

This report should be submitted within 2 weeks after you return to Japan. Please do not change the formatting

(Abroad • Domestic) Internship report form (Student)

2024/04/05 (Year/Month/Day)

Name	Nyein Chan Soe
Laboratory	Toxicology
Year (Grade)	D4
Internship institution	United States Geological Survey (USGS) Eastern Ecological Science Center (EESC) at the Patuxent Research Refuge
Internship period	Internship period: 03/18/2024 - 03/31/2024 (Departure Date from Sapporo: MM/DD/YYYY, Arrival Date in Sapporo: MM/DD/YYYY)

• Purpose and the reason why you chose this institute

The primary goal of the activity at the USGS EESC at the Patuxent Research Refuge is to gain a unique and hands-on learning experience, fostering the development of practical skills and theoretical knowledge in the understanding and assessment of the impacts of environmental contaminants on ecosystems and wildlife.

Several reasons motivated me to choose the USGS EESC at the Patuxent Research Refuge for the internship. The USGS EESC has a specific emphasis on ecological research, making it an ideal setting for an aspiring eco-toxicologist. The Patuxent Research Refuge offers a variety of ecosystems, including wetlands and wildlife habitats, providing a diverse range of environmental conditions for studying the effects of contaminants. This diversity will allow for a comprehensive investigation into the interactions between pollutants and different ecosystems. The center is equipped with state-of-the-art laboratories and research facilities, offering access to advanced technologies and instrumentation used in eco-toxicological studies. This exposure is crucial for gaining hands-on experience with the latest tools and methods in the field. The USGS community at the Patuxent Research Refuge comprises experienced scientists and researchers who are actively engaged in collaborative projects. Being part of this community will gain the opportunity for mentorship, collaboration and knowledge exchange, enhancing my learning experience. Since this internship is to gain a balance between educational development and practical application of eco-toxicological principles, this combination will enhance my skills, knowledge and prepare them for a successful career in

ecotoxicology.

- Result of the activity (about 800 words, provide photos, tables and figures that clearly show the activities during the period)

EESC is located in the Eastern U.S. with main laboratories in Maryland, West Virginia and Massachusetts. Recently, EESC in Maryland is the combination of two science centers: Patuxent Wildlife Research Center and Leetown Science Center. Patuxent Research Refuge established in 1936 under the executive order by President Franklin Delano Roosevelt to further the purpose of the Migratory Bird Conservation Act. Leetown Science Center has established as the U.S. Fisheries Experimental Station under the Department of Commerce, Bureau of Commercial Fisheries in 1931. The center transferred to the Department of Interior in 1939.

