM Loading Dock, Paint Shop, Battery Storage, and Marshalling Yard Building.

On a monthly basis, we would also inspect forty automated external defibrillators (AED) all around campus. The inspection itself was simple, we would come up to the AED cabinet, open it with special keys that wouldn't set off alarms and inspect that the electrodes were not expired, and that the AED battery had enough charge. If anything was wrong, we would make a note and notify our supervisors as early as possible. A majority of them were in any major building that were publicly accessible, but some of the AEDs had to be shared, for example, the AED in Artzen Hall is meant to be shared between that building, but also the ES and ET Buildings. From our inspections, some of the "cooler" sites were actually in vehicles, specifically, the University Police vehicles. On an average day, there is supposed to be four police vehicles equipped with fully functional AEDs.

The task that was not very fun but was inevitable is called chemical bulking. This referred to taking anywhere from 20-30 chemical waste bottles within one of our characterization categories and bulking them into a single 30- or 55-gallon drum. The 30-gallon drums were intended for bulking smaller amounts of wastes and vice versa for the 55-gallon drum. In any bulking session, we would wear our normal PPE (lab coat, gloves, proper attire), but also, we would need to wear our heavy-duty respirator masks. These masks had cartridge filters that did not let in organic vapors nor acid gases and a majority of what we bulked was organic or acid liquid chemicals.

One of the longer-term projects that EHS has been conducting since 2019 is the drinking water quality testing of lead on campus. It was a compilation of tasks that complied with EPA regulations to practice safe drinking water management. Although many sites of campus had been sampled in 2008 and 2013, there was a request to

expand this to vulnerable buildings built prior to 1988 and between 1988-2011. The goal was to have sampling completed in close to 1600 sites before December 2021, but the pandemic delayed that by an entire year.

Throughout the first half of my internship, EHS would take advantage of intersessions such as holidays, Winter, Spring and Summer breaks to do a majority of the residential buildings. Therefore, it was my responsibility to sample as many dorms as possible and public sinks or faucets. I would also sample other sites in other buildings, but a majority were in the residential buildings. After taking initial sample readings, if the concentration of lead came back higher than our limit of 15 parts per billion (ppb), we would go back to that site and collect a flush sample, where we would let the sink run for thirty seconds before collecting into our containers. This method indicated if the lead was coming from the plumbing or some other source. Which was important for later actions such as signing or replacement of plumbing.

My final task with the drinking water monitoring was to analyze the data from the 1600 sites to find any “hotspots” and make a report regarding them. Then, I would place temporary signs (Figure 5.A) at the sites that had confirmatory high concentration reading. These temporary signs would stay until FM could make a permanent sign stating that the faucet was non-potable (Figure 5.B) or to request the faucet to be replaced. Out of the 1600, only nineteen of them had limits above 15 ppb and were permanently signed as non-potable. There was four sites that had a high flush sample reading; therefore, they had the faucet replaced and were later sampled with concentrations below the limit.

Figure 5. A. A sink in the Academic Instruction Center East, room 232, that has been temporarily signed as non-potable. B. A sink in the Physical Plant, room 212, that has been permanently signed as non-potable.

From the various job duties that I had to do; this was the most rewarding. I was able to work with an important resource with drinking water in a public health setting. Even though we had to send our samples to be analyzed by an outside contractor, the project entailed various practices that an aspiring environmental scientist finds interesting. There were a lot of inter-departmental interactions that confounded the necessity for effective communication. The fact that the pandemic required the project to be delayed by a year made deadlines an important matter to keep in mind. While it may have been nice to take time off from school and work during intersessions, the drinking water sampling was an important issue that was going to help EHS and WWU move forward and improve safe drinking water management.

Going into my last quarter of the internship, I was given the responsibility of training our in-coming lab assistants that would be following in my footsteps and taking over once I graduate. My supervisor asked me to prepare a PowerPoint presentation that covered all the important tasks that would be expected of the lab assistants. This presentation included getting familiar with Washington Administrative Codes (WAC) that referred to proper handling of hazardous wastes. I provided links to each WAC and examples of how the WAC was being actively practiced on campus. An example was the WAC regarding universal wastes, universal wastes included batteries and lamps. These typically were produced by multiple departments, including non-laboratories. Ultimately, the new lab assistants would be familiar with these WACs and always have an easy way to refer to them if they needed a refresher.

Another training module I worked on up until the last week of my internship was to prepare the entire campus on how to properly handle hazardous wastes. This training included basic chemical safety, proper identification, toxicology, PPE, photos of what an SAA should look like, how to properly store chemicals after requesting a pick-up from EHS and more. This training will later be implemented as an annual requirement for all laboratories to complete if they were to produce hazardous wastes.

Finally, the very last task that was given to me was to create a SOP that outlined the proper ways to dispose of peroxides and peroxide-producing chemicals. I used research articles to properly learn how these chemicals affect public health, textbooks to understand the best practices and methods to dispose of them and some templates given from other university EHS departments. The importance of this SOP is because these chemicals are commonly used in our labs and since they are highly reactive, they

need to be carefully disposed of. The SOP included three main methods of removing the peroxides, one is to pass them through activated alumina, another was by treating with molecular sieves and the final method was removal through the reduction with ferrous sulfate.

Academic Preparation

The manner that my education at WWU prepared me for this internship has been reflected in almost all of the job duties that were expected of me. A basic requirement for the internship was to have done or currently doing the organic chemistry series. When I was hired, I was finishing up the first lab course in the organic chemistry series. I had to work with various chemicals, a majority being organic, but also other chemicals with other properties. The multiple lab courses I took had reinforced the concept of safe lab technique and behavior. This was a must as I was dealing with hazardous chemicals, where I would be transporting them through public hallways or roads. I was to be focus as could because the health of my community could be at risk if I wasn't.

It was tremendously useful that I took courses such as Water Quality, Toxicology and Watershed Biogeochemistry, which all contributed to my knowledge of how contaminants can travel through the environment. It prepared to take on the responsibilities that came of the drinking water quality program. It was a demanding project and my supervisors heavily relied on my ability to following SOPs, communicate, write reports ,and research concerns. It reinforced the values of EHS and mine because I want to be a reliable source of information for my community.

Having written so many lab reports for classes, it was great to practice that in a professional setting where my work would be critiqued by an employer rather than a professor. I was able to read my supervisor's reports and learn from their methods and technique. It is safe to say that writing a report that could be read by thousands of people demands a higher quality of writing. I came prepared but I left humbled.

My final point, reading. The amount of reading I had to do through my academic studies was reflective of how much I would be reading for this internship. If it wasn't an SOP, I would be reading something else. All of which were complex and advanced in their format and vocabulary. Many of the reading I had to do multiple times because it was expected of me to be able to fully understand a procedure before I could perform it. Having written SOP for peroxide-forming chemicals meant that I had long hours of reading to do. These reading included research articles, textbooks and previous SOP templates that would help me complete the task. It was that way for almost everything that we had tasked. I am glad that my professors assigned fifty pages of reading for a week because sometimes I had fifty pages to read in two hours while at EHS.

In summary, my time at Western as a student has tailored me into the scientist, I will become one day. It has been a rigorous journey, full of good and bad moments that will ultimately guide me through the science field. The internship and academic courses worked hand-in-hand to let me learn the knowledge and then apply it to a branch of environmental health sciences. I only wish I could do it longer, but I am grateful, nonetheless.