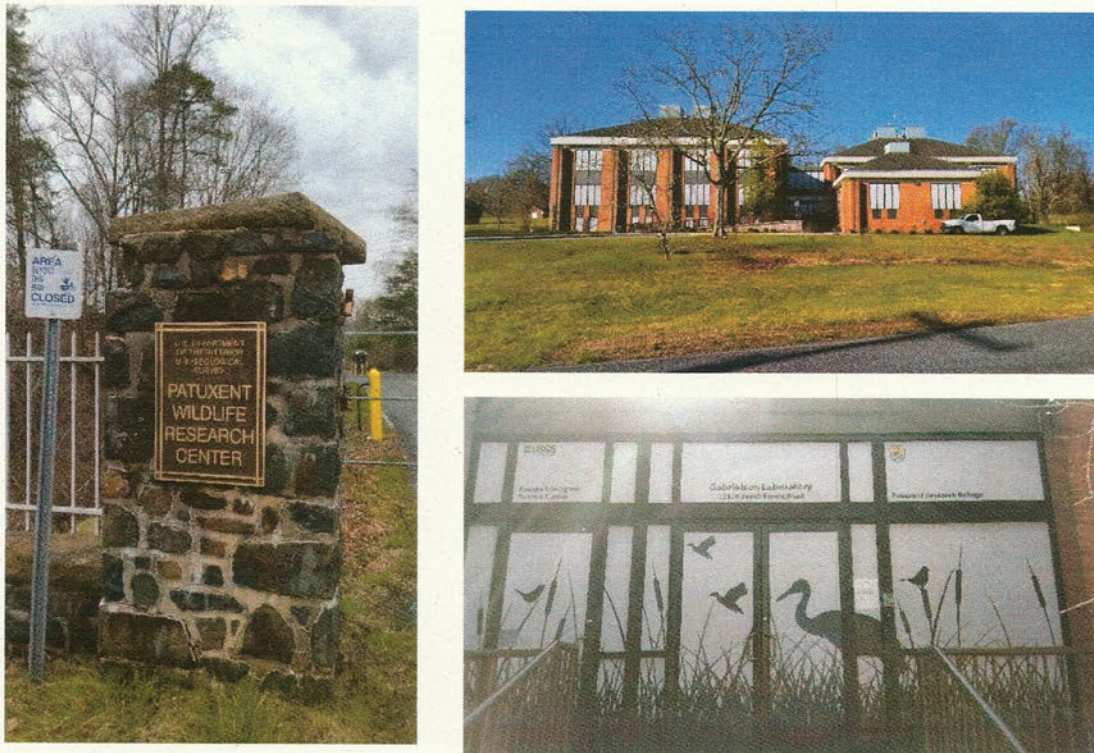


Fig 1. Eastern Ecological Science Center (EESC) at Patuxent Research Refuge

EESC in Maryland has focused on 6 key areas: Quantitative Methods and Decision Science, Species Population Dynamics and Surveillance, Animal Health Diagnostics and Surveillance, Ecological Patterns and Process, Fish Passage Design and Analysis and Remote Sensing and Geospatial Analysis.

My internship at EESC falls under the Animal Health Diagnostics and Surveillance unit which focuses on disease ecology, ecotoxicology, fish and wildlife physiology. Its unit is organized with unique facilities and resources including BSL-3 Laboratory, PFAS Laboratory, Environmental Chambers, Wet Labs, Research Ponds, Mesocosms, Avian colonies and facilities, and Veterinary Hospital. Under Dr. Barnett A. Rattner supervision, my internship has done at Avian colonies and facilities and Veterinary Hospital.



Fig 2. American Kestrel pans for ecotoxicology study at EESC



Fig 3. Duck pans and colonies at EESC

Arriving in the United States on March 18th was the start of an exciting journey into the world of ecotoxicology research. The next day, March 19th, was full of introductions to Ecotoxicology Research at the Environmental and Ecological Sciences Center (EESC), followed by a fascinating tour of the Veterinary Hospital. This helped me understand how environmental science and veterinary medicine come together.

The days that followed, March 20th and 21st, were all about getting

hands-on experience in the laboratory. I did various activities like preparing Microsomes and conducting assays such as the EROD metabolic assay, IgY assay, and T4 assay. These practical sessions gave me valuable insights into the methods needed to study biochemical, molecular toxicology, ecotoxicology, and physiology, laying a strong foundation for further learning.

March 22nd was especially interesting as I visited the Bee lab. We had enlightening discussions with Sam Droege, which helped me understand the importance of native bees in the United States. Learning about the vital role these bees play in ecosystems gave us a better perspective on conservation efforts and protecting biodiversity.

On March 25th, my focus turned to academic presentation. I made a research presentation titled "Assessing the efficacy of phosphate and lime amendments on bioaccumulation and toxicity of various forms of lead" and got a fruitful discussion with researchers from EESC. I also visited a crayfish and amphibian facility, where I learned about exposure studies that help me understand how environmental contaminants affect aquatic organisms.

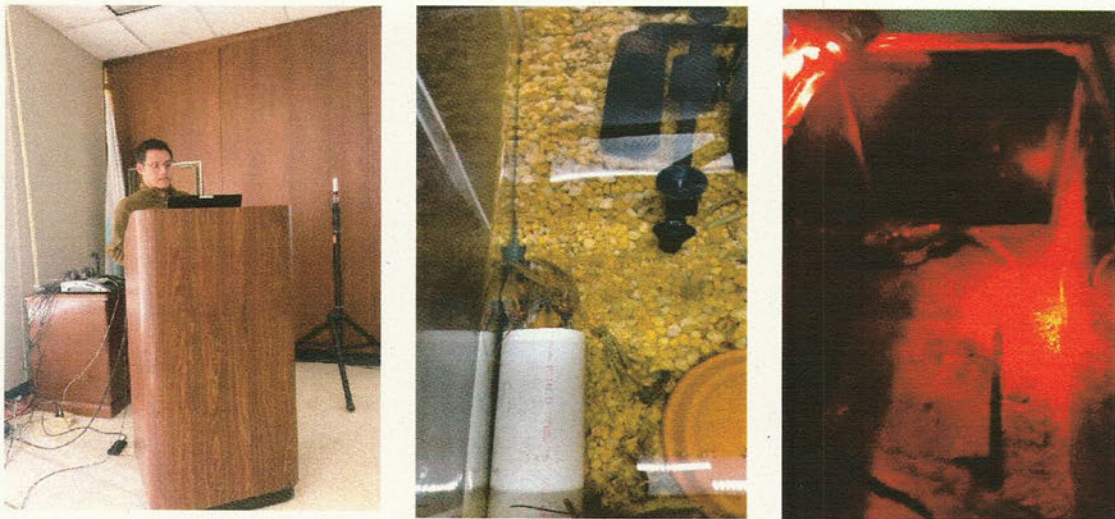


Fig 4. Presenting at EESC (Left); Cray fish exposed with aluminum contaminants water (Middle) and amphibians' exposure study using spotted salamander (Right)

March 26th was dedicated to essential training, where I had a first aid class tailored for field study. This training is crucial for conducting research in different environments, ensuring my safety and preparedness for any unexpected situations.



Fig 5. First aid training for researchers who will conduct field study at EESC

March 27th and 28th gave me the chance to visit animal colonies and review husbandry practices. Under the guidance of Dr. Glen Olsen, I also participated in sea duck health checks and vaccinations. These hands-on experiences highlighted the importance of animal welfare in research and conservation efforts.



Fig 6. Checking health of one of sea ducks from colonies (Left) and Hospitalized American kestrel (Middle) and Screech Owl (Right) from Vet Hospital at EESC

A memorable moment on March 29th was a stimulating discussion with Dr. Barnett A. Rattner. I also had a brief visit to a transmitter craftsmanship facility at Microwave Telemetry, Inc. This gave me insights into innovative technologies used in wildlife tracking and monitoring, deepening our understanding of animal behavior and ecology.



Fig 7. Photo with Dr. Barnett A. Ratter (Left) and Performing in vitro assay (Right) at the laboratory

From research and practical training to engaging discussions, it was clear that this journey had enriched my understanding and skills in ecotoxicology research. The exchange of knowledge and hands-on experiences not only broadened my horizons but also gave me a deeper appreciation for the connection between environmental health, wildlife conservation, and human well-being.

- What do you think the positive impact of the activity will have on your further career path?

The experience will not only enhance my knowledge and skills but also pave the way for further research with significant implications for environmental health. Hands-on experience in conducting fieldwork and collecting data in a real-world ecological setting will serve as a solid foundation for further research endeavors. Working closely with seasoned researchers and

scientists at the center will be invaluable, offering insights into cutting-edge research methodologies and fostering a spirit of inquiry. Moreover, the exposure to state-of-the-art technology and research equipment during the internship will expand my skill set. The networking opportunities will serve as a valuable resource for collaboration, knowledge exchange and potential partnerships for further research projects. Since my career path in the future will be a researcher or faculty member in the veterinary ecotoxicology field, the experience at the center will not only contribute to my personal and academic growth but also position me as a more capable and informed contributor in safeguarding environmental health allied with one health.

- Report how your activity could link to One Health Approach (If applicable)

If you also conducted OH onsite training (Ally Module4), please describe some of the examples of One Health approach you implemented in your activity. Or explain the possibility(ies) how you could link this activity to One Health approach for your future.

My internship at EESC under the Animal Health Diagnostics and Surveillance unit has provided me with a comprehensive understanding of ecotoxicology research, closely linking environmental health with veterinary medicine. Under the guidance of Dr. Barnett A. Rattner, my internship involved working with Avian colonies and facilities and the Veterinary Hospital, gaining practical experience in disease ecology, ecotoxicology, and fish and wildlife physiology.

Beginning on March 18th, I immersed myself in ecotoxicology research, engaging in hands-on laboratory experience and academic presentations. Visits to animal colonies such as duck pan and kestrel pan and engaging in discussion with experts like Dr. Barnett A. Rattner highlighted the interdependence of environmental conservation and human health, emphasizing the concept of One Health.


Through my internship, I've developed essential skills in biochemical and molecular toxicology, ecotoxicology, and physiology research methodologies. Additionally, exposure to cutting-edge technology and collaboration with seasoned researchers has broadened my horizons and positioned me for further research endeavors.

Looking ahead, the positive impact of this experience on my career path is substantial. It has equipped me with the knowledge, skills, and network necessary for future research in veterinary ecotoxicology. By aligning

environmental health with the One Health approach, I am better prepared to contribute to safeguarding environmental well-being and promoting human and animal health in my future endeavors as a researcher or faculty member.

Advice for your junior fellows

- Approach your internship with enthusiasm and an open mind.
- Take full advantage of the unique facilities and resources available within the place that you will go for the internship.
- Engage in discussions and seek mentorship to deepen your understanding and broaden your professional network.
- Understand the importance of One Health in addressing human, animal and environmental health.
- Prepare and deliver research presentations and engage in fruitful discussions with researchers.
- Overall, let your internship experience serve as a platform for personal and professional growth.

Approval of supervisor	Institution • Official title • Name
	Graduate School of Veterinary Medicine
	Professor
	Mayumi ISHIZUKA 

※1 A certification form from the host should also be submitted.

※2 The Career Path Committee will first confirm the content of this report and report will be forwarded to the Educational Affairs Committee for credits evaluation.

